



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

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

March 2015



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

SONARGAON PAURASHAVA MASTER PLAN: 2011-2031

STRUCTURE PLAN

URBAN AREA PLAN:

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

WARD ACTION PLAN

March, 2015



SONARGAON PAURASHAVA
SONARGAON, NARAYANGANJ

SONARGAON PAURASHAVA MASTER PLAN: 2011-2031

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PREFACE

Bangladesh has been experiencing rapid urbanization in the last four decades where level of urbanization has reached from 7.60% 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, Sonargaon 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 Sonargaon Paurashava.

Master Plan of Sonargaon Paurashava has been prepared following the pre-requisite of the Local Government (Paurashava) 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 and 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. Paurashava 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 Sonargaon Paurashava together with land use control and effective management of service facilities.

The Paurashava 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 Sonargaon Paurashava will be necessary to implement this Master Plan successfully and make this Paurashava developed and livable. I hope Sonargaon Paurashava will be a model Paurashava in Bangladesh through building itself green and sustainable by successful implementation of this Master Plan.

(Md. Sadakur Rahman)
Mayor, Sonargaon Paurashava

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, Plan for urban services 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 Sonargaon Paurashava, guided by the LGED under Package-01 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.

Sonargaon Paurashava is located within and on the north-east part of the Narayanganj zila at a distance of 15 km. from the Narayanganj City Corporation. Sonargaon Paurashava was established in 25 April 2001 as ‘C’ class Paurashava. Total area of the Paurashava is 8.53 Sq.km. with 60 mahallahs, 22 mouzas and 9 wards. Sonargaon, the administrative centre of eastern Bengal under the Muslim rulers of Bengal survives at present in the name of an Upazila in the Narayanganj district and the 'golden village' (its literal meaning) is now a township about 27 kilometers to the southeast of Dhaka. Sonargaon, also known as the old Sonargaon is the former capital of Bangla. Sonargaon was the place for Deva Dynasty till the 13th century. And from then until the coming of Mughol, the fascinating Sonargaon was the capital of Sultanate of Bangla. The ancient monument and the remaining are still seen there, the tomb of Sultan Ghasiuddin, the shines of Shah Abdul Allah and Panjpirs, and there is a beautiful prayer house at Galdi. The historical panam city located in this area. The Panam city was established as the commercial

center of cotton at the time of British. After a riot in 1965, Panam City became almost vacant place. This is indeed a historic place needs for preservation. There is Lok Shilpa Jadughar (Folk art & craft museum). This museum is one of the attractions to the visitors. Folk art & craft museum was established by the most popular Joynal Abedin in 1975. This house was actually known as the Bara Sagar Bari which came into existence in 1901. Sonakanda Fort and Khsnagar Dighi are other beautiful places for sightseeing. Sonargaon needs both national and international help for its preservation.

The Upazila Towns Infrastructure Development Project (UTIDP) of LGED requires that one of its outputs is a comprehensive set of plans for Sonargaon 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.

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, Traffic and Transportation Plan, Drainage and Environmental Management Plan and Plan for Community Services.

The Paurashava is mainly built up area around 46.27% land are under residential use and 33.07% agricultural land. Considering the development pattern and for effective development control 46.27% land has proposed as residential, 4.75% industrial, 0.97% commercial use.

Within the Paurashava area there is 76.67 km of roads of which Pucca road is 34.06 km, Semi-pucca road is 16.67 km and Katcha Road is 26.94 km. For efficient accessibility total, 79.24 km roads have been proposed for improvement within the Paurashava of which some are fully new road and others are road widening.

There is only 1.13 km drain within the Paurashava which is not sufficient to solve the drainage problem of the Paurashava. For effective drainage system, a planned drainage network has been proposed. About 73.88 km drain is being added as a proposal of which 6.03 Km are primary drain, 23.58 Km are secondary drain and 39.27 Km are tertiary drain.

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.

MASTER PLAN REPORT FOR SONARGAON PAURASHAVA

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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 Introduction

At present the rate of urbanization in Bangladesh is very high. Between 1961 to 1981, the average urban growth rate was 8%. The present average growth rate is about 4.5%. According to the population census of 2001, the share of urban population was about 23.29% and at present it is approximately 25%. By the year 2015, the share of urban population will be about 37% of the national population. The importance of urban development is emphasized in terms of its role in the national economy. More than 60% of the national GDP is derived from the non-agricultural sectors that are mainly based in urban areas. Again, the most foreign exchange earning sectors, like, garment and knitwear enterprises are agglomerated in urban areas. These sectors earn over 70% of the foreign exchange. Remittance is also a major sector of foreign exchange earning and a large share of the remittance goes into the purchase of urban land. Surplus remittance is invested in business and manufacturing located in urban areas. These phenomena indicate the increasing role of urban areas being played in the national economy. The expansion of urban economy leads to the growth of urban population and concomitant haphazard urban spatial growth without planning. The rapid urbanization is marked by the creation of Paurashavas, whose number at present stands at 312. Paurashavas are created not only to provide urban services to their citizens, but also to create a livable environment through development of planned and environmentally sound living space.

The present infrastructure provisions in the Paurashavas are in a precarious state. Drains are mostly clogged that can not drain out water during heavy rains and natural drainage systems have either been filled up or occupied by land grabbers creating water logging during monsoon. Traffic in Paurashavas is increasing day by day with the increase in population and demand. But the substandard road network can not keep pace with the growing demand for movement. As a result, congestion becomes a common problem. Road networks are not developed in planned and systematic way leaving room for traffic congestion that increases economic loss to the people due to travel delay. The land use development in the Paurashavas is unorganized and unplanned, which is a major source of environmental deterioration. Building Construction Rules are not effectively enforced in the Paurashavas mainly for want of a well formulated Master Plan and qualified planning professional.

Under the above circumstances, it is high time to think about solving the problems of the Paurashavas that might otherwise be emerged critically in the future. To overcome all likely problems to come in future, the Paurashavas should go for planned development through preparation and implementation of a Master Plan. The Master Plan can be prepared exercising the power conferred to them by the "Local Government

(Paurashava) Act, 2009". The Upazila Town Infrastructure Development Project (UTIDP) aims to prepare Master Plan for 223 Upazila level Paurashavas and Kuakata Tourism center for a period of next 20 years. The project has provisions for separate plans for land use control, drainage and environment, traffic and transportation management and improvement. The project also aims to prepare a Ward Action Plan (WAP) to ensure systematic execution of future infrastructure development projects. There is also aim to prepare proposals to enhance Paurashava revenue so that it becomes more capable to meet its own capital needs. of the total 223 Paurashavas Sonargaon is one of 19 Paurashavas within Dhaka Region under Package 01.

Thus the Master Plan of Sonargaon Paurashava suggests for the development of urban infrastructure, such as new roads and bridges/culverts, drainage facilities, street lights, markets, bus stands, solid waste management, sanitation, water supply, community facilities and other such infrastructure in order to equip the Paurashava to face future challenges of urbanization and economic regeneration. The Master Plan will initially focus on growth and development, social integration and environmental improvement following principles of sustainable development.

1.2 Philosophy of the Preparation of Master Plan

The philosophy behind preparation of Master Plan of the Upazila level Paurashava lies in the very motive of providing community welfare through a process of spatial organization, socio-economic rejuvenation, environmental improvement and provision of amenities to the present and future generations. The Master Plan aims for rational use of scarce land resources for concentrated development at urban scale following the principles of sustainable development.

1.3 Objectives of the Master Plan

As per the Terms of Reference (TOR), the objectives of the preparation of Master Plan of Sonargaon Paurashava are to:

- a) Find out development issues and potentials of the Sonargaon Paurashava and make a 20-year development vision for the Paurashava and prepare a Master Plan in line with the vision for the development;
- b) Plan for the people of Sonargaon Paurashava to develop and update provisions for better transport and communication network, housing, roads, markets, bus terminals, sanitation, water supply, drainage, solid waste management, electricity, education, leisure and such other infrastructure facilities for meeting the social and community needs of the poor and the disadvantaged groups for better quality of life;
- c) Prepare a multi-sector short and long term investment plan through participatory process for better living standards by identifying area based priority-drainage master plan, transportation and traffic management plan, other need specific plan as per requirement in accordance with the principle of sustainability;
- d) Provide controls for private sector development, with clarity and security in regard to future development;

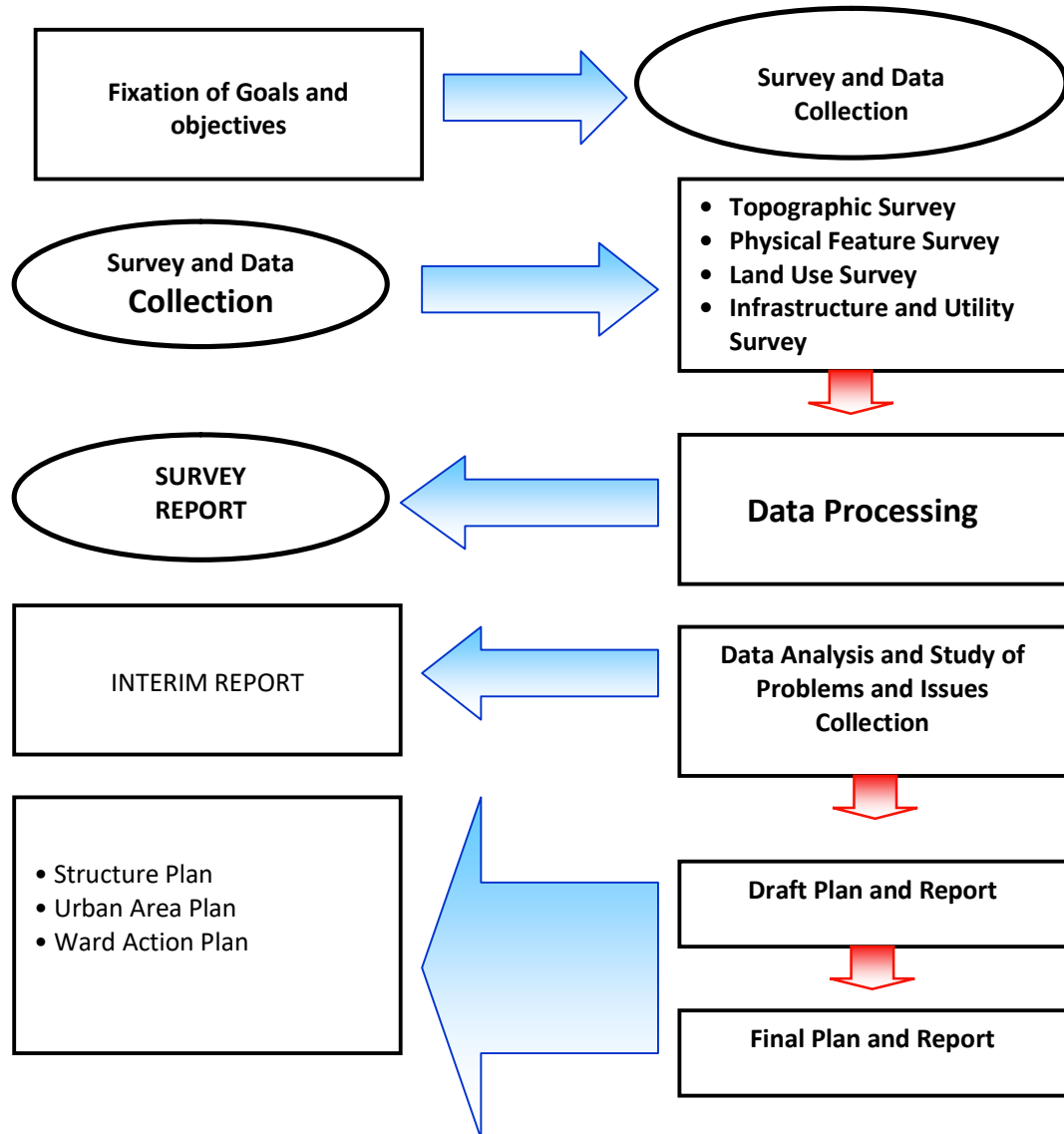
- e) Provide guideline for development considering the opportunity and constrains of future development of the Upazila Town; andf. Prepare a 20-year Master Plan to be used as a tool to ensure and promote growth of the

Sonargaon Paurashava in line with the guiding principles of the Master Plan and control anyunplanned growth by any private and public organization.

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. The data is presented through maps, text and tabular form. Than 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.

Figure 1-1: Flow Chart of Planning Process



After doing all these jobs thoroughly the Draft 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.

Map 1.1: The location of Sonargaon Paurashava within Bangladesh

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 Sonargaon 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, playgrounds, recreation centres and other environmental and social infrastructure. The following major tasks have been accomplished:
 - 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.
 - 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.
 - 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.
 - 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.

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Preparation of a plan has been set out proposed Master Plan at 3-levels namely Structural Plan, Urban Area Plan and Ward Action Plan.
- 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.
- 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.
- 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.
- 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.
- Preparation and submission of Master Plan and Report with required standards as per the TOR.

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 Sonargaon 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

INTRODUCTION TO STRUCTURE PLAN

The Draft Master Plan Report is the fourth of the series of the reports to be submitted as per the ToR of the project “Upazila Town Infrastructure Development Project - Preparation of Sonargaon Paurashava Master Plan (Structure Plan, Urban Area Plan and Ward Action Plan)”. Part A of this report describes the Structure Plan of Sonargaon Paurashava and Chapter 2 describes the conceptual issues related to the preparation of Structure Plan for Sonargaon Paurashava.

2.1 Background of the Paurashava

Sonargaon Paurashava was established in 25 April 2001 and now it is a ‘B’ class Paurashava. According to Ek-Nojore-Paurashava the total area of the Paurashava is 9.51 Sq. km. with 60 mahallahs, 22 mouzas and 9 wards.

With the active participation of the Paurashava authority, the Consultant has identified the Paurashava’s existing jurisdiction area is 8.53 sq. km. (2106.51 acres). With the expansion of some new areas, the Structure Plan area of the Paurashava is 9.84 Sq. km. (2431.38 acres). Among the nine Wards, Ward No. 1 has occupied largest area which is 391.71 acres and Ward No. 9 is the smallest (141.82 acres). A total of 1.32 sq. km. (332.26 acres) of land is being added as a Structure Plan area with the consultation of stakeholders. Physical development trend for next 20 years has been considered for such expansion.

Sonargaons’ importance in the pre-Muslim period is borne out by its ancient name of Suvarnagrama, from which it is obvious that the Muslim version of the name is derived, and by the existence of Langaband and Panchamighat, the two traditional holy bathing places of the Hindus, in this tract of land on the west bank of the old Brahmaputra. Suvarnavithi, mentioned in a 6th century land grant, the Ghugrahati copper-plate of Samacharadeva, has been taken to denote this area. The 13th century local Hindu ruler Danujamadhava Dasharathadeva (Raja Danuj Rai of Ziauddin Barani) may have shifted his capital to Suvarnagrama from Vikramapura sometime in the middle of the century. With the Muslim occupation of the Vanga area, Sonargaon continued to be the administrative centre of southeastern Bengal till the rise of Dhaka.

From the capture of Sonargaon by Shamsuddin Iliyas Shah (1352) down to the coming of the Mughals, it was a provincial metropolis except for a period when it became a capital city under the house of Isa Khan Masnad-i-Ala. After the fall of Musa Khan (1611), Sonargaon became one of the Sarkars of the Mughal Subah of Bengal. With the establishment of the Mughal capital at Dhaka, Sonargaon must have fallen fast into decay. In the late nineteenth and early twentieth century, Panam City was developed in a part of medieval Sonargaon. Panam City was established as a trading center of cotton

fabrics during British rule. Hindu cloth merchants built their residential houses following colonial style with inspiration derived from European sources. After the Indo-Pakistani War of 1965 and the Muslim-Hindu riot, Panam City has reduced into a vacant community. Today this area is protected under the department of archaeology of Bangladesh. Panam city area was linked with the main city area by three brick bridges - Panam Bridge, Dalalpur Bridge and PanamNagar Bridge - during Mughal period. The bridges are still in use. Lok Shilpa Jadughar (Folk Art and Craft Museum) of Sonargaon was established by Bangladeshi painter Joynul Abedin on March 12, 1975. The house, originally called Bara Sardar Bari, was built in 1901. Some Single dome mosques built by Jalaluddin Fath Shah (1489 AD), Alauddin Husain Shah (1522), tomb of Sultan Ghiyasuddin Azam Shah (1410 AD), tomb of Shah Langar (1422) are the mentionable archaeological heritage of Sonargaon Paurashava.

2.2 Vision of the Structure Plan

The vision of the plan is the creation of an urban livable environment, where people irrespective of their socio-economic, demographic and religious identities can live and enjoy today within affordable means without sacrificing interests of tomorrow. The implementation of Master Plan of the Paurashava will translate this vision into reality.

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 Sonargaon 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; catchments 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 Sonargaon 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 Sonargaon 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.

2.3 Concepts, Content and Format of the Structure Plan Concepts

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 lot by lot 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), Sonargaon. 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.

Content and 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.

2.4 Duration and Amendment of the Structure Plan

The Structure Plan is to remain valid for a period of 20 years from the time of its approval that is up to the year 2031. Structure Plan can contain two Urban Area Plan for the time period of 10 years each and four Ward Action Plan for the time period of 5 years each.

2.5 Structure Plan Area

Structure Plan Area boundary has been decided with the assistance and advises received from Sonargaon Paurashava Mayor, Councilors and other professional staffs and Gazette notification (S R O No-83 Law/ 2001). In order to delineate this boundary, there was a wide reconnaissance survey involving eye observation of the entire Paurashava area including those areas which have future potential growth. But since, the formation of

Sonargaon Paurashava is 10 years back (2001); the development trend do not took much momentum as it required. In addition, the Mayor and the Councilors opinioned in favor of keeping the Paurashava area encompassing the nine wards as exist for next 20 years. Strong arguments from Paurashava Mayor and Councilors were advised to extend the boundary as it is not an old Paurashava and various developments has taken place, and the present area is not enough as study/ planning area. But some development activities like tourist spot (Lok-O-Karushilpa Museum, Panam City) can influence the area for rapid development. Considering the real senarion around 325.01 acres of land comprises two separate location of 62.32 acres and 325.08 acre along Dhaka- Chittagong highway has incorporated within the structure plan area. So, Consultant has considered 2431.38.acres (9.84 sq km) with nine Wards as the planning area. Where the existing Paurashava area is 2106.30 acres and extension area is 325.08 acres.

Map 2.1: Sonargaon Paurashava in Regional Setup

Map 2.2: Jurisdiction of planning area of Sonargaon Paurashava

CHAPTER-3

PAURASHAVA'S EXISTING TREND OF GROWTH

3.1 Social Development

Age-sex structure

Age-sex distribution indicates that population mostly increase naturally. Population census 2001 implies that female population (8805 peson) is less than male population (9444 person) 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 18 to 34 age group. So, in all the Wards number of young and workable population is highest than any other aged group population.

Household size

Out of total households 2.99%, 6.92%, 15.34%, 23.74%, 20.18%, 13.64%, 7.51%, 3.72%, 2.50%, 1.94%, and 1.52% of with 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11 above person respectively. The average size of household is 5.

Family size ranges from 1-4, 5-8, 9-11and 11+ members, but most prevalent size is 1-4 and 5-8 members in the Paurashava and also in Bangladesh. There are both single and joint family systems in the study area. Ward No. 2 has major percentage of single family (17.59%) and Ward No. 7 is more joint-family system (25%) compared to other Wards. Most of the family in the Paurashava is single family (77.14%).

Marital status

In the Paurashava 45.94% of male and 31.27% of female population of age 10 years and over is never married. In the same age group percentage of currently married males and females are 53.45% and 60.99% respectively and percentage of widowed and divorced were 0.56% and 0.725%, and 0.05% and 7.02% respectively.

Migration pattern

According to the socio-economic sample survey-2009, about 97.8% households of Sonargaon Paurashava are permanent residents and 2.2% households are migrated. Migration occurred only in the ward no. 3, 6 and 9. Highest numbers of migrated people are in ward no-6(10%).There is various reasons for the migration. It is found for ward no.3 that migration occurred mainly for service or transfer and business or commerce purposes. In ward no. 3, 6 and 9, the reasons for migration are mainly business or commerce and service or transfer.

Growth rate

In the Sonargaon Upazila, from the year 1951-1961, annual growth rate of population was 2.32%, but from the year 1961-1974 the rate rises in to 2.94%. In 2001 government notified the urban characterized area of the Upazila as Paurashava and surprisingly then the growth rate of the whole Upazila decreased and it was 1.67% during the year 1991-

2001. In addition, for urban area population of the Upazila the growth rate was 1.53%. That's why here for Paurashava area 1.53% growth rate is being considered.

Table 3.1: Population growth rate of Sonargaon Upazila

Year	Growth rate (Decadal)	Growth rate (Annual)
1951-1961	23.2	2.32
1961-1974	29.4	2.94
1974-1981	21.1	2.11
1981-1991	24.5	2.45
1991-2001	16.7	1.67

Source: BBS Population Census-2001 (Community Series, Zila: Narayanganj)

Educational status

About 31.79% households head in Sonargaon are in class VI-X, 12.5% households head are in class I-V, 17.86% households head are in SSC/equivalent, 23.93% households head are in HSC/ equivalent, 7.14% households head are in BSS/equivalent, 0.36% households head are in MSS/ equivalent, and rest 6.43% household head are illiterate. The figure 5.2 represents the educational status of households head in Sonargaon Paurashava.

By considering education status according to ward wise in Sonargaon Paurashava, maximum illiterate household heads are existed in Ward No 2 (about 15.38%), maximum households heads who are educated at the level of BSS/equivalent are in Ward No 8. The following table illustrate ward wise educational status according to class VI-X, SSC, BSS, MSS.

Religion

In the Paurashava, Muslims are major religious group is 89.21% followed by Hindus is 10.76% and 0.03% is Christian. During the field survey, no Buddhist households are identified.

Land 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. In this study, the official land value is being quoted from the actual value considers by the Sub-registry Office of the Sonargaon Paurashava.

Table 3.2: Mouza-wise land value in the Study Area

SI	Mouza name	Type of land (Tk. / decimal)								
		Nal	Aman	Boro	Viti	Garden	Home	Pond	Doba	Fallow
01	Aminpur	43,600	23,100	23,500	106,600	67,200	166,400	16,000	10,200	10,200
02	Arjundi	52,800	24,800	35,100	76,800	47,600	95,100	16,000	10,000	10,000
03	Bagh Mahisha	23,600	11,800	12,000	28,100	14,000	75,700	10,000	8,000	8,000
04	Balia Dighirpar	20,900	10,000	10,000	17,800	14,000	61,800	8,000	6,000	6,000
05	Bhiti Adampur	31,300	46,200	22,800	12,000	12,000	20,000	10,000	7,000	7,000
06	Bagh Nazirpur	10,900	7,600	7,600	26,000	26,000	12,000	8,000	6,000	6,000
07	Chilarbagh	38,300	22,400	26,100	75,200	30,600	22,100	11,000	8,000	8,000
08	Chowdona	8,400	8,000	8,000	10,000	10,000	69,400	9,000	7,000	7,000

SI	Mouza name	Type of land (Tk. / decimal)								
		Nal	Aman	Boro	Viti	Garden	Home	Pond	Doba	Fallow
09	Chhota Magh Bazar	42,800	10,000	10,000	10,000	10,000	12,000	8,000	6,000	6,000
10	Chhota Silmandi	12,500	8,400	8,400	8,000	8,000	40,700	7,000	5,000	5,000
11	Darpat Thotalia	31,800	13,600	39,000	42,700	26,600	49,500	14,000	6,000	6,000
12	Gauribardi	70,200	54,800	56,000	12,000	12,000	54,700	10,000	8,000	8,000
13	Goladi	42,700	26,700	25,700	20,800	11,600	127,600	8,000	7,000	7,000
14	Ichhapur	31,000	26,400	26,400	10,000	24,000	38,000	13,000	8,000	8,000
15	Malliker Para	38,400	15,800	40,100	31,800	10,000	34,000	10,000	9,000	9,000
16	Padmalabdi	17,200	8,000	9,100	30,800	11,200	72,000	8,000	6,000	6,000
17	Panam Dulalpur	43,700	20,200	43,500	13,600	10,200	72,100	8,000	6,000	6,000
18	Raizdia	44,300	11,400	25,700	41,200	11,400	43,800	9,000	6,000	6,000
19	Sahapur	30,100	21,900	23,900	30,000	37,000	32,700	9,000	8,000	8,000
20	Solla Para	49,000	32,200	22,600	43,500	29,000	84,500	10,000	20,000	9,000
21	Sonargaon	32,200	22,600	28,200	25,700	34,000	40,000	12,000	12,000	8,000
22	Tipurdi	51,600	26,600	22,400	23,900	30,000	110,400	17,000	16,000	12,000

Source: Sonargaon Sub-Registry Office, 2011

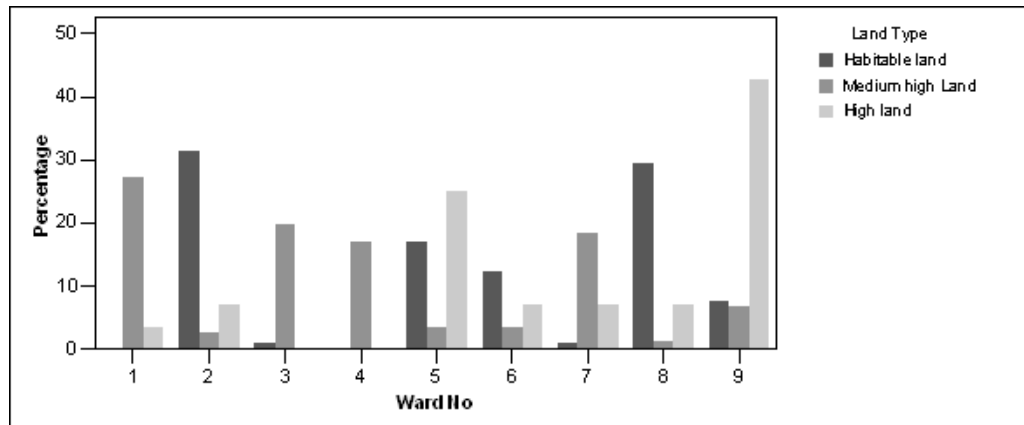
In this study, nine types of land in twenty two mouzas are being considered. In the natural land market, land for homestead / housing construction is higher than other type of land and this scenario is prevailing in the Paurashava also. Land value is low (Tk.6000 to Tk. 12,000 per decimal) for Doba and Fallow type of 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.

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.

Households almost all the Wards own medium high land (52.5%) followed by habitable land (37.5%) and high land (10%). Highest amount (27.21%) of medium high land owned by the households in the Ward No 1, habitable land (31.43%) owned in the Ward No 2 and high land (42.86%) owned in the Ward No 9. Except Ward No. 4 all other Wards have a combination of habitable, medium and high land ownership (Figure 3.1). Since, the area is tourism based with considerable number of agricultural activities, presence of considerable ownership of medium high land and habitable land supports small business as main activity.

Figure 3.1: Ward-wise different land type owned by household



Source: Socio-Economic/Household Survey, 2009

3.2 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 large rural area, besides an urban center of Paurashava town. One National Highway passes through the Paurashava. Agriculture land and sporadic homesteads, at places are showing the signs of development along with the hats, bazaars indicating the dominant role of agriculture and fishery. This indicates general feature of the study area as a 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.

Topographic survey result revealed that Mugrapara Chowrasta (Dhaka-Chittagong NHW, Mugrapara GC Road and Thana Road intersection), in front of Bangladesh Lok-O-Karushilpa Foundation/Museum (Museum Road and Tipurdi Road intersection), besides Upazila Health Complex (Hospital Road) and in front of Sonargaon G. R. Institution School and College (Paurashava Road, Panam City Road and Upazila Road intersection) area are the major commercial/market area of Sonargaon Paurashava and those are located at extension area (Mugrapara Chowrasta), Ward No 07, 08, 09 and 05 respectively.

Industry

Industrial/ Processing and Manufacturing activity in Sonargaon Paurashava mainly includes garments, melamine, poly and cable industries, handicraft, rice mill, saw mill, ice factory, seed processing industry, bakery factory and other manufacturing and processing activities. Major industrial/manufacturing concentration is seen in Ward No 03 and occupied 15.36 acres area.

The small 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

Among all the structures in Sonargaon Paurashava, commercial use is the second highest (7.04%). 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/bazaar, etc. Major part of trade and commerce of the study area is conducted through hat/ bazaar where agriculture produces, consumer items, merchandise for household and other farm and non-farm items are transacted. The market/ bazaar performs significant role on the Paurashava economy. It is observed that market/ bazaar provide good number of employment and act as an economic centre for the area of influence of the market/ bazaar. This market/ bazaar remain open everyday from morning to evening. Along with the daily business transactions, two market places are also used as hat which sits twice in a week. On the hat day farmers, traders, businessmen and many other informal professionals gather in the hats and run trades and business till evening. Actually, the market/ bazaar is the key supplying centers of all sorts of agro-products to the urban areas and other non-producing areas of the country, and similarly this market/ bazaar is the major distribution centers of industrial products to the vast majority of the rural people throughout the country at consumer levels. Importance of the market/ bazaar place can not be ignored, rather needs to be facilitated with provision of infrastructure facilities.

That hat/ bazaar are taking place in the core part of the Paurashava along with the road; tin-shed semi-pucca structures with parcels of open lands. Those hat / bazaars are prominent due to its availability of agro-product and fish. People from different Upazilas, Zilas and Capital City accumulate in those hat/ bazaars as a buyer.

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 different types of administration and government services like Paurashava Office, Upazila Headquarters, sub-registry office, Police station and non govt. establishments like banks and 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 special women and poverty-stricken has been getting various types of services from the NGOs for quite a long period.

Primary occupation

Occupation related to any Business is more dominating in Sonargaon Paurashava; about 47.5% household heads are involved with small business and 2.14% with large business. Besides business about 18.93% households are occupied in private service, 15.71% of households heads are involved in farming and agriculture, the other occupations are govt. officer 0.36%, skilled labor 0.71%, house wife 1.79%, teaching 4.29% and other govt. employee 6.07% in Sonargaon Paurashava.

Main occupations of the Head of Households according to Individual Ward in Sonargaon Paurashava, maximum household heads are involved with small business in all wards. Most of the household heads are occupied with private service in ward no 1, 2, 3, 4, 5, 6, 7, 8 and 9 (about 39.02%, 23.08%, 10%, 8%, 13.33%, 10%, 13.33%, 11.43% and 30% respectively).

Income

Major portion of income come from either business or service and other type of income sources are agriculture and house rent. About 29% of income generates from service, 50% generates from business, 16% from agriculture, 1% from house rent and 4% come from other sources.

Households' income from services is most in Ward No. 9 (about 43.3 %). In Ward No. 4, maximum incomes of the households come from agriculture (32%).

Highest income levels of households are from tk 9800-10600. Second highest range is tk 11900-12800 and third one is tk 13000-17000. 22.5% households earn tk 10000, 13.57% earn tk 12000 and 8.93% earn tk 15000. The figure 5.3 shows the income (tk per month) categories of various numbers of households.

Expenditure

There are various kind of expenditure of individual household in an urban area such as food expenditure, house rent expenditure, water expenditure, electricity expenditure, gas expenditure, health expenditure, education expenditure, transport expenditure,

recreational expenditure and others. Food expenditure is mandatory but other service-oriented expenditures are depending on fiscal condition of the urban dwellers and provisional system of urban authority. In Sonargaon Paurashava, minimum value of monthly food expenditure is tk. 1000; median value is tk. 6000 and maximum value is tk. 20000. From the figure it is evident that highest expenditure is for food and second one is for education purposes.

Agriculture

Agricultural land occupies 728.398 acres (31.40%) of the total of Paurashava. Agriculture nursery and horticulture farming are most commonly used within the agricultural service holders. Among agricultural products, important items besides paddy are wheat, jute, potato, pulse, oil seeds, sugarcane, vegetables, and fruits production such as mango, jackfruit, papaya, guava, carrots etc. Among the agriculture products, paddy, local fruits, mustards and vegetables are consumed locally and a considerable percent goes to the local market of Dhaka.

Agro-based

There are several types of agro based industry in the Paurashava. Rice mill, saw mill, ice factory, seed processing industry and bakery factory are prominent agro based industry here. The industrial activities cover 3.88 acres and 44.50% land of the study area. Local woods are being processed in the Saw Mill and locally produced paddy are using in the Rice Mill. Those industries have been established all over the Paurashava. After completion of 4 lane Dhaka-Chittagong NHW and with the execution of DAP and DMDP, number of agro-based industries will be increased.

Employment Pattern

In the Paurashava, 25.95% of the dwelling households depend on agriculture as the main source of household income with 12.39% cropping, livestock, forestry and fishery and 13.56% as agricultural labor. Other sources of household income are non-agricultural labor (2.60%), business (23.74%), employment (20.31%), construction (1.61%), religious service (0.31%), rent and remittance (4.68%), industry (1.96%), transport and communication (4.51%), weaving (2.31%) and others (12.01%). In urban area, main sources of household income are employment (20.07%), transport and communication (6.35%), construction (2.34%), religious service (0.11%), business (37.57%), non-agriculture labor (3.68%) and others (27.32%). In rural area the main sources of household income are agriculture (26.14%) of which cropping, livestock, forestry and fishery (12.41%) and agricultural labor (13.73%). Other sources are non-agricultural labor (2.59%), business (23.53%), employment (20.31%), transport and communication (4.48%), weaving (2.35%), construction (1.60%), industry (1.98%), rent and remittance (4.72%), religious service (0.31%) and others (11.99%).

Business related occupation in Sonargaon Paurashava is more dominating; about 47.5% household heads are involved in small business and 2.14% large business. Besides

business about 18.93% households are involved in private service, 15.71% of households heads are involved in farming and agriculture, the other occupations are govt. officer 0.36%, skilled labor 0.71%, house wife 1.79%, teaching 4.29%, other govt. employee 6.07% and rickshaw/ vanpooler/ Driver 0.71% in Sonargaon Paurashava. By considering Main Occupation of the Head of Households according to Individual Ward in Sonargaon Paurashava, maximum household heads are involved with small business in all wards. Most of the household heads are occupied with private service.

Informal Economic Sector

Informal sector covers a lot of activities which may be classified as Trading and Services. Various type of mobile or fixed salable items like food, fish, nuts, coconut, vegetables, daily household items, old cloth/ garment, repairing of household gadgets, electronic items repairing, hair cutting, shoe polishing, etc. are considered as informal economic activities.

In the Paurashava, informal entrepreneurs mainly perform their business in the market/ bazaars 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. 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.

3.3 Physical Infrastructure Development

Like others Sonargaon also Paurashava has different type of physical structures. Different types of structures such as pucca, semi-pucca and katcha have been identified from the physical feature survey conducted in the study area. Structure types vary from one story to multi-story of different varied dimension, size and shape. There are a total of 9755 structures within the study which is composed of pucca, semi-pucca and katcha structures and they are 1413, 1042 and 7300 in numbers respectively. The total road length found is about 42 km. There are 16 Bridges, 1 Telephone exchange, 2 Post offices, 1 Sub-registry offices are available in the area for the easiness of the people. The number of market place of the Paurashava is 05 and branches of bank are 04. The number of Governmental hospital is 01, Private clinic-01, Community clinic-01, Eyes hospital-01 and Veterinary clinic-01 for proving the medical facilities to the people of the Paurashava. There are 38 Mosques and 09 Temple in Sonargaon Paurashava for functioning religious activities of municipal people. There are 1 cinema hall, 1 park, 1 tourist home and a playground are available in Sonargaon Paurashava for providing recreational facilities. Sonargaon Paurashava also has very high growth potential of small cottage industries;

this Paurashava has various small industries like Weaving 948 (including Jamdani), Goldsmith 32, Blacksmith 42, Wood work 172 and Bamboo & Cane work 154.

On the other hand, Sonargaon Paurashava has also the growth potential of agriculture and related industries such as Paddy, Potato, Brinjal, Patal, Cauliflower, Sugarcane, Mula (radish) and Fishery, Poultry, Hatchery etc. Soanrgaon Paurashava can export Industrial products, sari, Cotton fabrics and Vegetables.

If consider the settlements growth pattern of the Paurashava we can say that, the Paurashava area is not radically growing its surrounding area. Again, there are many water bodies like canals and ponds are located in the Paurashava that hamper the frequent building of settlements. The Paurashava area is physically expanding to the northern direction.

Road: A national highway (named Dhaka-Chittagong NHW) Passed through the western part of Sonargaon Paurashava and it is only one national highway in this Paurashava. Its length is 0.56 km and average width is 19.51 meter. There is no Regional Highway passes through or near the Paurashava. All other roads are local roads and their total length is 76.11 km and average width is 3.72 meter.

Waterways: A canal named Manykaly Khal is used time only for transporting vegetables, cloths and wooden materials from besides commercial areas i.e. Baidder bazaar, Gauchia etc.

Railway: There is railway facility in the Paurashava.

Airway: No airway facility is found in the Paurashava.

3.4 Environmental Growth

The plan has documented Sonargaon 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).

3.5 Population

Accourding population census Year of 2001 the population of Sonargaon Paurashava was 18249 and in 2011 total population of the Sonargaon Paurashava was 32796 of which 16182 are males and 15984 are females. The entire population is over 9 wards with different density. The most populous ward was ward no-07 having 4847 peoples, while the least population was found in ward no-09 which population was 4545. The following table (table 3.4) represents the overall demographic scenario of Sonargaon Paurashava.

Table 3.3: Ward wise population of Sonargaon Paurashava, 2011

Ward No	Male Pop.	Female Pop.	Both Sexes
1.	1943	1917	3860
2.	1924	1681	3605
3.	2136	1763	3899
4.	1066	1073	2139
5.	1653	1636	3289
6.	1181	1138	2319
7.	2439	2408	4847
8.	2155	2138	4293
9.	2315	2230	4545
Total	16812	15984	32796

Source: BBS Population Census-2011 (Community Series, Zila:Dhaka)

Population distribution

Total population of Sonargaon Paurashava was 32796 according to population Census 2011. Table 3.5 represents area wise population and density per sq. km. in the Sonargaon Paurashava.

Table 3.4: Ward Wise population density and percentage of Sonargaon Paurashava

Ward No.	Area (sq. km)	Ward wise Population	Density /sq. km	Ward wise Population (%)
1	1.59	3860	2428	11.77
2	1.06	3605	3401	10.99
3	1.06	3899	3678	11.89
4	0.81	2139	2641	6.52
5	0.94	3289	3499	10.03
6	0.74	2319	3134	7.07
7	0.81	4847	5911	14.78
8	0.94	4293	4567	13.09
9	0.57	4545	7974	13.86
Total	8.53	32796	3840	100.00

Source: BBS Population Census-2011 (Community Series, Zila:Dhaka) and field survey 2009

Population variation among the Wards is 2000 to 5000 and household size is 4.54 for all the Wards in the Paurashava. Number of household and population is highest in ward 7,8 and in 9. In other area density is lower than those. The scenario proves that availability of land presents around all the residential developments. Expansion of roads to increase the width, construction of new missing links and new community services should not create rehabilitation problem or demolishing of construction.

Population density

In the Sonargaon Paurashava, the average density was 3840 persons per sq.km according to the Population Census, 2011. Ward no-9 was found to have the highest density of 7974 persons per sq. km while the lowest density was found in ward no-1 consisting of 2428 persons per sq. km., ward no -7 and 9 had higher density, where as the rest of the wards had comparatively low density.

Map 3.1: Existing Growth Potentiality of Sonargaon Paurashava

3.6 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 Sonargaon 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 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 and Existing Manpower of the Paurashava

There is acute shortage of manpower in each section of the Paurashava. Existing manpower scenario of Sonargaon Paurashava is horrible. Paurashava has only 12 official against 91 official mentioned in Paurashava organogram. There is no Chief Executive Officer, Health Officer. Engineering Division is not well established. 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. Allocated and existing manpower except the Councilors in the Sonargaon Paurashava is presented in the Table-3.5. In total 12 employees as permanent staffs are in the Sonargaon Paurashava. Those employees are under the Administrative division, Health division and Engineering division. Even, the distribution of employees is not followed by the allocated manpower guideline. There 8 employees work under administration division, 2 under health division and 1 under engineering division. As per the manpower allocation guideline, there should be 1 Lower Division Assistant under administration and 1 under engineering division whereas at Sonargaon both are under administration. Similarly, 3 and 1 MLSS should be under accounts and health division respectively while only 2 MLSS are there and they have been working under administration. Guard is also working under administration instead of engineering division. Moreover, only 1 person as Assistant Tax Collector is working under tax division, 2 persons by designation Vaccination Supervisor and Vaccinator under health division and no more than 1 person i.e. Assistant Engineer is working for engineering division. However, it is a matter of disappointment that there is no staff under license division. In addition, no water supply division is found in the Paurashava as there is no provision of water supply facilities yet. Hence, existing scenario deserves more involvement of employees as well as strengthening the divisions by recruiting allocated HR; otherwise execution of master plan will be very difficult through present manpower attachment of the Sonargaon Paurashava authority.

Table 3.5: Allocated & Existing manpower for Sonargaon Paurashava

Manpower Status	Allocated Manpower	Existing Manpower	Vacant Post
Mayor	1	1	0
Chief Executive Officer	1	0	1
Administrative Section			
Secretary	1	1	0
Administrative Officer	1	0	1
Head Assistant	1	0	1
Upper Division Assistant	1	0	1
Accountant	1	1	1
Assessor(Tax Assessor)	1	0	1
Tax Collector	1	0	1
Bazar Collector	2	0	2
Assistant Tax Collector	6	1	6
Bazar Inspector	1	0	1
License Inspector	1	0	1
Assistant License Inspector	1	0	1
Accounts assistant	1	0	1
Assistant Assessor	1	0	1
Cashier	1	0	1
Steno Typist/ PA	1	0	1
Store Keeper	1	0	1
Lower Division Assistant/Typist	2	2	2
Jeep Driver	1	0	1
MLSS	5	2	3
Gateman G	1	0	1
Gardener	1	0	1
Night Guard	2	2	0
Sub Total	35	9	26
*Part-time/ Contractual Staffs			
Education and Cultural Officer	1	-	1
*Librarian (if any)	1	-	1
*Teacher	18	-	18
*Other Officials	10	-	10
Total	30	-	30
Engineering Section			
Assistant Engineer	1	1	1
Water Super (SAE)	1	0	1
Sub-Assistant Engineer Civil)	2	0	2
Sub-Assistant Engineer (Electrical)	1	0	1
Bill Clark	1	0	1
Draftsman	1	0	1
Mechanic (Pump/Vulb Operator)	2	0	2
Pipe Line Mechanic	2	0	2
Tube-well Mechanic	2	0	2
Surveyor/ Sub Overseer	1	0	1
Lower Division Assistant/Typist	2	0	2
Work Assistant	2	0	2
Street Light Inspector	1	0	1

Electrician	2	0	2
Lineman	2	0	2
Electric Helper	1	0	1
Road Roller Driver	1	0	1
Mixture Machine Operator	1	0	1
Truck/Tractor Driver	2	0	2
Truck Helper	2	0	2
MLSS	2	0	2
Sub Total	32	1	31
Health, Family Planning & Conservancy Division			
Medical Officer	1	0	1
Conservancy Inspector	1	0	1
Sanitary Inspector	1	0	1
Slaughtering House Inspector	1	0	1
Moulvi (Contractual)	1	0	1
Lower Division assistant/Typist	1	0	1
Conservancy Supervisor	2	0	2
Vaccination Supervisor	1	1	1
Health Assistant	2	0	2
Vaccinator	6	1	5
Health Visitor	3	0	3
MLSS	2	0	2
Sub Total	22	2	22
Grand Total	91	12	79

Source: Local Government Ministry of Bangladesh, 2009.

**Part-time/ Contractual Staffs not included in grand total*

Paurashava Town Planning Capacity

In Sonargaon Paurashava, there is no Town Planner; even there is no surveyor and draftsman. Hence, it is not possible for only 1 technical person (Assistant Engineer) to monitor and execute all the activities related to development control as well as to follow the guidelines of Master Plan. So, indeed, no town planning capacity exists in the Paurashava.

Implementation Capacity of the Paurashava Master Plan

In implementation procedure, preparation of Project Proposal is the primary step of the Master Plan. Due to the absence of apposite employee for the purpose i.e. Town Planner, the Paurashava is not capable of implementation of the Master Plan.

Conservancy and health services

In the Sonargaon Paurashava, only 1 Vaccination Supervisor and 1 Vaccinator works under health division but there is no Conservancy Inspector to control and monitor the conservancy activities. In total, there are 15 employees for the purpose of street sweeping who works on casual basis. So, it is for sure, conservancy and health services are running in the Paurashava without any systematic procedure as well as following any healthy measures.

Logistic Support/Equipment

Logistic support and necessary equipment is limited for Sonargaon Paurashava which should be a really big concern. Two garbage trucks and 15 sweepers (on contract basis) are the only means of conservancy services. Except those trucks and road roller, other equipments are using for Paurashava administration.

3.7 Urban Growth Area

Physical growth of Sonargaon Paurashava town depends on the road pattern. Sonargaon Paurashava is connected with a National Highway. Concentrated development is the common feature of the Paurashava. A National Highway named Dhaka-Chittagong NHW Road passed through the Paurashava. So the agro product can easily transport in different districts.

Sonargaon Paurashava falls in the region of old Brahmaputra and Meghan floodplain. In 1787, a remarkable change in the course of the Brahmaputra took place. In that year, the river shifted from a course around the eastern edge to the western side of the Madhupur Tract. This new portion of the Brahmaputra is named Jamuna.

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.

Sonargaon Paurashava is well connected with the National Highway and railway. Negligible urban facilities like water supply, cleaning of road, road lighting, dustbin facilities and road maintenance (constructed by the Paurashava, LGED and RHD) are the facilities 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.

Average height of the Paurashava is 2.78 meter. Among the Wards, maximum height varies 4 meter to 10 meter. So construction cost should be minimum considered to provide those facilities.

3.8 Catchment area

Sonargaon Paurashava is located within the Narayanganj district at a distance of 15 km. from the district town and on the north-east part of Narayanganj district. Sonargaon, the administrative centre of eastern Bengal under the Muslim rulers of Bengal survives at present in the name of an Upazila in the Narayanganj district and the 'Golden Village' is now a township about 27 kilometers to the southeast of Dhaka. Sonargaon Paurashava has high prospects of agricultural crops production such as paddy, wheat, jute, potato, pulse, oil seeds, sugarcane, vegetables, and fruits production such as mango, jackfruit, papaya, guava, carrots etc.

3.9 Landuse and Urban Services

Landuse

Existing landuses are categorized on the basis of functional activities perform in Sonargaon Paurashava. Detail statistics of different landuses is shown in the Table-3.6.

Table 3. 6: General Land Use of Sonargaon Paurashava (Area in Acre)

Land Use Category	Ward No									Total	
	1	2	3	4	5	6	7	8	9	Area (acre)	(%)
Agriculture	189.30	103.64	95.74	129.48	48.95	49.86	21.63	31.49	26.39	696.44	33.07
Circulation Network	8.48	8.13	11.57	4.44	8.68	6.06	8.39	12.06	7.43	75.23	3.57
Commercial Activity	0.52	1.84	1.79	0.03	2.31	0.00	1.84	4.08	6.15	18.56	0.88
Community Services	0.75	1.04	0.27	0.58	0.50	0.23	0.37	1.57	0.52	5.83	0.28
Education & Research	0.26	0.61	0.45	0.62	0.93	1.54	0.19	3.99	0.56	9.15	0.43
Governmental Services	-	0.16	-	-	0.25	-	-	1.98	2.36	4.74	0.23
Manufacturing and Processing Activity	1.69	0.40	15.36	-	0.82	0.13	2.43	1.85	1.83	24.50	1.16
Mixed Use		0.05	0.09	-	0.44		0.14	0.18	0.37	1.27	0.06
Non Government Services	0.08	-	-	0.05	-	-	0.11	0.26	-	0.50	0.02
Recreational Facilities					7.48	24.07	9.31		0.72	41.58	1.97
Residential	138.10	102.97	94.13	48.03	115.05	63.37	101.13	141.93	75.20	879.91	41.77
Service Activity	0.13	0.54						0.26	2.48	3.41	0.16
Transport & Communication	-	-	0.54	-	-	-	-	0.25	-	0.79	0.04
Urban Green Space	0.60	0.55	0.08	0.30	0.60			0.10	0.23	2.46	0.12
Vacant Land	2.98	2.07	1.82	0.28	2.42	0.01	0.67	0.89	0.83	11.98	0.57
Water Body	48.82	40.01	39.94	16.83	42.80	38.53	54.86	31.70	16.46	329.94	15.66
Total	391.72	262.00	261.78	200.63	231.24	183.80	201.06	241.60	132.12	2106.30	100

Source: Land Use Survey, 2009

It is ascertained that 879.91 acres (41.77%) of land is presently under residential use. Agriculture and water body occupied 696.44 acres (33.07%) and 329.94 acres (15.66%) respectively. Circulation network occupied 75.23 acres (3.57%). An important part of this Paurashava is using a recreational purpose that is for Lok-O-Karushilpa Museum/Foundation and occupied 41.58 acres (1.97%). There 18.56 acres (0.88%) of land for Manufacturing and Processing activity (industry) and only 24.39 acres (1.16%) of land for commercial activities have been found in the land use survey.

Residential

Residential land use includes urban housing, 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 occupied 879.91 acres or about 41.77% of the Planning Area. The survey reveals that residential category is the major dominated land use. As per Ward-wise statistics, Ward No. 8 occupied highest amount of land (141.93 acres) and Ward No. 4 is minimum (48.03 acres).

Commercial

Commercial land use mainly comprises of different types of shop (book shops, cloth shops, departmental store, grocery shops, stationary shop etc.), market, katcha bazaar and other lands being used for commercial purpose. Survey result depicts that commercial activities are mainly concentrated in Ward No 9, 6.15 acres of total 18.56 acres. Main commercial establishment is situated in this Ward due to hospital and upazila HQ. Ward No 8 has 4.08 acre area, which is second highest and third highest in Ward No 5 (2.31 acre).

Industrial

There have several garments, melamine, poly and cable industries, and handicraft, rice and saw mill in Paurashava area. Industrial/ Processing and Manufacturing activity in Sonargaon Paurashava mainly includes garments, handicraft, rice mill, saw mill, ice factory, seed processing industry, bakery factory and other manufacturing and processing activities. Major industrial/manufacturing concentration is seen in Ward No 3 and occupied 15.36 acres out of 24.50 acres of land.

Agricultural

Agricultural land use includes paddy field, cropland, grazing land, horticulture, orchard, etc. Around 696.44 acres of land is under agricultural use in Sonargaon Paurashava. It has been appeared from field survey that, Ward No 1 has maximum agricultural land 189.29 acres and after it comes Ward No 4 129.63 acres.

Education

The Paurashava is not well developed with number of educational institutions like college, high school and primary school for improvement of educational activities. The total land area under this category is 9.15 acres. The students who like to develop him with higher education shifts to the Dhaka or Zila Headquarters, but for general educational services two government high school and six government primary schools are found in the Paurashava premises. One public college and one kindergarten are showing the demand of higher education. Major concentration of educational institutes is found in Ward No 8 (3.99 acres) and Ward No 6 (1.54 acres). However, educational institutes

spread over most of the wards of this Paurashava at certain percentage. Ward No 7 has lowest area of this facility in compare to other Wards.

Government Services

Sonargaon Paurashava office, UNO office, Food Office, Sub-Register Office, Upazila Primary and Secondary Education Office, Water Development Board, Rural Development Board and other Upazila level government offices come under this land use category. Government offices are located at Ward No 2, 5, 8 and 9, and occupied 0.16, 0.25, 1.98 and 2.36 acres respectively. Most of the government institutions are located at Ward No 9.

The Paurashava office is a one-storied building using as administrative building of the Paurashava. About 0.247 acre land has been acquired for this purpose. The building is known as Paurashava Office and located at the inner side of the Paurashava at Ward No 5. Surrounding lands are using mostly for residential and commercial purposes. For extension of the Paurashava office another site has been selected.

Circulation network

Circulation network includes road network, waterways, railway and airway etc. Road includes national highway, regional highway, primary, secondary, tertiary roads, local road, access road, feeder road, walk way, etc. This land use includes establishments to accommodate all transport and communication facilities such as bus terminal/ stoppage, railway station, toll station, ferry ghat, launch ghat, boat ghat, etc. Pucca road, semi pucca road and katcha road constitutes this category of land use. Percentage of road network is around 15.89% in Ward No 8, 13.32% in Ward No 7, 13.28% in Ward No 3, 12.87% in Ward No 5 and 12.22% in Ward No 2. Ward No 4 has minimum amount (4.57%) of this kind of land use. Ward No 1, 6 and 9 consists 8.51%, 9.62% and 9.72% respectively. Total area covers by road network is 75.23 acres.

No transport terminal facility exists within the Paurashava area. Buses and trucks as well as other vehicles generally park on the adjacent roads. One bus stand is found at Mugrapara intersection (outside of the Paurashava), known as Mugrapara Bus Stand. Dhaka-Chittagong National Highway passes through the Mugrapara Bus Stand. This national highway produces a hub at Mugrapara intersection. All type of vehicles stand and park on this Bus Stand. This intersection known as bus stand, but no demarcated area or structure is there for Bus Stand. Besides this, all the major intersections in the Paurashava are the places where all local passengers carrying vehicles await on roads with some stoppage time and those are mostly non-motorized vehicles.

Water Bodies

Water body of Sonargaon Paurashava is mainly consists of pond, ditches, khals, dinghies and canals. It covers 329.94 acres of land. Ward No 01 (48.82 acres), Ward No 07 (54.86 acres) share that major percentage of water bodies in this Paurashava.

Recreational

According to the field survey, recreational facilities in Sonargaon Paurashava are mainly located in Ward No 06 (24.07 acres) Ward No 01, 2, 3, 4 and 8 has no land use in this category. Total land under this category is 41.58 acres.

3.10 Paurashava Functional Linkage with the Regional and National network

National Network

Sonargaon is approachable by a tarred road: Dhaka-Chittagong NHW using the bifurcation at Mugrapara crossing. Sonargaon was an old capital of Hindu and Muslim ruling houses and a flourishing centre of trade and commerce especially because of its favorable location as an inland port on the confluence of large rivers and its access to Dhaka by road. The Folk Art Museum of Bangladesh was set up at Sonargaon. Sonargaon was also renowned for its fine muslin weaving and wooden toys as much as for its sufis, saints and poets.

The setting of Sonargaon because of its cultural-historical background as well as its authentic rustic landscape with ponds, rivers, fields, hamlets and regional flora, is ideal for the establishment of a folk art museum.

Regional Network

Sonargaon Paurashava is located within the Narayanganj district at a distance of 15 km. from the district town and on the north-east part of Narayanganj district. Sonargaon, the administrative centre of eastern Bengal under the Muslim rulers of Bengal survives at present in the name of an Upazila in the Narayanganj district and the 'Golden Village' is now a township about 27 kilometers to the southeast of Dhaka. Sonargaon Paurashava has high prospects of agricultural crops production such as paddy, wheat, jute, potato, pulse, oil seeds, sugarcane, vegetables, and fruits production such as mango, jackfruit, papaya, guava, carrots etc.

Map 3.2: Existing Landuse of Sonargaon Paurashava

Map 3.3: Regional/ National Road Network of Sonargaon Paurashava.

3.11 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 3.7: 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-3.9) 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.
- Identify the existing procedural and institutional constraints and resolve them with full cooperation of other responsible agencies.

CHAPTER 4

CRITICAL PLANNING ISSUES

4 Introduction

Chapter 4 of the planning report introduces the critical planning issues of Sonargaon Paurashava. The discussion has been carried out on sectoral basis.

4.1 Transport

As a small town the Paurashava is yet to encounter critical transport and traffic problems as faced by large cities with huge traffic population. Sources of Sonargaon transport problems are associated with admixture of contrasting traffic modes, faulty road network and disobedience of traffic rules.

4.1.1 Traffic Conflict

Traffic conflict is common and frequent phenomena in towns where there is admixture of transport vehicles-slow and fast-in the streets. Areas of conflict occur at point where there intensity of traffic movement is high. The consultant studied the traffic movement in all over the town and has identified main points where the traffic conflict is the highest. These are Bazar road Intersection, Bus stand More and Nimtola/Thana More etc. At these points the slow moving vehicles, like, rickshaw and vans come in conflict with motor vehicles, creating traffic congestion. Besides, bus and CNGs remain standing on these points for long time for boarding and descending of passengers. Upcoming other vehicles do not get required road space to cross the standing vehicles smoothly. For this reason, a sudden but short time jam has occurred. As the number of slow moving vehicles is higher the conflict is usually frequent.

The identified reasons for traffic conflict are, improper intersection design, parking of vehicles on the street, waiting of operators on the roads looking for possible passengers, absence of traffic signal, disobedience of traffic rules etc.

4.1.2 Unplanned and Narrow Roads

Road network in the town is not planned nor standardized. As there was no town plans earlier covering road network, roads were developed in an unplanned manner. No standards have been followed in determining road width, network design. Road widths are of rural type. More than 84% roads of entire project area is less than or equals to 10 feet. Besides, more than 49% roads in Paurashava is less than or equals to 8 feet width. These roads are not capable to serve an Upazila town like Sonargaon. Therefore, narrow widths of roads and poor maintenance have been marked everywhere. These also have been expressed in opinion survey of the households.

Narrow widths of roads have marked by most respondents as major road problems in the town. Narrow width of roads is likely to become a major problem of traffic movement when the town grows and density of population increases in future. As field survey

shows, about 40% of the households of the town reported that the road widths in front of their houses are 8 ft. or less. This is alarming, as there will be increase in population leading to higher density. In future traffic will rise and will create serious traffic congestion on the narrow streets. There is little chance that the authority will be able to increase the road width in highly built up areas- especially in the crossing point of main bazaar area, as there will be high cost involvement and social-pressure on any attempt to demolition.

4.2 Environment & Drainage

4.2.1 Environmental Problem

In Sonargaon Paurashava, noise pollution occurred 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 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 Sonargaon Paurashava.

However, implementation of activities like roads, drainage, bridge / culverts, housing and industrial establishments and bazars will radically change the natural topography and land use pattern. The agricultural land will be converted into urban and semi-urban nature. Existing scenic beauty will disappear; water bodies will be 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 land uses should be provisioned for all the public and private organizations as their necessities.

4.2.2 Drainage Problem

The condition of drainage service in the Paurashava is in critical shape. There is no hierarchy of drains and they are not properly connected. Therefore, water logging occurs at various points. Only in Paurashava Office area there are a few pucca drains. In rest of the town, either there are no drains or where they exist, they are all katcha or semi-pucca. As a result during the concentrated heavy rainfall the water stagnation is frequent. Major natural drainage channels have been encroached (mainly in the Bazar area as well as the adjacent khals) causing their width to become narrow reducing the flow of water. Reoccupying the drainage encroachments and opening up of the system is highly lacking.

Powerful encroachers often hinder such attempts. As a result problems of the primary drains remain unresolved.

4.2.3 Waste Management

Although there is a formal dumping ground, it was reported and proved that, the authority did not maintain formal dumping system. A portion of the wastes were dumped on the drain and low land beside the road. The Paura authority could not ensure the prohibition of waste dumping along the entire length of the canal, which has blocked the canals at several points. The authority only collects waste from road side points and dustbins. There is also limited Door to door collection system in the Paurashava. Negligence of duties/responsibilities of staff is another main problem for inadequate operation and maintain of the drainage system.

4.2.4 Water Supply

Due to salinity of the ground water, drinking water is a critical problem in the town. Most people use surface water from ponds. But with the advent of urbanisation these ponds are likely to get filled up as land prices go up. Besides, in the face of increasing population the existing ponds are unlikely to serve as the only sources of water supply for the constantly growing population. This will create problem regarding water supply in the town in future.

4.3 Land Use Control

Accommodation of future thrust of growth due to the rapid growth of urban population and influence of Dhaka city demand for supply of safe drinking water, providing safe and easy accessibility, use of agriculture production in income generating activities and create provision for further investment will increase.

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.

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.

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 a major portion of land is demarcated as high value agriculture land.
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. In the core urban area the existing roads are very narrow and there is an absence of drainage network. So, water logging is a common phenomenon in this area.
3. Missing links in road transportation creates accessibility problem. In the intersections, lands are using by commercial activities including daily bazar and saw mill which are increasing traffic congestion.
4. Easy accessibility with neighbouring Upazilas and a regional linkage is needed. Those linkages will grave huge amount of agriculture land. The single crop land may be used for this purpose.

4.4 Disaster

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 Sonargaon 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 Sonargaon 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.

4.5 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 33.07 % (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 (now Bangladesh), 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.”

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 Sonargaon 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 landuse 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 conserves 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 in to 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 46% land of the Sonargaon Paurashava is under the agricultural practices. According to the Landuse Policy, 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 for distribution by the government.

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 Sonargaon 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 upgradeable 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			Recommended Design		
	Cumulative Million ESA's	Typical Expected Design Life (Years)	New Class	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 Sonargaon 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 be 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 MjcÉ 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 (HLϕV hjs£ HLϕV Mijjil LjÑp\$Q£)
- Back to home Program (O-l ®gli LjÑp\$Q£)
- Food for Education Program (Mj-cÉl ϕhϕej-u ϕnrj LjÑp\$Q£)
- Rural Occupational Project (fð£ S£ϕhLjue fÈLÒf)
- Poverty Reduction Project (cjϕlâ ϕh-jjQe fÈLÒf)
- Self-employment Program for Women (jϕqmj-cl BaÈ-LjÑpwØqje fÈLÒf)
- Women Empowerment Program (jϕqmj-cl pijjϕSL rjaue fÈLÒf)
- Coordinated Women Development Program (pjϕeÄa jϕqmj Eæue fÈLÒf)
- Peace Home Program (njϕç¹ ϕehjp LjÑp\$Q£)
- Shelter Support Program (BnÈue LjÑp\$Q£)
- Educational Allowance Program (ϕnrj Efhªϕš LjkÑH²j)
- Aged-allowance Program (huØLija LjkÑH²j)
- Micro-credit Program (r¥âGZ LjÑp\$Q£)
- Allowances for Widowed, Poor and Husband-renouncement Women Program (ϕhdhij, cªxØq J üjj£ fϕlaÉJ²j jϕqmj-cl SeÉ ija fÈcje 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, Landuse 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) Ordinance, 2009 but the name remains same.

The Local Government (Paurashava) Act, 2009 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.

1. AḡbñL fĒçauḡe AḡCe, 1993 (1993 p-el 27 ew AḡCe)
2. Abñ GZ Aḡcḡma AḡCe, 2003 (2003 p-el 8ew AḡCe)
3. ÛŬḡe£u pLḡl Lḡjne AdĒḡ-cn, 2008
4. hḡwmḡ-cn nĒj AḡCe, 2006 (2006 p-el 42 ew AḡCe)
5. Cantonments Act, 1924 (Act No. II of 1924)
6. District Act, 1836 (Act No. I of 1836)
7. The Penal Code, 1890 (Act No. XLV of 1890);
8. Prevention of Corruption Act, 1947 (Act No. II of 1947)
9. hĒḡwL ®LḡÇfḡe£ AḡCe, 1991 (1991 p-el 14 ew AḡCe)
10. The Bangladesh Shilpa Rin Sangstha Order, 1972 (P.O. No. 128 of 1972)
11. The Bangladesh Shilpa Bank Order, 1972 (P.O. No. 129 of 1972)
12. The Bangladesh House Building Finance Corporation Order, 1973 (P.O. No. 17 of 1973)
13. The Bangladesh Krishi Bank Order, 1973 (P.O. No. 27 of 1973)

14. The Investment Corporation of Bangladesh Ordinance, 1976 (Ordinance No. XL of 1976)
15. The Rajshahi Krishi Unnayan Bank Ordinance, 1986 (Ordinance No. LV III of 1986)
16. @LjÇfje£ A;Ce, 1994 (1994 p-el 18 ew A;Ce)
17. Local Government (Paurashava) Act, 2009
18. SeË J jªaªË øehåe A;Ce, 2004 (2004 p-el 29 ew A;Ce) (see section 53(2)(Q))
19. Evidence Act, 1872 (Act No. I of 1872) (see section 131)
20. 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.

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.

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 distribution systems 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.

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) Act, 2009 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.

Major activity	Specific functions	Functions in brief
		Among other matters, a site development scheme may provide for- the division of the site into plots; the street, drains and open spaces to be provided; the land to be reserved for public purposes and to be transferred to the Paurashava; the land to be acquired by the Paurashava; the price of plots; the works that shall be executed at the cost of the owner or owners of the site or sites; and 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 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 by notice require 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 suitably repaired to the satisfaction of the Paurashava.
Development	Development plans	The Paurashava shall prepare and implement development plans for specific time. Such Plans shall

Major activity	Specific functions	Functions in brief
		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 about streets	The Paurashava may assign names to streets and paint the names or fix the nameplates on or at conspicuous places at 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

Major activity	Specific functions	Functions in brief
		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 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 Padma Bridge at Dauladia 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 Dauladia 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

PROJECTION OF FUTURE GROWTH BY 2031

6.1 Introduction

The Chapter presents future growth of the Paurashava according to the population, economy and landuse. The projected period for those components has been considered for the year 2010 to 2031. In case of population and landuse, projection has been presented but in case of economy, opportunities have been considered. For the Sonargaon 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.

6.2 Projection of Population

In the Sonargaon Upazila, from the year 1951-1961, annual growth rate of population was 2.32%, but from the year 1961-1974 the rate rises in to 2.94%. In 2001 government notified the urban characterized area of the Upazila as Paurashava and surprisingly then the growth rate of the whole Upazila decreased and it was 1.67% during the year 1991-2001. In addition, for urban area population of the Upazila the growth rate was 1.53%.

Accordinging population census 2001 the population of Sonargaon Paurashava was 18249 and in 2011 the total population of the Sonargaon Paurashava was 32796. According to census data 2011 the total population of Sonargaon Paurashava was of which 16182 are males and 15984 are females. From 2001 to 2011 the population growth rate was 1.45 which is below the upazilla growth rate as because there is a limited urban facility in this area.

Table 6.1: Population growth trend analysis

Items	2011	2001	Growth Rate	
			Decadal	Annual
Both sexes	32796	18249	60.4	6.04
Male	16182	9444	55.33	5.53
Female	15984	8805	61.44	6.14

Source: Population census-2011 and 2001, Community Series

Basis of population projection: According to population census 2001 the population of Sonargaon Paurashava was 18249 and it becomes 32796 in 2011 population census. So, we have considered 2011 census data as base population and annual growth rate is 6.14 according to the Census Year 2011 which is abnormally high. Though this area is in rural character considering real scenario the consultants recommended that the nation urban population growth rate may considered as expected annual growth rate for this area which is 3.43. The formula quoted in calculation of the population projection is -

$$F = A (1+r)^n$$

F=Projected population

A=Current population

R=Growth Rate

N=Year

The growth rate as presented and calculated in the Table-6.1 is considered for the preparation of population projection. The projection shows that the population of the study area was 32796 in 2011 and it will be 38830 in 2016, 45975 in 2021, 54435 in 2026 and 64451 in 2031. The scenario proves that in next 20 years the Paurashava population will be highly increase and present growth rate will continue. In special case, 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 6.2: Population projection (Sonargaon Paurashava growth rate 3.43)

Ward No	Area (in sq.km)	Existing Population 2011	Projected Population			
			2016	2021	2026	2031
1	1.59	3860	4570	5411	6407	7586
2	1.06	3605	4268	5054	5984	7085
3	1.06	3899	4616	5466	6472	7662
4	0.81	2139	2533	2999	3550	4204
5	0.94	3289	3894	4611	5459	6464
6	0.74	2319	2746	3251	3849	4557
7	0.81	4847	5739	6795	8045	9525
8	0.94	4293	5083	6018	7126	8437
9	0.57	4545	5381	6371	7544	8932
Total	8.53	32796	38830	45975	54435	64451

Source: BBS, 2011 and calculated by the Consultant (Considering Urban growth rate 3.43)

6.3 Identification of Future Economic Opportunities

Some small-scale pisciculture is located in the Sonargaon Paurashava area. The production mostly uses for the large local market of Dhaka City and Narayangonj City Corporation. Investment in this field will bring huge prospects of the Paurashava. Other economic prospect summarizes in the following discussions:

- Availability of agriculture land. The land may be used for different agricultural production and those productions may be used for the input of agro-based industries.
- Availability of unskilled and cheap manpower.
- 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 has been developed as growth centre concept. 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 same time, economic development parallel to the physical and social development will be encouraged.

6.4 Projection of Landuse

Landuse requirement

Most of the land of this Paurashava is agricultural land. There are also a large numbers of industries are seen in this Paurashava. Agriculture and manufacturing based township can 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.

Future landuse will be calculated according to the development control for the masses and the standard supplied by the LGED. 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.

In case of landuse change, the standard given by the LGED according to the projected population and area for the specific service will be 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 will be 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.

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.

Demand Analysis

Different methods will be followed for the calculation of landuse demand (such as 1 acre land for 20000 populations in case of a primary school). Demand for utility services, will be calculated according to the growth of people and the standard followed in the country. In case of special allocation, emergency services and restricted use of land, any

method should not be considered. An amount of land will be allocated or preserved for that service. The detailed of land use standard and proposals have discussed in land use planning chapter.

Table 6.3: Standard of Land use and future need

Types of Land Uses	Recommended Standard	Existing (acre)	Future land requirement(acre)			
			2016	2021	2026	2031
Residential		886.91	388.30	459.7	544.34	644.50
- General residential	100 persons/1 acre		388.30	459.7	544.34	644.50
-Real Estate – Public/Private	200 population/ 1 acre		-	-	-	-
Roads		75.23	10-15% of total land			
-Paurashava primary roads	150 – 100 feet		-	-	-	-
-Paurashava secondary roads	100 – 60 feet		-	-	-	-
-Paurashava local roads	40 - 20 feet		-	-	-	-
Education		9.15	68.25	80.80	95.67	113.27
-Nursery	0.5 acre/10,000 population		3.88	4.60	5.44	6.44
-Primary School/ kindergarten	2.00 acres/5000 population		15.53	18.39	21.77	25.78
-Secondary/High School	5.00 acres /20,000 population		9.71	11.49	13.61	16.11
-College	10.00 acres/20,000 population		19.42	22.99	27.22	32.22
-Vocational Training Centre	5 - 10 acres / Upazila		10.00	11.84	14.02	16.60
-Other	5.00 acres / 20,000 population		9.71	11.49	13.61	16.11
Open Space		14.29	83.48	98.85	117.03	138.57
-Play field/ground	3.00 acres/20,000 population		5.82	6.90	8.17	9.67
-Park	1.00 acre /1000 population		38.83	45.97	54.43	64.45
-Neighborhood park	1.00 acre /1000 population		38.83	45.97	54.43	64.45
Recreational		41.58	11.94	14.14	16.74	19.82
-Stadium/sports complex	5 – 10 acres/Upazila HQ		10.00	11.84	14.02	16.60
-Cinema/ Theatre	1.0 acre /20,000 population		1.94	2.30	2.72	3.22
Health		3.41	7.77	9.19	10.89	12.89
-Upazila health complex/hospital	10 -20 acres/Upazila HQ			0.00	0.00	0.00
-Health centre/Maternity clinic	1.00 acre/ 5,000 population		7.77	9.19	10.89	12.89
Community Facilities		5.83	15.21	18.01	21.32	25.24
-Mosque/Church/Temple	0.5 acre /20,000 population		0.97	1.15	1.36	1.61
-Eidgah/	1.0 acre/20,000 population		1.94	2.30	2.72	3.22
-Graveyard	1.00 acre /20,000 population		1.94	2.30	2.72	3.22
-Community centre	1.00 acre /20,000 population		1.94	2.30	2.72	3.22
-Police Station	3 – 5 acres/Upazila HQ		5.00	5.92	7.01	8.30
-Police Box/outpost	0.5 acre/ per box		0.50	0.59	0.70	0.83
-Fire Station	1.00 acre/ 20,000 population		1.94	2.30	2.72	3.22
-Post office	0.5 acre /20,000 population		0.97	1.15	1.36	1.61
Utility Facilities		0.00	11.76	13.20	14.88	16.88
Drainage	As per requirement	-	-	-	-	-
Water supply	1.00 acre/ 20,000 population		1.94	2.30	2.72	3.22
Gas Station	1.00 acre/ 20,000 population		1.94	2.30	2.72	3.22
Solid waste disposal	4-10 acres/ Upazila HQ		4.00	4.00	4.00	4.00
Waste transfer station	0.25 acres/ per transfer station		0	0	0	0
Electric sub-station	1.00 acre/ 20,000 population		1.94	2.30	2.72	3.22
Telephone exchange	.5 acre/ 20,000 population		0.97	1.15	1.36	1.61
Fuel station	.5 acre/ 20,000 population		0.97	1.15	1.36	1.61
Slaughter House	As per requirement		-	-	-	-
Others	-					0
Commerce and Shopping		18.56	42.71	50.57	59.88	70.89
-Wholesale market	1.0 acres/ 10000 population		3.88	4.60	5.44	6.44
-Retail sale market	1.0 acres/ 1000 population		38.83	45.97	54.43	64.45
-Corner shops	0.25 acre/per corner shop		-	-	-	-
-neighborhood market	1.00 acre/per neighborhood market		-	-	-	-
-Super Market	1.50 – 2.50 acres/per super		-	-	-	-

Types of Land Uses	Recommended Standard	Existing (acre)	Future land requirement(acre)			
			2016	2021	2026	2031
	market					
Industry (Manufacturing & Processing activity)		24.50	97.08	114.9	136.09	161.12
-Small scale	1.50 acres /1000 population		58.25	68.96	81.65	96.67
-Cottage/agro-based	1.00 acres /1000 population		38.83	45.97	54.43	64.45
Transportation and Communication		0.79	9.35	11.07	13.11	15.53
-Bus terminal	1.0 acre /20,000 population		1.94	2.30	2.72	3.22
-Truck terminal	0.50 acre /20,000 population		0.97	1.15	1.36	1.61
-Launch/steamer terminal	1.00 acre /20,000 population		1.94	2.30	2.72	3.22
-Railway station	4.00 acre / per Station		4.00	4.74	5.61	6.64
-Rickshaw/van stand	0.25 acre /one baby taxi/tempo stand		0.25	0.30	0.35	0.41
-Passenger Shed	0.25 acre /one baby taxi/tempo stand		0.25	0.30	0.35	0.41
Administration		4.74	13.00	13.00	13.00	13.00
-Upazila complex	10-15.00 acres	4.31	10.00	10.00	10.00	10.00
-Paurashava office	3 – 5 acres	0	3.00	3.00	3.00	3.00
Urban Deferred	10 percent of the total build up area	-	-	-	-	-

6.5 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. Population density is very high in this Pourashva. There are a total of 9755 structures within the study which is composed of pucca, semi-pucca and katcha structures and they are 1413, 1042 and 7300 in numbers respectively. Owners of the buildings have been found violated the setback rule by the construction. Except labor charge there is very little variation in building construction cost between Dhaka and Sonargaon Paurashava. Besides the natural growth rate high rural urban migration rate is creating problem in housing sector. In the central part there is informal housing on the abandoned land of absentee land lord. These housing are required to be formalized. Problems relating to the housing are mostly concerned with the poor community. 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.

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. Currently private developers investment shows the future potentiality of housing sector development. There is a great demand for rental housing in Paurashava area. Since it is very close to Dhaka city people are interested to reside and commute to their work place in Dhaka regularly. Small and large industries can provide housing for their employee which can contribute to an extent in the housing sector.

Basis of housing projection

Existing landuse is the only basis for housing projection. Residential use and mixed-use has considered for the year 2011 as base year and projected housing area is calculated considering 100 persons per acre and there is no standard for industrial use, commercial use, etc.

Demand analysis

The existing residential area is about 879.91 acres. It is estimated that housing demand stands at 644.51 acres at the end of project period 2031 which is higher than the demand, followed by 388 acres housing areas in 2016, 459.75 acres in 2021 and 544.35 acres in 2026. The estimate is based on the standard supplied by 100 person per acre. So, as per standard no additional housing areas will be needed at the end of 2031.

Table 6.4: Ward wise housing demand (in acre)

Ward No.	Existing housing areas (acres)	Estimated housing demand			
	2011	2016	2021	2026	2031
1	138.10	45.70	54.11	64.07	75.86
2	102.97	42.68	50.54	59.84	70.85
3	94.13	46.16	54.66	64.72	76.62
4	48.03	25.33	29.99	35.50	42.04
5	115.05	38.94	46.11	54.59	64.64
6	63.37	27.46	32.51	38.49	45.57
7	101.13	57.39	67.95	80.45	95.25
8	141.93	50.83	60.18	71.26	84.37
9	75.20	53.81	63.71	75.44	89.32
Total	879.91	388.30	459.75	544.35	644.51

Source: Land use survey 2010 and calculated by the consultant

Map 6.1: Population Density of the Study Area

CHAPTER 7

LAND USE ZONING POLICIES AND DEVELOPMENT STRATEGIES

This chapter sets land use policies and development strategies for planning area. It classifies the Structure Plan area into categories and also includes strategies for optimum use of urban land resources, plans for new area development and areas for conservation and protection.

7.1 Zone of Structure Plan Area

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 zones are broadly classified into seven categories. Table 8.1 shows the Structure Plan area zones, its area and percentage coverage. Details of the description of structure planning zones are given in the following paragraphs.

7.1.1 Core Area

Total 223.35 acres of land, which covers 9.19% of Structure Plan area, is declared as Core Area. It includes major portion of ward 8 and ward 9. It is mainly the highest concentration of service area for an example upazila complex, schools, post office, police station, bazar area etc. and it has the highest potentiality of development. Because the town developed based on the major roads namely thana road, Thana-museum road, hospital road, Upazilla Road and annanda bazaar GC road. Within this area, there are differences in levels of provision, particularly between the formally developed and planned areas and the majority of unplanned areas. Levels of provision should be maintained in the planned areas. Since these areas are forecasted to show density increase and increased demand and therefore will require regular upgrading. The main thrust to improve services should be in the unplanned zones, particularly where the deficiencies already are great and quality of life will sharply decline when the services also have to cater for the additional population.

7.1.2 Fringe Area

A total of 955.94 acres of land covering 39.32% of Structure Plan area is declared as Fringe Area. Maximum fringe area of proposed structure plan is located at Ward 5,6,7,8 and 9. This area mainly proposed, where a slow trend of urbanization is continuing in unplanned manner. The area is 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 encouraging a more rapid urbanization in a planned way.

7.1.3 Peripheral Area

A small portion of land are within this category. A total of 64.71 acres of area, which covers 2.66% of Structure Plan area, is declared as Urban Peripheral Area which mainly is located at the Ward no 1,2,3,4 and 5 of the Paurashava. This zone is developing areas that will take a longer time 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.

Map 7.1: Structure Plan of Sonargaon Paurashava

Table 7.1: Structure Plan Policy Zoning

Zoning	Description of the Zone	Area (acre)	%
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.	223.35	9.19
Fringe Area	This zone is 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.	955.94	39.32
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.	64.71	2.66
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 proposed to grow within 2031.	421.23	17.32
Agriculture	Agricultural land (also <i>agricultural area</i>) 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, other technical crops, potatoes, 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.	192.37	7.91
Water body	Water body containing an area equals to or more than 0.25 acres excluding those of khal, irrigation canal and river will be treated as this category.	314.62	12.94
Circulation Network	It covers all the major roads within the structure plan areas.	259.16	10.66
Total		2431.38	100

7.1.4 New Urban Area

Total 421.23 acres of land covering 17.32% of Structure Plan area is declared as New Urban Area. New urban area mainly proposed western portion of the Paurashava. It is assumed that town will be developed on north-west side of present core area. So most of the new urban lands will be use to meet the extra pressure of development trend for this reason. A large portion of land of the extension area be used to establish industry and rest of the land will be used for future planned urban development as per population projection.

7.1.5 Agriculture

Total 192.37 acres of land covering 7.91% of Structure Plan area is declared as Agriculture Area. Eastern portion of the Paurashava is mostly declared as agriculture area.

7.1.6 Waterbody

Total 314.62 acres of land covering 12.94% of Structure Plan area is declared as Agriculture Area. It includes ponds and ditches with an area equal to or more than 0.3 acres and river within the Paurashava.

7.1.7 Major Circulation Network

It contains Regional Highway passes over the paurashava area, road network with other neighboring urban centers and also includes the major road way network required for maintaining existing internal communication. Total 259.16 acres of land which covers 10.66 % of total structure plan area.

7.2 Strategies for optimum use of Urban Land Resources

7.2.1 Optimum use of Urban Land Resources

With a limited land mass, Bangladesh is the most densely populated country in the world. The land area of the country remains static amid continuously increasing population. Such a situation calls for strict regulation to utilize its scarce land resources for non-agricultural purposes. Increase in urban population means more demand for houses, roads, schools, hospitals, factories, bazars, shops, business centres, offices, other service facilities etc. Providing all these facilities require land and that is at the cost of valuable agricultural land, as the country has hardly any fallow land to accommodate all these land uses. Sonargaon Paurashava is surrounded by valuable fertile agricultural land. Any urban expansion will cost net deduction of agricultural land that will consequently affect local food and cash crop production. Practice of thriftiness on land utilization is, therefore, essentially needed in plans and development proposals. Such practice should start through adoption of conservative and rational standards of space use and their proper application in planning, designing and development. Table 7.2 shows the optimum use of urban land resources.

Table 7.2: Policy for optimum use of urban land resources

Policy	Justification	Means of Implementation	Implementing Agency
<p><u>Policy UA/1: Optimization of Available Land Resources</u></p> <p>Growth within the established urban area is not compact in Sonargaon. There are still large amount of land lying vacant amid all categories of land uses within the Paurashava area and beyond. Infilling of these lands should be promoted and encouraged to optimize use of land.</p>	<p>Keeping large land areas vacant within the existing built up area, extension of physical boundary of the town is not logical. Such a tendency might cause valuable agricultural land out of use. There is a need to economize the use of land, which is a scarce resource against an expanding population in the country.</p>	<p><i>Control:</i> Imposition of tax on the land remaining vacant for a long time can be tried to discourage speculation on the land use practices. Measures should be adopted to minimize the use of land by public sector agencies. Policies to discourage large scale land acquisition for development by the public sector can be tried.</p> <p><i>Promotion:</i> The public sector should develop infrastructure facilities and services in deprived areas to enable the land owners for development.</p>	<p>-Sonargaon Paurashava; -Ministry of Land</p>
<p><u>Policy UA/2: Utilisation of Khas Land for Urban Development</u></p>	<p>Khas lands are public land that should be made best use for community purpose. Instead of evicting people from their own land for implementing development proposals, khas land should be used as much as possible.</p>	<p>Taking over of khas land by Paurashava that falls under different development proposals under the current development plan. Paurashava can later on hand over the land to the concerned authority that will implement the particular development proposals.</p>	<p>-Sonargaon Paurashava -Ministry of Land -DC, Dhaka</p>

7.2.2 Plans for New Area Development

Table 7.3 shows policy to develop new urban area. It includes justification of new area development, means of implementation and agencies for implementation.

Table 7.3: Policy for new area development

Policy	Justification	Means of Implementation	Implementing Agency
<u>Policy UA/3: Initiatives For New Urban Area Development</u>	New areas with their growing stage offer excellent opportunity for organized development with little or no compensation cost for eviction and less hindrances in motivation of the local residents in favor of organized development	Participatory approach to new urban area development is to be supported by innovative ideas of spatial development. Long motivational activities will have to be carried out for this purpose. Public sector with technical and financial support of the private sector and cooperation from service giving agencies will make the task easier.	-Sonargaon Paurashava -DPHE -Private sector.

7.2.3 Areas for Conservation and Protection

To ensure livable environment in the planning area, different areas are conserved in various forms, namely agricultural land, low land, pond and natural drainage, green belt, historic and heritage areas, etc. Details are given in Table 7.4.

Table 7.4: Area for conservation and protection

Type of Land	Means of Implementation	Implementing Agency
The historical areas: As this a historical area, the Panam city area, museum area and other historical area with the Paurashava should preserve.	As per existing rules and regulation of Department of Arciology of Bangladesh.	-Department of Arciology of Bangladesh. -Bangladesh parjatan Corporation. -Sonargaon Paurashava
Loss of Productive Agricultural Land: The Master Plan area has a vast agricultural land in the northern side of this project. After implementation of the project, environment of agriculture will be converted into non-productive urban and semi-urban area.	The EIA Guidelines of DOE emphasized on the avoidance of productive agricultural land for any development project. Therefore, it will be wise to consider more economical use of land to avoid fertile lands. The town expansion and land acquisition should be based on the growth rate of population. According to population projection for the year 2031, the present residential land use area will grow with increasing density. So a large share of agricultural land can be spared at least for the time being.	-Sonargaon Paurashava -DOE.
Low Land, Pond and Drainage Path: Pond and ditches with an area	This area is declared as water body in the Master Plan. As per the guideline of 'Playfield, Open	-Sonargaon Paurashava

Type of Land	Means of Implementation	Implementing Agency
equal to or more than 0.3 acres within the Paurashava are declared as retention area. In no way permission for filling up of these ponds should be given. Paurashava should acquire these ponds at suitable time to use them for retention and emergency use.	space, Park and Natural water reservoir Conservation Act, 2000' this area will be conserved as water body. According to population projection for the year 2031, the present residential land use area can be developed with increasing density up to this year. So a large share of water body can be spared.	-Water Development Board
Green Belt: The river bank is declared as green belt. This area will be used for aforestation and recreational purposes for conservation of environment and creation of opportunity for tourism development in this town.	This area is declared as green belt in the Master Plan.	-Sonargaon Paurashava

7.3 Policies for Development

This section of the chapter sets forth strategies and policies for various components of the Master Plan on sectoral basis.

7.3.1 Policies for Socio-economic Sector

Population

Controlling population should be given utmost importance nationally, as because of the uninterrupted population growth, the country's economic problems are being accentuated, pressing on its resources. It makes poverty reduction difficult, which is the key to overall national development. It is, therefore, necessary to enhance population control drive. The people at the grassroots can play an effective role in this regard. An efficient, well trained and well paid grassroots level work force can help profoundly in achieving the targets of population control policy of the government. Side by side, promotion of education can be very effective in the creation of awareness about small family size. The Paurashava may undertake relevant measures in line with national objectives to strengthen its own position in population planning.

Strategy:

Raise the level of education among mass people and emphasize more on grassroots level family planning workers' services with effective delivery of birth control services.

Table 7.5: Policy for Population Sector

Policy	Executing Agency
<p><u>Popu/1:</u> Declaring population as one of the most critical sectors of national development Justification: Per capita national growth is being eaten up by constantly growing population. By controlling population, national benefits earned from economic growth can be shared in a better way, raising the level of living standard of the people.</p>	<p>-Ministry of Planning -Ministry of Health and Family Planning</p>
<p><u>Popu/2:</u> Putting more efforts and resources in raising the level of education. Justification: Education would not only create awareness among the masses about the benefits of small family size, it will also help secure better job with higher pay that would reduce poverty.</p>	<p>-Ministry of Education -Ministry of Planning -Ministry of Health and Family Planning</p>
<p><u>Popu/3:</u> Creation of well paid and well trained grassroots level family planning workers for motivational work. Justification: Grassroots level workers can give door to door motivational services and distribute birth control materials in a better way. To get good services they must be efficient and well paid.</p>	<p>-Ministry of Planning -Ministry of Health and Family Planning</p>

Economic Development and Employment Generation

Economic development of any place is associated with generation of employment. The generation of employment depends on the rate of investment in various sectors of an economy. An urban economy of any town starts building up with investment in the basic sector that leads to the building up of the non-basic sector. Investment in basic sector is very bright in Sonargaon as it is very close to Dhaka City. Besides, it has good communication with other adjoining urban centers. However, the Paurashava must ensure that any foreseeable opportunity in economic development is given due attention for its own growth and economic benefits.

Strategy:

Creating basic sector investment climate and leading the local economy forward through promotion of Small and Medium Enterprises (SME).

Table 7.6: Policy for Economic Development and Employment Generation

Policy	Executing Agency
<u>Econ/1:</u> Provision of bank loans on easy terms to attract prospective investors in the SME sector. <u>Justification:</u> Easy loans would encourage and attract prospective investors for investment in small scale industries.	-Ministry of Industries -Ministry of Commerce
<u>Popu/2:</u> Taking of measures to channelize remittance to value adding productive sectors. <u>Justification:</u> Larger amount of remittance is being diverted to land purchase, which is considered as the safest investment. This huge capital may be diverted to productive sectors to help create more employment.	-Ministry of Industries -Ministry of Commerce
<u>Popul/3:</u> Arranging entrepreneurship training programmes for prospective investors. <u>Justification:</u> There are many potential investors who are ignorant of the ways and means of investment and operation of an enterprise. The training can help them get educated in these lines.	-Ministry of Industries. -Ministry of Commerce.

Housing

Being very close to Dhaka city there is an extreme demand of housing for the commuter people. Housing policy and programmes are provided and executed by the national government. There is no local office of the National Housing Authority to execute housing programmes at Upazila level. As a local government, Paurashava can facilitate housing area development by means of providing road infrastructure, drainage, water supply, etc in designated housing zones. The consultant supports the prevailing national housing policy and advocates its execution at all levels, which at the moment is highly lacking.

No slums are observed in this small town, the way they are exposed in large cities. So no slum and squatter related problems are there in the town. This provides a better scope for planned housing development in the Paurashava.

Strategy:

Upholding the role of Paurashava, as a facilitator to provide all necessary infrastructure and services to enable housing by people in general. As a least cost approach, involvement of the land owners can be encouraged in housing area development on a public-private partnership basis.

Table 7.7: Housing and Slum Improvement

Policy	Executing Agency
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<p><u>Policy House/1:</u> Provision of necessary services and facilities to promote housing at private sector.</p> <p><u>Justification:</u> It is more difficult to provide housing on public sector initiatives, as it involves funding and land acquisition that takes a long time. By providing infrastructure and services, general people can be encouraged to build their own houses.</p>	<p>- National Housing Authority</p> <p>- Ministry of LGRD</p> <p>- Sonargaon Paurashava</p>
<p><u>Policy House/2:</u> Housing zone land owners can be involved in a participatory development approach, where Paurashava will provide infrastructure and the cost will be shared by land owners.</p>	<p>- National Housing Authority</p> <p>- Ministry of LGRD</p> <p>- Sonargaon Paurashava</p>

Social Amenities and Community Facilities

Social amenities and community facilities include, education facilities, health facilities, open space recreation facilities like, park and playground, amusement park and community centre. For comfortable and healthy urban living, these facilities are the fundamentals. Since these are social services, they must be provided by the public sector agencies as public good. For education and health facilities, the national government have policies and there are separate ministries and their agencies to execute the policies through programmes and projects. There are also Upazila level offices of the concerned agencies to take care of the execution of national education and health policies and programmes. For providing amenities like, park and playground and community centre, the responsibility lies with the Paurashava. For park and playground, the Paurashava may secure local khas land. The open space recreation is difficult to provide as population expands and land price goes higher. Once time is lost, vacant lands are also lost. Amid soaring land price and absence of vacant land, it becomes extremely difficult to provide open space recreation. So, it is better to secure vacant lands for open space before density of population increases and land becomes scarce and pricier. For community center, intensive use of land should be made by making multiple use of the same space, for example, providing community center, ward councillor's office, clinic or any other use in the same building.

Strategy:

Exploring khas /public land within the Paurashava and using the unused/vacant land for providing amenities, before density of population increases and land becomes scarce and dearer.

Table 7.8: Social Amenities and Community Facilities

Policy	Executing Agency
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<p><u>Policy-Amenity/1:</u> Procurement of khas and other public land for park, playfield, community centre.</p> <p><u>Justification:</u> Since above facilities are non-revenue earning, they should be procured at least cost.</p>	<ul style="list-style-type: none"> - Ministry of Land - DC Office, Dhaka - Ministry of LGRD - Sonargaon Paurashava
<p><u>Policy-Amenity/2:</u></p> <p>Land should be procured for open space facilities as quickly as possible, because when land value will be higher, cost of providing the facilities will also be very higher. Besides, with the growth of population, vacant land will disappear gradually, so no land will be available at strategic locations for providing open space facilities.</p>	<ul style="list-style-type: none"> - DC Office, Dhaka - Ministry of Land - Ministry of LGRD - Sonargaon Paurashava

7.3.2 Physical Infrastructure Sector

Transport

By far, transport is the most important means to revitalize an urban center. Intra and inter urban transportation facilities create economies of scale for prospective investors and enables easy and comfortable mobility of the residents. Easy and cheaper transportation of raw materials and finished goods create good investment climate for manufacturing enterprises that lead to development of the service sector firms. New employment generates and the non-basic sector expands leading to thriving urban center. To create transportation facilities, quality inter-Upazila and inter-District road network will have to be created that makes movement faster and easy. With good transport infrastructure, economic development may become attractive. Besides, quality of local roads will have to be upgraded to encourage people live in the town. Once population starts increasing, it will expand local consumer market and will attract new investments in consumer goods production.

Strategy:

Creation of efficient inter-city and intra-town communication for easy transportation of goods and passengers.

Table 7.9: Policy for Transport Sector

Policy	Executing Authority
<u>Policy-Transport/1:</u> Development of efficient inter-city road network with standard road. Justification: Increased inter-city mobility will increase business transactions and generate investment and employment.	- Roads and Highways Department (RHD)
<u>Policy-Transport/2:</u> Promotion of efficient road transport facilities between urban centers. <u>Justification:</u> Not only that communication is needed between urban centers, but to attract investment, emphasis must be laid on quality of roads built.	- Bangladesh Road Transport Authority (BRTA) - Dhaka District
<u>Policy-Transport/3:</u> Development of local road network through participatory approach. Justification: Development of roads will involve huge cost. Participatory development will enable cost sharing, which will reduce cost of road construction substantially.	- Sonargaon Paurashava - Local Government Engineering Department (LGED)

Utility Services

Utility services are the most essential parts of urban life. To make an urban center livable, there must be adequate provision for utility services. Utility services include water supply, solid waste management, power supply, sanitation and drainage. Except power supply, the rest are the responsibilities of the Paurashava.

Strategy:

Attainment of self reliance in revenue collection and adoption of participatory approach to service provision to ensure better services and facilities to the people.

Table 7.10: Policy for Utility Services

Policy	Executing Agency
<u>Policy-Utility/1:</u> Exploration of alternative sources of water to ensure sustainable supply. Justification: Amid constant rise of urban population, it is time to explore alternative sources of water like, rain water harvesting and surface water supply.	- LGED - Sonargaon Paurashava
<u>Policy-Utility/2:</u> Involvement of beneficiaries in solid waste management. Justification: Involvement of beneficiaries in solid wastemanagement will make the operation more effective and reduce financial responsibility of the Paurashava.	- Sonargaon Paurashava, - NGOs and CBOs

Policy	Executing Agency
<p><u>Policy-Utility/3:</u> Exploring re-use and recycling of waste materials to extract resources.</p> <p><u>Justification:</u> Re-use and recycling of waste materials will produce resources and reduce cost of waste management.</p>	<p>- Sonargaon Paurashava, - NGOs and CBOs</p>
<p><u>Policy-Utility/4:</u> Publicity on the benefits of hygienic sanitation to motivate people and enable people to have easy access to sanitary materials.</p> <p><u>Justification:</u> Motivation will encourage people to adopt healthy sanitation and reduce health risks.</p>	<p>- LGED - Sonargaon Paurashava - NGOs and CBOs</p>
<p><u>Policy-Utility/5:</u> Protection of natural drainage system and preparation of hierarchical drainage network.</p> <p><u>Justification:</u> Natural drainage systems are being grabbed and filled up, which increases the risk of water logging. Well planned hierarchical drainage network helps smooth drainage of storm and waste water.</p>	<p>- LGED - Sonargaon Paurashava</p>

7.3.3 Environmental Issues:

From environmental point of view Sonargaon Paurashava is not yet badly affected. There are some issues that must be taken care of. The issue of sanitation has already been dealt within the utility services section. Except cyclone, there is no natural hazard. There is no mentionable air, water or soil pollution in the Paurashava from any mentionable sources at present.

Natural Resources

The Paurashava is not endowed with many natural resources that can be conserved. Among the major natural resources there are 561 ponds, 453 ditches, 44 irrigational canals and 3 natural canals/ khals naturally drain the rain water. Out of the total ponds with an area equal to or more than 0.25 acres and the natural khals need to be protected and conserved to ensure sustainability in drainage and water supply of the Paurashava.

Strategy:

All khas land and canals should be vested with Paurashava for use in community interest.

Table 7.11: Policy for Natural Resources

Policy	Executing Agency
<p>Policy-Nature /1: All khas lands within the Paurashava must be assessed and handed over to the Paurashava for use in community interest. Justification: This will prevent misuse of khas lands by political and powerful local people.</p>	<p>- Ministry of Land - Sonargaon Paurashava</p>
<p>Policy-Nature/2: All natural canals within the Paurashava must be vested with the Paurashava for maintenance and proper use as drainage canal. Justification: This will help prevent unauthorized occupation and filling of natural drainage.</p>	<p>- Ministry of Land - Sonargaon Paurashava - NGOs and CBOs</p>

CHAPTER 8

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.

8.1 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.
- Massive training programme has to be arranged for the municipal staff for computerized accounting, billing and infrastructure development. .
- 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 can not 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 can not 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 can not 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 Sonargaon 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.

8.1.1 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. The Paurashava is capable to collect the taxes and tolls prescribed by the government. But still they have lack of tax collection. There is no proper arrangement for staff training only few training are received by LGED which are not sufficient enough. 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.

8.1.2 Lack of Automation

Still now 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.

8.1.3 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.

8.1.3.1 Institutional Framework

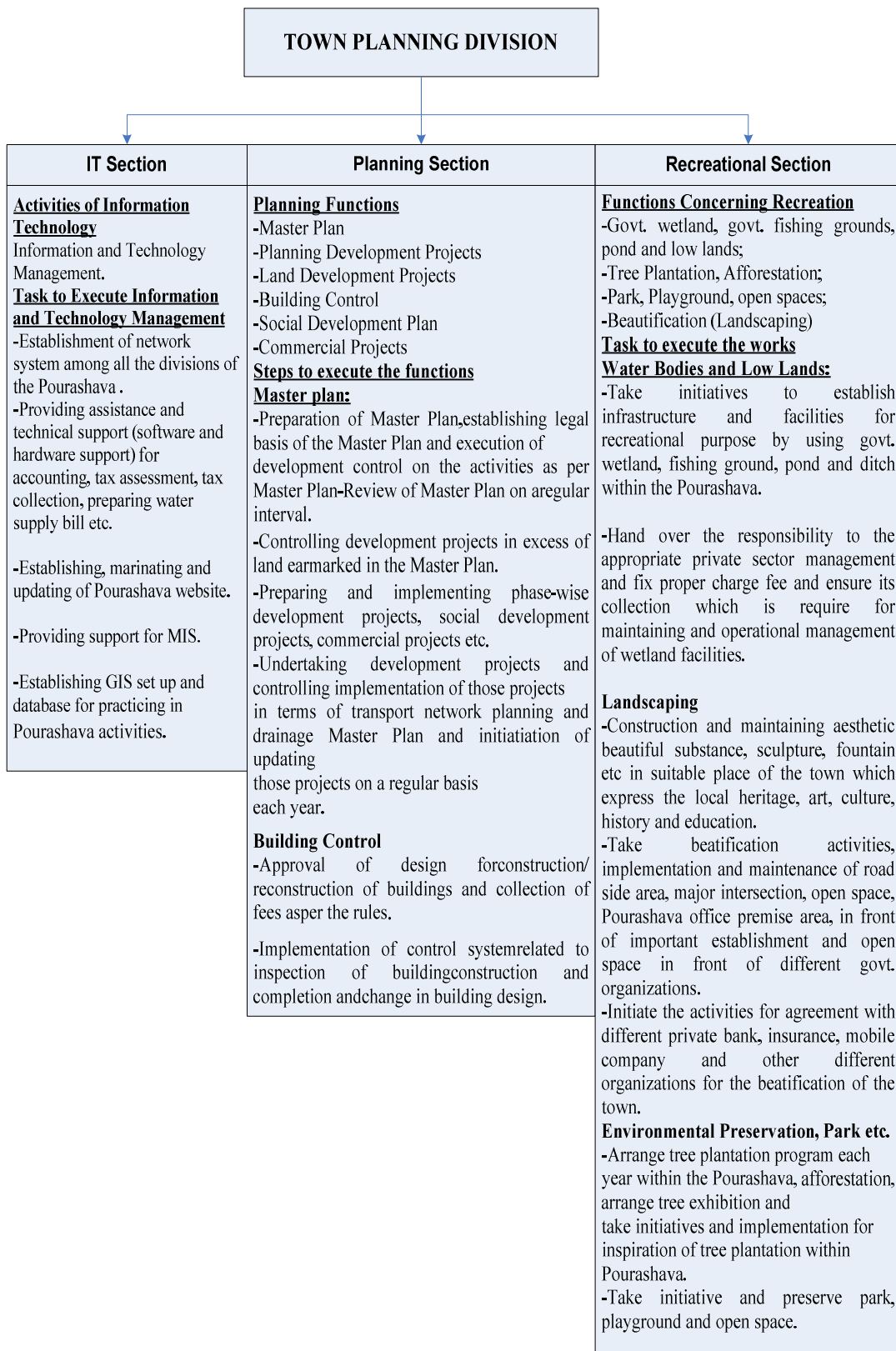
To rearrange the institutional framework for the Paurashavas recently the government has made a committee to reform the organogram of all the Paurashavas of Bangladesh. According to the clause no. 72-78 (Paurashava Officer & staff, provident fund etc) of Paurashava Act, 2009 and on the basis of the type 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 8.1: Scope of Work for Planning Division



8.1.3.2 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. For proper implementation of the Master Plan for each Paurashava under UTIDP, establishment of a separate planning unit 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.

Sonargaon 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 Paura 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.

8.1.4 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.

8.1.5 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.

8.1.6 Financial Issues

Governance in Sonargaon 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.

The Ministry of LGRD and Cooperative has undertaken a number of projects in respect of establishing governance in upgrading Paurashava accounts system, like, UGIIP, STIFPP. Computer and accessories are supplied under these projects for automation of the accounts system. Besides, trainings are also offered to the Paurashava accounts staff for enabling introduction of automation in accounts system. But all these services have not yet reached Sonargaon Paurashava.

Revenue Management

The Paurashava still follows a traditional management system in tax collection and revenue management though a scheme of computerized automotive financial system has already been introduced in this Paurashava. 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. The public is mainly informed about tax collection during the presentation of annual budget. They may, however, get information from the councilor 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 have been supplied and installed in the Paurashavas covered by financial automotive projects. The projects also provided training to the relevant staffs 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, Sonargaon 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 can not raise its own revenue adequately, it will not be able to execute much of the development projects under the Master Plan.

8.1.7 Monitoring, Evaluation and Updating

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 Sonargaon 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.

8.1.8 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 Sonargaon 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.

8.2 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.

8.3 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 piecemeal. 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.

CHAPTER 9

URBAN AREA PLAN

This is the first chapter of Part- B that starts with Urban Area Plan. Urban Area Plan is the mid level plan that covers the existing Paurashava. It lays down the land use zoning plan and infrastructure development proposals at the town level. Land use planning is an important part of Master Plan ensuring that land is used efficiently for the benefit of economy, society and environment of Sonargaon Paurashava. This planning means the scientific, aesthetic, and orderly disposition of land, resources, facilities and services with a view to securing the physical, economic and social well-being of urban communities.

9.1 Goals and Objectives of Urban Area Plan

Urban Area Plan is the first phase illustration of the Structure Plan intended to be implemented over a time span of 10 years. The Urban Area Plan has been prepared within the policy framework of the Structure Plan and aims to attain the overall project objectives. So there is a hierarchical relationship between the two. In fact, Urban Area Plan is the first phase detailed illustration of the policies and strategies of the structure plan.

The preparation of Master Plan for Sonargaon Paurashava is aimed towards its future development, and covers the areas that are likely to become urban in future. The Urban Area Plan is aimed to:

- Determine the present and future functional structure of the town, including its land uses; and
- Provide infrastructure proposals for improving and guiding development of future urban area.

9.2 Methodology and Approach to Planning

The base map supporting for land use survey was obtained from the physical feature survey that contained all categories of physical features within the planning area. During physical feature survey, all structures and the functions of principal buildings were picked up and depicted on the map. The physical features were superimposed on a mouza map and printed for land use survey on the map. The map was carried to the field by investigators for detailed plot to plot land use survey. The field investigators carrying the map visited each and every plot and the structures therein and noted their uses in writing and marking them on the map with colour pencil. They also verified the land use names put during the physical feature survey. Back in the office, the common land uses of plots were delineated in the map as per land use format given in the ToR. The delineated zones were then digitized and a new land use map was prepared for the entire planning area. After land use demarcation, field checking was done to correct possible errors.

Urban Land Use Plan is aimed to guide the physical development of Sonargaon town including its economic and social activities. This plan adheres to the policy directives spelled out in the Structure Plan. The current 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. The Urban Area Plan is, therefore, more rigid than Structure Plan. Making a land use plan on a cadastral map makes the Urban Area Plan 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 objectives of the Urban Area Plan have been attained through:

- Orderly location of various urban land uses;
- Location of appropriate transportation and drainage network; and
- Orderly location of services and facilities.

9.3 Delineation of Planning Areas

Planning area has been decided with the assistance and advises received from Sonargaon Paurashava Mayor, Councilors and other professional staffs and Gazette notification (S R O No-83 Law/ 2001). In order to delineate this boundary, there was a wide reconnaissance survey involving eye observation of the entire Paurashava area including those areas which have future potential growth. But since, the formation of Sonargaon Paurashava is 10 years back (2001); the development trend do not took much momentum as it required. In addition, the Mayor and the Councilors opinioned in favor of keeping the Paurashava area encompassing the nine wards as exist for next 20 years. Strong arguments from Paurashava Mayor and Councilors were advised to extend the boundary as it is not an old Paurashava and various developments has taken place, and the present area is not enough as study/ planning area. But some development activities like tourist spot (Lok-O-Karushilpa Museum, Panam City) can influence the area for rapid development. Considering the real senarion around 325.01 acres of land comprises two separate location of 62.32 acres and 325.08 acre along Dhaka- Chittagong highway has incorporated within the structure plan area. So, Consultant has considered 2431.38.acres (9.84 sq km) with nine Wards as the planning area. Where the existing Paurashava area is 2106.30 acres and extension area is 325.08 acres.

9.4 Content and Form of Urban Area Plan

The Urban Area Plan is presented in both map and textual format. The plan map is presented in 1:1980 or 1 inch to 165 feet scale, superimposed 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. The report explains the various plan proposals and other components of the plan.

The Urban Area Plan of the Master Plan of Sonargaon Paurashava contains several components. These are:

- Land Use Plan;
- Transportation and Traffic Management Plan;
- Drainage and Environmental Management Plan; and
- Proposals for Urban Services.

The Urban Area Plan is concerned only with the area where the greatest change is expected in the medium-term (10 years). For this area, it indicates how the Structure Plan policies might be pursued whilst also giving greater precision to the spatial dimension of the policies.

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 is the first chapter of Part-B of this report. It 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.

CHAPTER 10

LANDUSE PLAN

The Landuse Plan is the first element of the Sonargaon 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 Urban area Plan. It contains more details about specific programs and policies that require to be implemented over the medium-term.

10.1 Methodology and Approach

For the preparation of Landuse Plan, spatial information or data of all existing landuses from landuse survey was processed and stored under a comprehensive GIS database component. GIS software such as PC ArcView and PC ArcInfo (Version as suggested in the ToR) has been used for processing of physical feature survey data. Data was stored in WGS-1984 format (latitude, longitude, ellipsoidal height in meter) and later on it was projected and stored in Lambert Conformal Conic (LCC) projection system.

Landuse map has prepared applying the appropriate systematic command through GIS. Landuse is transferred on CS Mouza map in a scale of RF 1:1980. Landuse is divided into different categories and subcategories approved by the LGED. Landuse colours and legend were also fixed by the PD (Project Director) of the UTIDP, LGED. Legend contains, necessary themes, features using different symbolize schemes. As per suggestion of the LGED for fixed legend and approved format for landuse, Consultants have prepared existing landuse map.

Based on the existing landuse map, the landuse plan is being prepared according to the guidelines given by the ToR. The planning starts from formulation of strategies to issues like functional quality (meeting of space requirements for different functions, relation between functions etc., aesthetic quality, flexibility, deviation, public agency support etc.) for plan implementation. The planning in detail also covers the delineated existing urban area and the new urban area.

10.2 Existing and Projected Landuse

10.2.1 Introduction

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.

At present, except about 33.07% agriculture land, 41.77% residential development and 15.66% water bodies, rest land are using for various purposes. According to the physical feature survey, the study area has as many as 30537 structures. There are a total of 9755 structures within the study which is composed of pucca, semi-pucca and katcha structures and they are 1413, 1042 and 7300 in numbers respectively. For rearrangement and enforcement of new provision those land will generate planning scope. Due to the absence of airport and helipad, vertical expansion of the building will be easily encouraged in anywhere of the Paurashava. New innovation for increase the agriculture production may be encouraged easily.

The Paurashava seems a barren land area. People are not quite aware about the modern facilities available to their door step. It is easier to inject guiding principles, modern facilities and long run development control for the Paurashava as well as for the inhabitants.

Table 10.1: Existing landuses of Sonargaon Paurashava

Land Use Category	Area (acre)	Percentage (%)
Agriculture	696.44	33.07
Circulation Network	75.23	3.57
Commercial Activity	18.56	0.88
Community Services	5.83	0.28
Education & Research	9.15	0.43
Governmental Services	4.74	0.23
Manufacturing and Processing Activity	24.50	1.16
Mixed Use	1.27	0.06
Non Government Services	0.50	0.02
Recreational Facilities	41.58	1.97
Residential	879.91	41.77
Service Activity	3.41	0.16
Transport & Communication	0.79	0.04
Urban Green Space	2.46	0.12
Vacant Land	11.98	0.57
Water Body	329.94	15.66
Total	2106.30	100

Note: Including 325.08 acre extension area total area stands 2431.38 acre.

10.2.2 Analysis and Projection on Existing and Proposed Landuses

Due to nearness of Dhaka city and rapid urbanization and as it is a historical Panam city area. Tourism 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.

Future landuse will be calculated according to the development control for the masses and the standard supplied by the LGED. 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 People of the Paurashava are not quite aware about the modern facilities available to their door step. It is easier to inject guiding principles, modern facilities and long run development control for the Paurashava as well as for the inhabitants.

10.2.3 An estimate on the Requirement of Land for Different Landuses

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.

Future landuse have been calculated according to the development control for the masses and the standard supplied by the LGED. In case of public land, existing use and khas land may be emphasized. Willingness and participation of the people in development activities may be the key factor for future landuse demarcation. Slow change of landuse has 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 has been 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.

Projection of landuse depends on the growth of population. After population projection it is found that, population of this Paurashava will be 45975 in the year 2021 and 64451 in the year 2031. Projection on landuse also depends on present trend of migration.

In case of landuse change, 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 (including extended areas). 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 fifteen years period.

Commerce

In total, 18.56 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 study team has considered 64451 populations for the study area up to the year 2031. For this population total number of required wholesale market/bazar stands at $(64451/10,000)$, means 6.45 acres land is being needed up to the year 2031 and for retail sale market, 64.45 acres.

Recommendation / Forecast: In the planning area already has retail sale market including wholesale market/bazaar. The study team recommended a new wholesale market/bazar and 3 super market and a community center cum market. Considering our country context and development scenario probable areas for commercial development are earmarked as mixed use area so that they may use this land for residential/commercial purpose according to the demand. Necessary planning permission and design criteria will be provided by the Paurashava.

Map 10.1: Existing Landuse of Sonargaon Paurashava

Industry

In the Paurashava, 24.50 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 64451 populations for the planning area up to the year 2031. For this population total required land for industry stands at $(64451/1,000 \times 1.5) 96.67$ acres land for small-scale industry, 64.45 acres for cottage / agro-based industry up to the year 2031.

Recommendation / Forecast: The study team observed that though this Paurashava is rural base there is potentiality of industrial development due to nearness of Dhaka city. Considering the real scenario the consultants has proposed a area of 115.35 acres for industrial development of which 46.68 acres are general industries and 68.45 acres are heavy industries. 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. The industrial development proposal has proposed both side of Dhaka-Chittagong Highway.

Primary School

There are 16 primary schools in the planning area covering together 4.08 acres land.

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 study team has estimated 64451 populations for the planning area up to the year 2031. For this population total number of required primary school stands at $(64451/5,000)$, means 13 schools with 26 acres land will be needed up to the year 2031.

Recommendation / Forecast: According to the standard there is no need for new primary school. The existing area of school has proposed for extension and a new primary school has recommended. Proposal has made not to extend the number of school but proposed for increasing of enrollment, area extension and expanded vertically.

Secondary School

There are 6 secondary schools in the planning area covering together 2.46 acres land.

Determination of Standard: According to standard, 5 acres of land may be provided for every 20,000 population for one secondary school. The projected population of the planning area is 64451 up to the year 2031. Therefore, as per standard the planning area needs $(64451/20,000)$ 4 secondary school with an area of 20 acres up to the year 2031. Number of schools already exceeds the requirement.

Forecast / Recommendation: As per above standard, no more secondary school is needed. But considering the real scenario a new secondary school are recommended. Existing areas of the schools also proposed for expansion.

College / Higher Secondary School

There is only one college in the planning area. The existing colleges are located on 0.36 acres of land.

Determination of Standard: The standard for college is 10 acres per 20000 populations. So there is a need of 4 colleges as per planning standard in 2031.

Recommendation / Forecast: two new college and a university college has recommended in the planning. Necessary horizontal and vertical expansion of the existing college is also recommended.

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, there is no vocational training centre in the Paurashava.

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.

Besides that there is 10 madrasah and 5 coaching centre in the Paurashava area.

Health Facilities

Existing health facilities are not bad in this Paurashava. There is one upazilla health complex and three clinics in this Paurashava.

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, (6445/5000) means 12.89 acres of land will be needed for Health centre/Maternity clinic.

Recommendation / Forecast: The study team recommends a new hospital zone for health facility development. The land owners/private developer will develop such services. Necessary planning permission will be offered by the Paurashava.

Open Space

At present there is 11.98 acres of land under this category 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. A total of 138.57 acres of land is needed for this category.

Recommendation / Forecast: The study team is not recommended play field. A central park cum stadium, 2 neighborhood park is being recommended. 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, ward office 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, club, etc. Existing land under community facilities is 5.85 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 community centre, a graveyard, a cremation, an eidgah, a area for fire service and nine ward centre. Areas for Mosque/Church/Temple, Post office and T&T remain with existing areas.

Administration

In the Paurashava, 4.74 acres land is under administrative use.

Determination of Standard: According to the standard for administrative land, 10-15 acres of land is to be provided for every Upazila, 3 to 5 acres per Paurashava office, 0.10 acres per Union and 10 acres for jail/sub-jail. Total required land for administration stands at 13 acres.

Recommendation / Forecast: The planning area already has one Upazila office, one Paurashava office and other govt. offices. A new area for administrative area development and a area for Paurashava bhaban developmet has recommended under this category.

Table 10.2: Existing landuses and future demand including standard

Types of Land Uses	Recommended Standard	Existing land (acre)	land requirement (acre) in 2031	Proposed Land	Percentage
Residential		879.91	644.50	1133.88	46.63
-General residential	100 persons/1 acre		644.50		
-Real Estate – Public/Private	200 population/ 1 acre		-		
Roads		75.23	10-15% of total land	242.43	9.97
-Paurashava primary roads	150 –100 feet	-	-		
-Paurashava secondary roads	100 – 60 feet	-	-		
-Paurashava local roads	40 - 20 feet	-	-		

Types of Land Uses	Recommended Standard	Existing land (acre)	land requirement (acre) in 2031	Proposed Land	Percentage
Education		9.15	113.27	68.14	2.80
-Nursery	0.5 acre/10,000 population	5.07	6.44		
-Primary School/ kindergarten	2.00 acres/5000 population		25.78		
-Secondary/High School	5.00 acres /20,000 population	2.47	16.11		
-College	10.00 acres/20,000 population	0.88	32.22		
-Vocational Training Centre	5 - 10 acres / Upazila	-	16.60		
-Other	5.00 acres / 20,000 population	0.79	16.11		
Open Space		14.29	138.57	24.53	1.01
-Play field/ground	3.00 acres/20,000 population	-	9.67		
-Park	1.00 acre /1000 population	-	64.45		
-Neighborhood park	1.00 acre /1000 population	-	64.45		
Recreational		41.58	19.82	4.19	0.17
-Stadium/sports complex	5 – 10 acres/Upazila HQ	-	16.60		
-Cinema/ Theatre	1.0 acre /20,000 population	-	3.22		
Health		3.41	12.89	14.03	0.58
-Upazila health complex/ hospital	10 -20 acres/Upazila HQ	-	0.00		
-Health centre/Maternity clinic	1.00 acre/ 5,000 population	-	12.89		
Community Facilities		5.83	25.24	14.95	0.61
-Mosque/Church/Temple	0.5 acre /20,000 population	-	1.61		
-Eidgah/	1.0 acre/20,000 population	-	3.22		
-Graveyard	1.00 acre /20,000 population	-	3.22		
-Community centre	1.00 acre /20,000 population	-	3.22		
-Police Station	3 – 5 acres/Upazila HQ	-	8.30		
-Police Box/outpost	0.5 acre/ per box		0.83		
-Fire Station	1.00 acre/ 20,000 population	-	3.22		
-Post office	0.5 acre /20,000 population	-	1.61		
Utility Facilities		0.00	16.88	6.40	
Drainage	As per requirement	-	-		0.26
Water supply	1.00 acre/ 20,000 population	0.00	3.22	0.00	
Gas Station	1.00 acre/ 20,000 population	0.00	3.22	0.00	
Solid waste disposal	4-10 acres/ Upazila HQ	0.00	4.00	5.61	
Waste transfer station	0.25 acres/ per transfer station	0.00	0	0.30	
Electric sub-station	1.00 acre/ 20,000 population	0.00	3.22	0.00	
Telephone exchange	.5 acre/ 20,000 population	0.00	1.61	0.00	

Types of Land Uses	Recommended Standard	Existing land (acre)	land requirement (acre) in 2031	Proposed Land	Percentage
Fuel station	.5 acre/ 20,000 population	0.00	1.61	0.00	0.97
Slaughter House	As per requirement	0.00	0	0.10	
Others	-	0.00	0	2.27	
Commerce and Shopping		18.56	70.89	23.59	
-Wholesale market	1.0 acres/ 10000 population	-	6.44		0.97
-Retail sale market	1.0 acres/ 1000 population	-	64.45		
-Corner shops	0.25 acre/per corner shop	-	-		
-Neighborhood market	1.00 acre/per neighborhood market	-	-		
-Super Market	1.50 – 2.50 acres/per super market	-	-		
Industry		24.50	161.12	115.35	4.75
- Small scale	1.50 acres /1000 population	-	96.67		
- Cottage/agro-based	1.00 acres /1000 population	-	64.45		
Transportation		0.79	15.53	10.46	0.43
- Bus terminal	1.0 acre /20,000 population	-	3.22		
- Truck terminal	0.50 acre /20,000 population	-	1.61		
- Launch/steamer terminal	1.00 acre /20,000 population	-	3.22		
- Railway station	4.00 acre / per Station	-	6.64		
- Rickshaw/van stand	0.25 acre /one baby taxi/tempo stand		0.41		
- Passenger Shed	0.25 acre /one baby taxi/tempo stand	-	0.41		
Administration		4.74	13.00	11.34	0.47
- Upazila complex	10-15.00 acres	4.31	10.00		
- Paurashava office	3 – 5 acres	0.25	3.00		
- Others		1.05			

Recreational facilities and heritage site

About 41.58 acres land including heritage site is under recreational use in the Paurashava.

Determination of Standard: According to the standard for recreational facilities, 1 acre of 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 64451 populations for the planning area up to the year 2031. For this population total 19.82 acres of land is being needed up to the year 2031.

Recommendation / Forecast: The study team recommends a Tourist complex under this category. The proposed stadium cum central park which is calculated within openspace.

Residential

Existing residential areas of the Paurashava is 879.91 acres. All type of residential lands is included with such amount of land.

Determination of Standard: The standard recommends in Table-10.1 is 100 persons per acre (net). Again, it is recommended 200 persons per acre for real estate or housing areas both for public and private. No standard is being recommended for low-income group.

Recommendation / Forecast: According to the standard (100 persons per acre), 644.50 acres land will be needed up to the year 2031. As the area is in rural character and there is no vital potentiality for future rapid urban development, there is limited opportunity for private sector housing development. The consultant team assumed that within 2031 no major change will be occurred in urban development. Considering 100 person/acre there is a need for further residential land development. A total of 1133.88 acres of land has been proposed for urban residential development including 102.01 acres planned residential area and around 22.67 acre is rural settlement.

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

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.

10.2.4 Distribution of Land for Existing and Proposed Landuse

After a detailed consultation between the PMO and the consultants of the project, the land use classification for the Paurashava Master Plan has finalized. The followings are the finalized land use zone classification recommended by the PMO.

- Urban Residential Zone
- Rural Settlement
- Commercial Zone
- Mixed Use Zone
- General Industrial Zone
- Government Office
- Education & Research Zone
- Agricultural Zone
- Waterbody

- Open Space
- Circulation Network
- Transportation Facilities
- Utility Services
- Health Services
- Community Facilities
- Urban Deferred
- Recreational Facilities
- Forest
- Beach
- Miscellaneous
- Heavy Industrial Zone
- Historical and Heritage Site
- Restricted Area
- Overlay Zone

First 16 land use and Historical and heritage site, heavy industrial zone of the above list are available and proposed for Sonargaon Paurashava Master Plan and 5 types of land use will not be applicable for Sonargaon. In the sections 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 **conditional uses of land and permitted land use** under each category has shown in **Annexure-D**.

Following is a short description recommended land use zones.

1) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. This includes single family housing or multi-family residential. Zoning for residential use will permit some services. It will permit high density land use. In the year 2031, total population of the Paurashava will be 64451. If, standard of population considers 100 persons per acre (at present net density 37 persons per acre and it will be 100 persons per acre in the year 2031), total residential land will be needed 644.51 acres. Existing residential area of the Paurashava is 879.91 acres, So, there is no need of additional land for future residential development. But in practical the rate of overall urbanization in country context will influence the area for future rapid urbanization considering that some area for future residential use and compact residential area development has proposed. A total of 1133.88 acres of land has been proposed for residential development of which 102.01 acre is

planned residential area. Besides that a sweeper colony, a low cost housing, a sweeper colony and a resettlement zone has proposed under his category.

Table 10.3: Proposed new areas for Residential Purpose

Proposed Facilities	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Low Income Housing Area	Ward No. 01	Choto Maghbazar	3-46, 139	34.998
		Goaldi	43 part, 44-48, 59 part, 54, 59	
Re-Settlement Residential Zone	Ward No. 01	Darpat Thotalia	87-102, 104-119, 356-387, 737, 745-747	16.767
Sweeper Colony	Ward No. 06	Baghmahisha	260-262, 263 part	1.117
Planned Residential Area-1	Ward No. 05	Sollapara	186-192, 193 part, 194-196, 197 part, 201-202, 205-239, 240 part, 241-246	21.144
Planned Residential Area-2	Ward No. 04	Balia Dighirpur	188-230, 234-241, 246, 334-364, 368-369, 371-372	28.043
Planned Residential Area-3	Ward No. 03	Tipurdi	86-102, 103 part, 108, 111 part, 112-115, 122-123, 161-208, 209-211 part, 212, 213 part, 309-310, 313 part	16.672
Total				118.741

2) Rural Settlement

Rural settlement includes the low dense residential area which is scattered within Paurashava boundary and rural in nature. This use will have only low density uses and only up to double story building will be permitted aiming to control the growth in this zone. Less service and facilities will be provided. The zone of rural settlement is intended to provide locations, where rural settlement including agriculture can be set up and function. Without creating hazards and changes to surrounding land uses. A total of 22.67 acres of land under this category.

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". Commercial land includes established markets and areas earmarked for markets. The commercial zone is intended to provide locations which can function without creating hazards to surrounding land uses. Existing commercial area of the Paurashava is 18.56 acres. If standard of area calculate according to the population for the year 2031, total 70.89 acres commercial land will be needed.

These commercial activities may be market / bazar, different services relevant with daily needs and shops (include General store, Grocery, Stationary, Confectionary, Medicine Shop, Sweet Meat Shop, Fruit Shop, Fresh Corner (Vegetable, fish, meat, egg, chicken, etc.)). Considering the real scenario including a whole sale market, a poura super market a total of 23.59 acres of land has proposed as pure commercial area has proposed. Important nodal place and probable area of such type of development has proposed as a mixed use area and a total of 86.06 acres of land has proposed as mixed use land. The proposed new areas for Commercial Purpose has shown in table: 10.3.

Table 10.4: Proposed new areas for Commercial Purpose

Proposed Facilitiles	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Wholesale Market	Extension Area 01	Choto Sadipur	66-77, 81-82, 85-90, 110 part, 111-113	5.640
Poura Supper Market	Ward No. 05	Aminpur	83-84	0.565
Poura Market & Community Center	Ward No. 01	Aminpur	145	0.423
Sonargaon Poura Market	Ward No. 05	Aminpur	269,271 part	0.199
Poura Market	Ward No. 03	Choto Silmandi	93-94	1.007
		Padmalabhdi	34 part, 38 part, 40-41	
Total				7.834

4) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. In a small town like Sonargaon, 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 to any particular use. Existing land under this use is 65.87 acres. Mostly central area of the Paurashava is under mixed-use zone. Up to the year 2031, such use of land will be increase along the major road side and in CBD area. The existing CBD area and around 30 meter both side of the major road has proposed as mixed use zone and a total of 86.06 acres of land has proposed as mixed use land.

5) General Industrial Zone

General industries are the Green and Orange A categories of industries as per The Environment Conservation Rules, 1997. The general industrial zone is intended to provide locations, where general industrial establishments can be set up and function without creating hazards to surrounding land uses. In the Paurashava, industries occupied 24.50 acres land. For the year 2031 a total of 161.12 acres land should be provisioned according to the standard for industrial development. The land has been provisioned for agglomeration of those industries. A total of 116.33 acres land has proposed as industrial zone of which 70.66 acres are heavy industrial area.

Table 10.5: Proposed new areas for Industrial Purpose

Proposed Facilitiles	Ward Name	CS Mouza Name	Plot No.	Area in Acre
General Industrial Zone	Extension Area 01	Ratandi	90-125, 140-141, 143-156, 158-168, 172-183, 189-234	31.617
		Choto Bandara	19-21	
		Choto Sadipur	1 part, 2, 11-13, 19-22, 27-29, 37-43	
Heavy Industrial Zone	Ward No. 03	Mallikerpara	35-36, 43, 45-76	30.130
		Chhata Silmandi	106-161	
	Extension Area 01	Ratandi	1, 3-86	38.318
		Choto Bandara	1-18	
Total				100.065

6) Government Office

Government Office zone covers all kinds of government offices including existing and proposed (e.g. proposed neighbourhood center) in the town. The existing government offices are Upazila Tahsil Office, Upazila Agriculture Office, Upazila Livestock Hospital, PDB Office, Police Station, Post Office, Paurashava Office, Sub-registry Office, T & T Office, Upazila Parisad Office. Existing land under this use is 4.74 acres. For the year 2031, 13 acres land will be needed. The standard prescribed for Upazila Complex is 10-15 acres. Again, standard for Paurashava Office is prescribed 3 to 5 acres. A total of 11.34 acres of land including a new administrative area, Paurashava auditorium and new area for Paurashava development has proposed for this area.

Table 10.6: Proposed new areas for Government Office Purpose

Proposed Facilitiles	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Administration Area	Ward No. 07	Ichapur	202-204, 206-209, 212-213, 288-295	3.508
	Ward No. 08	Chowdona	202-206 part, 207-209, 212-213	3.130
Paurashava Office	Ward No. 05	Aminpur	234	0.400
Sonargaon Poura Auditorium	Ward No. 05	Aminpur	239,141-142	0.439
Total				7.477

7) Education & Research Zone

Educational & Research zone refers to mainly education & research and other social service facilities as listed in **Table-A.13, ANNEX-B**, and conditional uses as listed in **Table-A.14, ANNEX-B**. Mostly educational institutes such as primary school/kindergarten, secondary school, college and vocational training institute are in this group. Mostly educational institutes such as primary school/kindergarten, secondary school, college and vocational training institute are in this group. Existing land under this use 9.15 acres. For the year 2031, about 113.27 acres land will be needed if standard considers for this purpose as presented in the Table-10.1. As this area is almost developed so, considering

the real situation a total of 68.14 acres land has proposed under this category including one primary school, one secondary school, two new college, one vocational institute and an university.

Table 10.7: Proposed new areas for Educational Institution Purpose

Proposed Facilities	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Primary School	Extension Area 01	Bandara	84, 85 part, 89-92	1.529
High School	Ward No. 02	Goaldi	361-362 part, 363, 365 part	0.508
College-1	Ward No. 04	Raishdia	263-264, 269-273, 280-297, 313-327	11.111
College-2	Ward No. 01	Darpat Thotalia	335-348, 350-352, 388-405	4.861
University College	Ward No. 01	Darpat Thotalia	177-195, 200-241, 243, 245-256, 280, 283, 296-327	26.966
Vocational Training Institution	Ward No. 04	Aminpur	7, 8, 9, 10, 11	3.227
	Ward No. 05	Raishdia	142-144, 154-166, 170-171, 261-262, 298-307, 311-312	10.480
Total				58.682

8) 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. The Paurashava has a vast area of agricultural land that demands formation of a separate zone like, agriculture zone. Agriculture zone is primarily meant for agriculture; land uses related to it and land uses that support it. Existing total area under agricultural use is 696.65 acres. After implementation of the Urban Area Plan up to the year 2031, it will be reduced. A total of 173.21 acres of land have proposed under this category.

9) Waterbody

These will act as water retention areas which include ponds, water tanks, natural khals and irrigation canals. The plan suggests preserving most of these 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. No standard is being prescribed for water body. In the Paurashava, total water body is 329.94 acres. A total of 313.54 acres of land have proposed under this category including extension area.

10) Open Space

Open space includes play field/play ground, park, neighborhood park, community/reserve forest, tennis ground and open tourism components. At present, 11.98 acres of land is under the open spaces. Up to the year 2031, 138.57 acres land under open spaces will be needed. Including one central park cum stadium, 2

neighbourhood park and community open space for forest a total of 27.45 acres of land have proposed under this category. Proposed new areas for Open Spaces are shown in the table-10.7

Table 10.8: Proposed new areas for Open Spaces

Proposed Facilities	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Central Park Cum Stadium	Ward No. 02	Aminpur	4-5, 40, 43-44, 66-73, 110	5.632
		Goaldi	516-517	
Sonargaon Poura Park	Ward No. 05	Aminpur	243, 259	1.085
Community Park	Ward No. 01	Choto Maghbazar	143, 145-147 part, 148-149	1.300
Total				8.017

11) Circulation Network

Road network including primary, secondary, tertiary and local access road falls under this category. In the Paurashava, 75.23(3.57%) acres land is under regional and local roads. More land will be needed for provisioning proposed roads up to the year 2031. About 10-15% of the total land may be considered for road network. But as this area has vast agricultural area the proposed road network become below the required area. A total of 256.68 (10.56%) land has proposed under this category.

12) Transportation Facilities

Under transportation facilities, both transport and communication services are considered. This category includes, bus terminal/ stand, filling station, garage, passenger shed, ticket counter, transport office, etc. In the Paurashava, 0.79 acres land is under this use. For the year 2031, 15.53 acres land will be needed according to the standard prescribed in the Table-10.1. Transportation and Communication related services are Bus transport terminal, Railway station, Truck terminal, Rickshaw / Van / Auto stand, Launch/Boat ghat, Passenger shed, etc. Considering the present scenario a Intercity bus terminal and truck terminal with loading& unloading facility has proposed on Dhaka Chittagong highway. Besides that a poura bus terminal for regional bus service and atempoo stand has proposed for this Paurashava. A total of 10.46 acre (0.43%) land has proposed under this category.

Table 10.9: Proposed new areas for transportation facilities

Proposed Facilities	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Inter city Bus Terminal	Ward No. 03	Choto Silmandi	92, 97-98, 99 part	2.757
		Padmalabhdi	24-27, 34-37, 38 part	
Poura Bus Terminal	Ward No. 05	Aminpur	324 part, 328-330, 334-335	1.519
Track Terminal &	Ward No.	Mallikerpara	9 part, 10-15, 16 part	4.016

Loading& Unloading	03	Choto Silmandi	69-83	
Tempo Stand	Ward No. 01	Raishdia	89-90 part, 91-93	1.226
Total				9.518

13) Utility Services

A number of utility establishments are required in a town to serve the people. Utility services include Overhead Tank, Power Office/Control Room, Public Toilet, Sewerage Office, Waste Disposal, Water Pump House, Water Reservoir, Water Treatment Plant, Waste transfer station etc. A pump house, a dumping station, three transfer station and a Slaughter house has proposed under this category with an area of 6.40 acres. Proposed new areas for Utility Service Purpose have shown in the table-10.9.

Table 10.10: Proposed new areas for Utility Services

Proposed Facilitiles	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Weste Dumping Ground-1	Ward No. 01	Garibardi	85-87, 88 part, 90 part, 91-96, 113-117, 121-122 part	3.951
Weste Dumping Ground-2	Ward No. 05	Sollapara	266-267, 271	1.657
Waste Transfer Station	Ward No. 06	Baghmahisha	259, 263 part, 264 part	0.297
Public Toilet-1	Ward No. 06	Baghmahisha	264 part	0.101
Public Toilet-2	Ward No. 03	Tipurdi	148 part	0.273
Water Pump House & Ward Community Clinic-1	Ward No. 06	Baghmahisha	83	0.382
Water Pump House & Ward Community Clinic-2	Ward No. 01	Raishdia	69	0.141
Water Pump House-3	Ward No. 05	Aminpur	272 part, 273, 274 part	0.227
Water Pump House-4	Ward No. 02	Goaldi	543	0.065
Slaughther House	Ward No. 08	Chowdona	522 part	0.093
		Sahapur	21 part	
Total				7.187

14) Health Services

The zone of health care facilities is intended to provide locations, where health facilities including upazila health complex and other maternity clinic can be set up and function. Existing land under these use 3.41 acres. For the year 2031, 12.89 acres land will be needed if standard considers for this purpose. Including an area for hospital zone a total of 14.03 acres of land has proposed under this category.

Table 10.11: Proposed new areas for Health Services

Proposed Facilities	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Health Center	Ward No. 03	Tipurdi	124-126, 154-160, 209-213 part, 214-225, 254-259, 305, 305-306 part	10.090
Total				10.090

15) Community Facilities

All community facilities, including funeral places (i.e. graveyards), ward councilors offices and other religious uses denoted as community facilities. At present, 5.83 acres of land is under this category. The planning team has proposed a community center. Standard for post office will be 0.5 acre per 20000 populations. According to the standard, one police station may be covered 3 to 5 acres land for an Upazila. There is no formal poura graveyard in the Paurashava. According to the standard, about 25.24 acres land may be prescribed for community facilities.

One of the important philosophies of this plan is provisioning compact township development. Based on this concept, there may be a ward councilor office in each ward. The Ward Councilor's Office building may be used including family planning clinic, Union Parishad Office and club. Land for Ward Councilor's Office is prescribed in the plan which is marked as community facility.

A total of 14.95 acres of land have proposed under this category.

Table 10.12: Proposed new areas for Community facilities

Proposed Facilities	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Cremation	Ward No. 08	Chowdona	501-502	0.189
Poura Eidgah	Ward No. 06	Baghmahisha	79 part	1.910
Poura Graveyard	Ward No. 06	Baghmahisha	79 part	1.183
Fire Station	Ward No. 03	Choto Silmandi	99-100 Part, 101	0.207
Ward Community Clinic	Ward No. 02	Goaldi	546	0.267
Ward Center	01	Raishdia	95 part	0.220
	. 02	Goaldi	478 part	0.200
	03	Goaldi	677 part	0.057
	04	Balia Dighirpur	137 part	0.049
	05	Aminpur	324 part, 328 part	0.186
	06	Baghmahisha	267 part	0.285
	07	Ichapur	330 part	0.204
	08	Chowdona	362 part	0.065
	09	Sahapur	231 part	0.058
Total				5.08

16) Urban Deferred

According to planning standard provided by LGED seeks about 10 percent of the total build up area. The total area under this use has been proposed as 104.11 acres (4.28%) of the existing Paurashava area that include existing and proposed land uses. A portion of this zone may use for housing of the poor, disadvantages and refugee for climate change and other disasters to fulfil National Housing Policy, Disaster Policy and other policy prescriptions of the Government. The following are permitted Uses within the Urban Deferred (UD) 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.

Table 10.13: Proposed areas for urban defferd

Proposed Landuse	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Urban Defferd	Extension Area 02	Sreenibashdi	1-200, 204-208	60.358
	Ward No. 02	Bagh Nazirpur	1-33	18.632
		Goaldi	244-279, 285-291	
	Ward No. 03	Choto Silmandi	48-56	25.116
		Tipurdi	1-75, 103-110, 116-118	
Total				104.106

17) Recreational Facilities and heritage site

Recreational facility is covered 2.43 acres land including 43.39 acre heritage site. Standard for recreational facility includes cinema/theatre and covered stadium/sports complex. Up to the year 2031, about 5 acres land (1 acre per 20000 populations) will be needed for cinema / theatre and 5 to 10 acres for stadium. Total 19.82 acres of land is needed for this category. But stadium and park has included within open space zone. As this is a tourism based area as per demand of pouravhava and considering the real scenario area a new area of 4.39 acres for poura tourist complex has proposed for this area.

Map 10.2: Landuse Plan

Table 10.14: Proposed areas for recreational facilities

Proposed Facilities	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Sonargaon Poura T ourist Complex	Ward No. 05	Aminpur	286, 292-293, 323-295-298, 300-306, 323-324 part, 325, 326 part, 334-335 part, 337-340, 342	4.185

18) 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. These uses are only sites and not zones, actually. They have local, regional or national importance, though they don't conform to surrounding land uses. No other use except the use of overlay site is permitted in this zone. There is no scope for permitting or conditionally permitting the functions or uses as the zone itself is an overlay. The present and proposed use of the zone will continue until the next zoning regulation is imposed on those specific parcels of land.

There are a variety of overlay zones within the project area. Some of the important types of overlay sites are listed below including the purpose of retaining them are described below.

Environmental Protection Area

Environmental protection overlay areas refer to the areas that need to be preserved protected and manage for their natural resources. The purpose of this zone is to protect the areas of environmentally sensitive, areas critical to the ecosystems.

Graveyard Sites

The sites cover existing graveyards that imposes restriction on building or acquisition of such sites for their religious an emotional value.

Sports and Recreation Sites

Some existing open spaces, water bodies, etc. are delineated as overlay sites in order to protect them in consideration of their future need. These places are meant exclusively for sports and recreation.

Special Use Sites

There are some special use areas that need to be protected. Special and temporary events like, fair, hat etc. may be permitted in this zone. The purpose for delineating this zone is to preserve them and make them be able to render services to the present community and future generations.

Table 10.15: Proposed landuse of the Sonargaon Paurashava

Land Use Type	Area (Acre)	Percentage (%)
Urban Residential Zone	1,133.88	46.63
Rural Settlement	22.67	0.93
Commercial Zone	23.59	0.97
Mixed Use Zone	86.06	3.54
General Industrial Zone	46.68	1.92
Heavy Industrial Zone	70.66	2.91
Government Office	11.34	0.47
Education & Research Zone	68.14	2.80
Agricultural Zone	173.21	7.12
Water Body	313.54	12.90
Open Space	27.45	1.13
Recreational Facilities	4.19	0.17
Circulation Network	256.68	10.56
Transportation Facilities	10.46	0.43
Utility Services	6.40	0.26
Health Services	14.03	0.58
Community Facilities	14.95	0.61
Urban Deferred	104.11	4.28
Historical & Heritage Site	43.39	1.78
Total	2,431.43	100.00

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

10.3 Introduction

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 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 Regioal 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.
- 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.
- 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.

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, administration 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 landuse 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 6m 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.

10.4 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) Ordinance, 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. 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.
2. 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.
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).
5. 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.

6. 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.
7. 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.
8. 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.
9. 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.
10. 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) Ordinance, 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.
11. 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.
12. 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.

13. 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).
14. 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 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 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 on going and implemented projects is essential to keep the future course of action on the right track. An on going 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

Transport study provides special attention to urban transportation planning as it greatly influences the location decisions and travel behavior of people, goods and services. Transportation is critical for the efficiency of towns contributing to their productivity and economic growth. A good network of roads and other transportation mode coupled with an efficient transport management system makes substantial contribution to the "working efficiency" of cities and towns and enables them to become catalysts for social and economic development. On the other hand, the impact of a poorly designed urban transport system is manifested in terms of traffic congestion, delays, accidents, high energy consumption, high pollution of the environment and inequitable access to services. A well-planned transportation system results in orderly urban growth, greater use of urban public transport, lower vehicular pollution, and shorter auto trips.

The current chapter of the report is about Transportation and Traffic Management Plan covering its development plan proposals and traffic management up to the year 2031. Transportation and Traffic Management Plan is a part of the second stage of the current plan package. This planning component is based on the framework of the Structure Plan prepared in the earlier phase. The Plan is intended to address those areas of the Structure Plan that are likely to face urban growth during next 10 years, and obviously that includes the existing Paurashava area and its extension areas. The report also gives the objectives of the purpose and the role of Transportation and Traffic Management Plan and its relation with Structure Plan and Land Use Plan.

11.2 Approach and Methodology

A comprehensive transportation study was undertaken to investigate the existing transportation infrastructure, transportation mode and modal share scenario of Dhamrai Paurashava and to estimate the anticipated transportation needs of the town up to the year 2031. Transportation study was conducted to determine the present travel patterns and the characteristics of existing transportation facilities to forecast the future travel demand and develop a transportation plan.

Standard methodology was followed for traffic study in the project area as per the Terms of Reference. A nine hour traffic counting was conducted to assess the traffic volume at the most important traffic point. Three intersections have been selected for traffic count survey. The roads at these intersections attract traffic from its surroundings to a great extent mainly for commercial, official and educational purposes. The the concentration of development is high along the both side of these road. The selected intersections for traffic survey is given below at table 11.1.

Table 11.1: Description of the survey stations

Intersection/ Link No.	Intersection/ Link Name	Station/ Link No.	Link name (Survey station)	Traffic Direction
01	Museum (2nd gate) Intersection	01	Museum (2nd gate) Intersection to Thana Road	2
		02	Museum (2nd gate) Intersection to Museum Road	2
		03	Museum (2nd gate) Intersection to Tipurdi Road	2
02	Tipurdi Road Link	04	Tipurdi to Museum Road	2
		05	Tipurdi to Dhaka-Chittagong NHW	2
03	Thana Road (Titas) Link	06	Thana Road to Museum Road	2

Source: Physical Feature Survey, 2009

Bus and tempo fleet data were collected from local transport owners' offices like, Bus Owners' Association, Tempo Owners' Association. They also provided information about routes, trips and movement data. Information about bus station and tempo station were collected from the respective owners' associations and the Paurashava/District Administration. Year wise data of non-motorized traffic were collected from the Sonargaon Paurashava, where these vehicles are registered.

Data on road pattern and condition of roads with their problems and road width were collected from the physical feature survey and verified through field visit. Data on household mobility were also collected from socio-economic survey of the households. Information on road ownership was collected from the Paurashava, LGED and RHD. The same sources also provided information about future road projects in and around the town. Information about traffic conflict and accident were collected from the field and from Thana (police station). Mapping of major roads was done using physical feature survey data and by thorough reconnaissance survey of roads. By considering the planning standard and analyzing the demand, Traffic and transportation plan were made.

11.3 Existing Conditions of Transportation Facilities

11.3.1 Roadway Characteristics and Functional Classification

The planning area covers 8.54 sq. km. and road/ circulation network length is 76.67 km with an area of 59.29 acre. The Dhaka-Chittagong highway runs through the Paurashava and links a number of Connector Roads and Access Roads and these are the main arterial road of the planning area. It provides connection with Sonargaon Paurashava to the north Chittagong and Dhaka.

The roads of the Paurashava belonging to number of agencies named Roads and Highways Department (RHD) responsible for Regional Highway, Local Government Engineering Department (LGED) responsible for construction and maintenance of Upazila and Union roads and Sonargaon Paurashava responsible for construction and

maintenance of roads within the Paurashava area. Existing transportation system is dominated by road network catering to the passenger service and freight transport.

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 Upazila Road, Tipurdi Road, Thana Road, Thana-Museum Road, Sonargaon Bazaar (Panam) Road, Raisdia Mosque Road, Paurashava Road, Museum Road, Hospital Road, and Ananda Bazaar GC Road.

The Dhaka-Chittagong NHW attracts traffic from outside of the Paurashava because it is an entry and exit point of the Paurashava.

Total length of pucca (bituminous carpeted) road is about 34.06 km encompassing an area of 38.60 acre. The semi pucca road is generally constructed with brick soling called Herring Bone Bond (HBB) road. Total length of semi pucca road is 16.67 km. In total, 14.97 of land is being used under semi pucca road in the Paurashava. Third category is katcha road called earthen road. Total length of katcha road is 25.94 km coursing 25.94 acres of land. In total, there in Sonargaon Paurashava roads under three categories coursing 76.67 km in length and 75.23 acre of land.

Table 11.2: Road network of Sonargaon Paurashava

Type	Length		Area	
	KM	%	Acres	%
Pucca	34.06	44.42	38.60	51.31
Semi-pucca	16.67	21.75	14.97	19.9
Katcha	25.94	33.83	21.66	28.79
Total	76.67	100.0	75.23	100

Source: Physical Feature Survey, 2009.

Motorized and non-motorized vehicles are operated in all the nodes of the planning 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. Locally modified motorized transport vehicle named *Nosimon* also uses for short distance passenger and goods transportation.

11.3.2 Mode of Transport

Modal choice behavior is destinations to work/personal business use motorcycle, car/pickup/ jeep/microbus, bus mostly (24.25%) and 21.05% use rickshaw/van. For school/college/ university based trips bicycle has found as the most common mode of transport (9.95%). Trips toward home have almost equal shares of different modes like in 14.75% trips truck, 19.45% trips tempo, motorcycle (5.25%) and private car (5.3%) have been used.

11.3.3 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. The counted traffic data for different intersections as well as for different links at different time period and the generated PCU is presented in the following paragraphs.

Depending on the location and landuse around that location, traffic flow varies over different hours of the day. In this context, peak hour traffic flow has a special meaning. Depending on the landuse and socio-economic characteristics of the Paurashava, there could be 1 or 2 more peak hours in a day. Sometimes this peak hour could cover periods which are more than one hour. Highest peak hour traffic is usually taken in to account in determining the adequacy of the road section i.e. to determine whether the road section gets congested at certain hours of the day. Traffic flow survey has been carried out in selected intersections of the study area and the findings are presented in the following paragraphs.

Museum (2nd gate) Intersection

At this intersection, on Hat Day there are large numbers of non motorized vehicles (403.62 NMV/hr and 69.04% of total PCU) than motorized vehicles (256.54 MV/hr and 30.96% of total PCU). Average hourly volume is 1017.42 PCU at Museum (2nd gate) Intersection on Hat day which is greater than that of Non-Hat day.

So, comparatively more traffic congestion occurs at this intersection on Hat day. Peak traffic flow occurs during 10am to 11am on Hat day (1290.75 PCU/hr).

On hat day peak traffic flow occurs in the morning from 10am to 11am and in the afternoon from 5pm to 6pm.

During peak hour (10am to 11am) rickshaw is the dominant vehicle covering 52.63% of traffic composition on Hat day. There are also significant numbers of bicycle and motor cycle in the traffic composition of Hat day during peak hour.

At this intersection, on Non-Hat Day there are large numbers of non motorized vehicles (333.54 NMV/hr and 70.08% of total PCU) than motorized vehicles (194.62 MV/hr and 29.92% of total PCU). Average hourly volume is 795.73 PCU at Museum (2nd gate) Intersection on Hat day which is less than that of Hat day. So, comparatively less traffic congestion occurs at this intersection on Non-Hat day. Peak traffic flow occurs during 12pm to 1pm on Non-Hat day (917.25 PCU/hr).

Traffic flow on Non-Hat day is clearly understood. Peak traffic flow occurs from 12pm to 1pm and in the afternoon from 6pm to 7pm. Another peak hour is found from Figure 6.4. During peak hour (12pm to 1pm) rickshaw is the dominant vehicle covering 58.39% of traffic composition (detail in Figure 6.5) on Non-Hat day. There are also significant numbers of bicycle and motor cycle in the traffic composition of Non-Hat day during peak hour.

Tipurdi Link

At this link, on Hat Day there are large numbers of non motorized vehicles (224.08 NMV/hr and 67.32% of total PCU) than motorized vehicles (154 MV/hr and 32.68% of total PCU) (Table 6.15 and 6.16). Average hourly volume is 567.67 PCU at Tipurdi Link on Hat day which is greater than that of Non-Hat day. So, comparatively more traffic congestion occurs at this link on Hat day. Peak traffic flow occurs during 10am to 11am on Hat day (701.75 PCU/hr). On hat day peak traffic flow occurs from 10am to 11am and in the afternoon from 5pm to 6pm. another peak hour is found. During peak hour (10am to 11am) rickshaw is the dominant vehicle covering 51.21% of traffic composition on Hat day. There are also significant numbers of bicycle and motor cycle in the traffic composition of Hat day during peak hour.

At this link, on Non-Hat Day there are large numbers of motorized vehicles (103.85 MV/hr and 57.51% of total PCU) than non motorized vehicles (64.85 NMV/hr and 42.49% of total PCU) (Table 6.17 and 6.18). Average hourly volume is 218.15 PCU at Tipurdi Link on Non-Hat day which is less than that of Hat day. So, comparatively less traffic congestion occurs at this link on Non-Hat day. Peak traffic flow occurs during 12pm to 1pm on Non-Hat day (307.5 PCU/hr). On non-hat day peak traffic flow occurs from 12pm to 1pm and in the afternoon from 7pm to 8pm another peak hour is found. During peak hour (12pm to 1pm) both rickshaw and baby taxi are the dominant vehicle covering 25.11% of traffic composition on Non-Hat day. There are also significant numbers of bicycle and motor cycle in the traffic composition of Non-Hat day during peak hour.

Thana Road (Titas) Link

At this link, on Hat Day there are large numbers of motorized vehicles (488.85 MV/hr and 37.11% of total PCU) than non motorized vehicles (390.23 NMV/hr and 62.89% of total PCU). Average hourly volume is 1103.83 PCU at Titas Link on Hat day which is greater than that of Non-Hat day. So, comparatively more traffic congestion occurs at this link on Hat day. Peak traffic flow occurs during 12pm to 1pm on Hat day (1338.25 PCU/hr). On hat day is clearly understood. Peak traffic flow occurs from 12pm to 1pm and in the afternoon from 5pm to 6pm another peak hour is found. During peak hour (12pm to 1pm) rickshaw is the dominant vehicle covering 41.17% of traffic composition on Hat day. There are also significant numbers of bicycle and motor cycle in the traffic composition of Hat day during peak hour.

At this link, on Non-Hat Day there are large numbers of motorized vehicles (390.46 MV/hr and 38.46% of total PCU) than non-motorized vehicles (301.77 NMV/hr and 61.54% of total PCU). Average hourly volume is 856.06 PCU at Titas Link on Non-Hat day which is less than that of Hat day. So, comparatively more traffic congestion occurs at this link on Hat day. Peak traffic flow occurs during 7pm to 8pm on Non-Hat day (1073.5 PCU/hr). On Non-Hat day peak traffic flow occurs from 7pm to 8pm and in the afternoon from 2pm to 3pm another peak hour is found. During peak hour (7pm to 8pm) baby taxi

is the dominant vehicle covering 38.39% of traffic composition (detail in Figure 6.13) on Non-Hat day. There are also significant numbers of rickshaw, bicycle and motor cycle in the traffic composition of Non-Hat day during peak hour.

11.3.4 Level of Service: Degree of Traffic Congestion and Delay

Speed and delay survey is used to determine speed variations along a route at different times; number, location, cause, frequency and duration of delays, and overall speed and travel time along a route.

As traffic congestion is not very severe in Sonargaon Paurashava, generally delay of traffic movement is not common here.

These studies are used to determine speed variations along a route at different times; number, location, cause, frequency, duration of delays, overall speed and travel time along a route. Non-motorized vehicles like rickshaw, van and pushcart, waits at major intersection with a stoppage time on an average of 5 minutes. Those buses have 36 to 40 seats available for the passengers but they used to carry standing passengers.

The Origin-Destination (O-D) survey is conducted to collect information on travel and transportation generated between zones of a study area. The study also identifies passenger movements where and when trips are originated and ended, the socio-economic characteristic of the trip maker, the purpose of travel and the mode of travel. The following table-11.3 describes the trips different modes from the origin of trip to the destination of Hat day and non-Hat day in Sonargaon Paurashava.

Table 11.3: O-D purposes matrix in generated trips (in %)

Origin Zones (%)	Destination Zones (%)									
		Bogra	Chittagong	Dhaka	Gazipur	Sonargaon	Manikganj	Narayanganj	Narsingdi	Comilla
Dhaka	-	-	-	-	-	5.13	-	-	-	-
Narayanganj	2.56	2.56	38.46	2.56	-	2.56	23.08	2.56	2.56	-
Narsingdi	-	-	-	-	-	-	2.56	-	-	-
Gazipur	-	-	-	-	-	-	2.56	-	-	-
Chandpur	-	-	-	-	-	-	5.13	-	-	-
Comilla	-	-	-	-	-	-	2.56	-	-	-
Rajshahi	-	-	-	-	-	-	2.56	-	-	-
Rangpur	-	-	-	-	-	-	2.56	-	-	-

Source: O-D survey, 2009

The data shows that people of Sonargaon Paurashava have high percentage to travel from their own residence to the surrounding urban areas rather than attract people to come in that area. In most cases people are traveling to Dhaka town to attain their requirements and their second priority has found as Narayanganj.

11.4 Analysis of Existing Deficiencies

11.4.1 Roadway Capacity Deficiencies

Primary Road: A National Highway named Dhaka - Chittagong Highway passed through the Sonargaon Paurashava is the Primary Road of this Paurashava. Its length is about 0.56 km and the average width is about 19.51 meter. Road standard (ROW) recommended in the is 80-150 feet, proves that the standard (ROW) of the existing primary road in the Paurashava is enough.

Secondary Road: Upazila Road, Tipurdi Road, Thana Road, Hospital Road and Museum Road are the major secondary roads of the Paurashava. Total 7.88 Km of secondary roads are in the Paurashava. The pavement width of these roads are 5.29 to 3.34 meter respectively. Recommended Road standard (ROW) 60 feet to 80 feet, proves that the standard (ROW) of the existing secondary roads in the Paurashava is lower than the standard (ROW) recommended. Moreover, in hat day and non-hat day, considering highest volume of traffic flows on those secondary roads is there is no deficiencies regarding the capacity of those secondary road exits at present.

Tertiary Road: Within the Paurashava major tertiary roads are Kathali Katha Road, paban bepari road, yousufpur road etc. with 2.36-3.51 meter road width. Recommended standard (ROW) for tertiary road is 20 feet to 40 feet, proves that the standard (ROW) of the existing tertiary roads in the Paurashava is lower than the standard (ROW) recommended.

Access road: Road standard (ROW) recommended for access road is 20 feet to 40 feet. in the Paurashava, all access roads are less than 12 feet and most of them are using as footway. Non-motorized vehicles named Van sometimes use those walkways. No deficiencies regarding the capacity of those access road exits.

Table 11.4: Hierarchy of road

SI No.	Name of Road	Avg. Width(m)	Length(km)	Road Type
1.	Dhaka-Chittagong NHW	19.51	0.56	Primary Road
2.	Upazila Road	3.34	1.45	Secondary Road
3.	Tipurdi Road	4.72	1.13	Secondary Road
4.	Thana Road	5.29	2.21	Secondary Road
5.	Hospital Road	3.76	0.92	Secondary Road
6.	Museum Road	4.87	2.17	Secondary Road
7.	Thana-Museum Road	2.36	1.38	Tertiary Road
8.	Paurashava Road	3.51	0.42	Tertiary Road
9.	Ananda Bazaar GC Road	3.21	1.1	Tertiary Road
10.	Sonargaon Bazaar (Panam) Road	3.04	0.96	Tertiary Road
11.	Raisdia Mosque Road	3.07	0.92	Tertiary Road

Source: Physical Feature Survey, 2009

11.4.2 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.

11.5 Condition of other mode of transport (Rail/Water/Air)

There is no railway line in Sonargaon Paurashava. Although there is a A canal named Manykaly Khal is used time only for transporting vegetables, cloths and wooden materials from neighbouring area to commercial areas but still it is not a major transportation network. There is no airport in this Paurashava.

11.6 Future Projections

Road design standards are prescribed in the section 21 of the Public Roads Act, 2004. The regulations of the sections are:

- The Government may declare design standards for roads by publication in the Official Gazette.
- The road design standards shall set out design requirements for roadways and road-related areas including structures located on roadways or road-related areas.
- A road authority shall comply with the road standards when carrying out works on a roadway, road-related area or when installing, modifying or maintaining a structure on a roadway or road-related area.
- Despite sub-section (3), a road authority is not required to comply with the road standards if:
 - the road authority is carrying out maintenance and, in the view of the road authority, it would not be practicable to comply with the road design standards.
 - the Government has, in writing, exempted the road authority from complying with the road design standards in relation to the works or structure.
- The Government may revoke or amend road design standards in the same manner as a declaration.
- The Urban Area Plan for Dhaka City has recommended road standards with the consideration of traffic volumes, which were not undertaken in conjunction with the Dhaka Integrated Transport Study (DITS). A wide range of standards was suggested for various classes of roads, ranging from 4 meters to 24 meters, as mentioned below. The required right of way (ROW) is also indicated:

- Main Road	24.0	meter (78 ft) ROW
- Arterial Road	14.5	meter (47.5 ft) ROW
- Collector Road	13.0	meter (42.6 ft) ROW
- Access Road	9.0	meter (29.5 ft) ROW
- Access Road	6.0	meter (19.7 ft) ROW

- Non-motorized Road 4.0 meter (13.4 ft) ROW
- Footpath 2.5 meter (8.2 ft) ROW

In order to promote development of all roads in a systematic manner, new road standards were recommended for both built up areas, as well as for less built-up areas. These will replace the old standards, which were included in the Dhaka Metropolitan Development Plan (DMDP). The standards, when adopted will facilitate earmarking the right of way (ROW) for all major roads. The details of these standards used in this plan are indicated below.

Table 11.5: Road standards for future development of the network

Class of Roads	Standards recommended
Paurashava primary roads	200-100 ft.
Paurashava secondary roads	100-60 ft.
Paurashava local roads	40-20 ft.

Source: UTIDP, LGED, 2010.

11.6.1 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. Katcha roads needs to be constructed as pucca or at least semi-pucca. 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 study 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.

11.6.2 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.

11.6.3 Future Traffic Volume and Level of Service

The roads presented in the Table-11.3 are the important roads of the Sonargaon Paurashava. Present population of the Paurashava is 71362 (2011) and in the year 2021 it will be 86977. Highest PCU/hr. at hat day is 1394 and non-hat day is 745 in Ibrahimpur road. The scenario proves that traffic congestion is not alarming will in other roads but in Ibrahimpur Road in hatbar it becomes alarming as the PCU/hr. increased above 1000. The income and other socio-economic condition of this area is very poor. 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.

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

At present, all of traffic is under the private sector and above 80% people enjoying by the non-motorized vehicles. It is expecting that the scenario will change next 20 years and the percentage of motorized vehicle will increase.

11.7 Transportation Development Plan

11.7.1 Plan for Road Network Development

For an efficient road network development, implementation of some of the recommendations made by the Roads and Highways Department in 2008 would be essential. In order to serve the Paurashava, as well as the local traffic around Paurashava, an analysis will present in the proposals. It is found that many of the roads are not well linked and there are some missing links. Further analysis under the Transportation Plan will be revealed that most of the links suggested by this study are infect required to be developed in a phased manner. Under the Transportation Plan, an attempt is being made to promote existing major link roads in the Paurashava which. The northern part of the study area is in rural character and have limited road linkage wth the central area. There is a need of some north south and east-west link road. The connection with national highway with Paurashava secondary road is not enough. Considering of the above scenario the road network plan has made.

11.7.2 Road Network Plan

The primary road will act as through-route, taking traffic from Paurashava to other centres in the region or the country and avoiding the need for this through-traffic to enter the internal road network of the Paurashava. The route is intended to be high

Map 11.1: Important Roads of Sonargaon Paurashava

capacity and fast flowing. In the case of existing roads in Paurashava (designated as secondary and tertiary roads), this may require the introduction of side collector roads which restrict entry onto the main carriageways from roadside development. Without this, the road may not be able to fulfill the given function.

Table 11.6: Roads proposed for improvement with sufficient ROW and pavement width.

Sl No.	Name of Road	Existing Avg. Width(m)	Proposed Width(feet)	Road Type	Remarks
1.	Dhaka-Chittagong NHW	19.51	100	Primary Road	-
2.	Upazila Road	3.34	60	Secondary Road	There is no scope to improve the road upto 80 feet
3.	Tipurdi Road	4.72	60	Secondary Road	There is no scope to improve the road upto 80 feet
4.	Thana Road	5.29	60	Secondary Road	There is no scope to improve the road upto 80 feet
5.	Hospital Road	3.76	30	Secondary Road	There is no scope to improve the road upto 40/60 feet
6.	Museum Road	4.87	60	Secondary Road	There is no scope to improve the road upto 80 feet
7.	Thana-Museum Road	2.36	40	Tertiary Road	There is no scope to improve the road upto 60 feet
8.	Paurashava Road	3.51	40	Tertiary Road	There is no scope to improve the road upto 60 feet
9.	Ananda Bazaar GC Road	3.21	30	Tertiary Road	There is no scope to improve the road upto 40/60 feet

Source: Physical Feature Survey, 2009

New Link Roads

Following are the major link road proposed for future urban development.

Three major new north south link roads has proposed which are:

- A 60 feet wide road from Sonargaon thana to museum has proposed for easiest connection from CBD to museum.
- Two 60 wide north-south link from tripurdi road to weatr part of ward no-1 has proposed.
- Three no of 60 feet east-west link passes through ward no-01 to ward no-02, ward no-03 to ward no-04 and ward no-05 to ward no-06.

Besides that a nubber of link road and road widening proposal were made in the plan.

Improvement of other local roads

Improvement of other local roads which deserve priority attention and could contribute a lot in reducing pressure on the existing focal points of the Paurashava all tertiary road is essential all local roads has proposed for widening.

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.

11.7.3 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.

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. Again, this may vary according to necessity but where deviation from this desired spacing is necessary, the deviation should be small. Junctions will be in the form of roundabouts or traffic lights.

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.

Considering the overall scenario and road improvement options the proposed road with for Sonargaon Paurashava are as follows:

Table 11.7: Recommended road standards

Sl.No.	Class of Roads	Standards recommended
1.	Primary Road	100 feet and above
2.	Secondary Road	40-60 feet
3.	Tertiary road/ Local Road	30 feet
4.	Access Road	20 feet

11.8 List of Proposed Roads

A number of roads including improvement of existing roads are presented in the following table. In the Paurashava, one primary road named Dhaka- Chittagong highway lying with length 0.56 km under the Paurashava jurisdiction. But with the extension of the Paurashava area the length of Dhaka-Chittagong Highway will be 2.61 km.

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, 76.67 km roads existing in the Paurashava and 79.24 km roads have been proposed for efficient

accessibility of the Paurashava of which some are fully new road and others are road widening. Details of Road Network proposal are shown in **Annex-E**.

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.

Table 11.8: List of proposed roads

Sl No	Road Width (Feet)	Length (Meter)	Percentage	Type
1	200	2,629.16	3.32	Primary road
2	60	16,779.57	21.17	Secondary road
3	40	19,909.88	25.13	
4	30	22,661.77	28.60	
5	20	16,583.05	20.93	Tertiary road
6	12	679.42	0.86	
Total		79,242.85	100.00	

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.

11.9 Plan for Transportation Facilities

11.9.1 Transportation Facilities Plan

Transportation facilities and services include Bus Terminal, Bus Stoppage with Shade, Ticket Counter, Waiting Place for Travelers, Parking Space for Motorized and Non-motorized Vehicles, Service Centre and Washing / Toilet Facilities. At present, no formal transportation facilities and services are available in the Paurashava.

Considering the present scenario an inter city bus terminal and truck terminal with loading& unloading facility has proposed on Dhaka Chittagong highway. Besides that a poura bus terminal for regional bus service and a tempoo stand has proposed for this Paurashava. The area and mouza schedule of this facilities has shown in the Following table.

Table: 11.9: Proposed new areas for transportation facilities

Proposed Facilities	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Inter city Bus Terminal	Ward No. 03	Choto Silmandi	92, 97-98, 99 part	2.757
		Padmalabdh	24-27, 34-37, 38 part	
Poura Bus Terminal	Ward No. 05	Aminpur	324 part, 328-330, 334-335	1.519
Track Terminal & Loading & Unloading	Ward No. 03	Mallikerpara	9 part, 10-15, 16 part	4.016
		Choto Silmandi	69-83	
Tempo Stand	Ward No. 01	Raishdia	89-90 part, 91-93	1.226
Total				9.518

11.9.2 Parking and Terminal Facilities

Bus stand and intersections are using as bus stops including loading and unloading of man and materials. Those intersections are also using for parking both motorized and non-motorized vehicles. Informal economic activities also often encroaches road space. All those factors are together resulted in traffic congestions and also for a cause of accident. The proposed truck terminal will include the parking area and loading and unloading facilities.

11.9.3 Development of Facilities for Pedestrian, Bicycle and Rickshaw

People of the Paurashava move using both sides of the roads. It is noted that the Paurashava is without any footpath for pedestrian movement. Pedestrian movements take place mostly on carriageway and right of way of the roads.

According to the standard for provisioning of footpath, 2.5 meter is necessary and it will be demarcated on both the sides of the road. Development of facilities for pedestrians, bicycles and rickshaws is relevant with the design criteria of the road.

11.9.4 Other Transportation Facilities

Boat ghats should be constructed. This ghat may be designed considering water-based tourism.

11.10 Waterway Development / Improvement Options

A canal named Manykaly Khal is used only for transporting vegetables, cloths and wooden materials from commercial areas i.e. Baidder bazaar, Gauchia etc. may improve.

11.11 Proposal for Improvement of the Existing Waterway

Existing water way may improve with providing a ghat.

11.12 Proposal for New Waterway Development

- Encourage private sector to develop a 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 canal.

11.13 Railway Development Options

In future this area may connect with rail network.

11.14 Transportation System Management Strategy (TSMS)

11.14.1 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.

11.14.2 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.

Map 11.2: Proposed Circulation Network for Sonargaon Paurashava

Map 11.3: Proposed Transport Infrastructure of Sonargaon Paurashava

11.14.3 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.

11.15 Plan Implementation Strategies

11.15.1 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.

(2 a) 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-

(i) erects, places or retains a sign on a public road, or

(ii) 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-

- (a) 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,
- (b) 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.

11.15.2 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 needed.

Evaluation

Monitoring and evaluation of on going and implemented projects is essential to keep the future course of action on the right track. An on going 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 Introduction

The consultant has made an extensive drainage network study in Sonargaon 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 natural and 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

The objective of Drainage Plan is to find out the present functions of main and secondary drains and natural streams within the Sonargaon 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.

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)

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 full), 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-12.1

$$V = [1.49/n] [R^{2/3}] [S^{1/2}]$$

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-3.1.

Table 12.1: 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
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 (Cs): 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-12.2.

Table 12.2: 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 (Cr): 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-12.3.

Table 12.3: 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.

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.

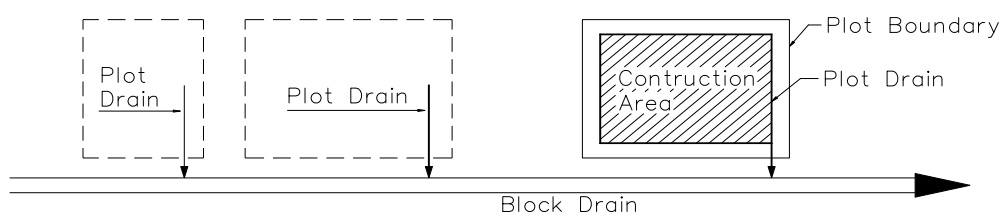
Projection

In implementing various infrastructures for development, 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 spent 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.

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drainage infrastructures. In planning for drainage network, care will be given on road network in terms of conflict of drainage and waterways with roads. In the following and subsequent sections major element, their principle, purpose and function of drainage infrastructures are discussed and presented in lower to higher order which will be considered as a method for drainage plan.

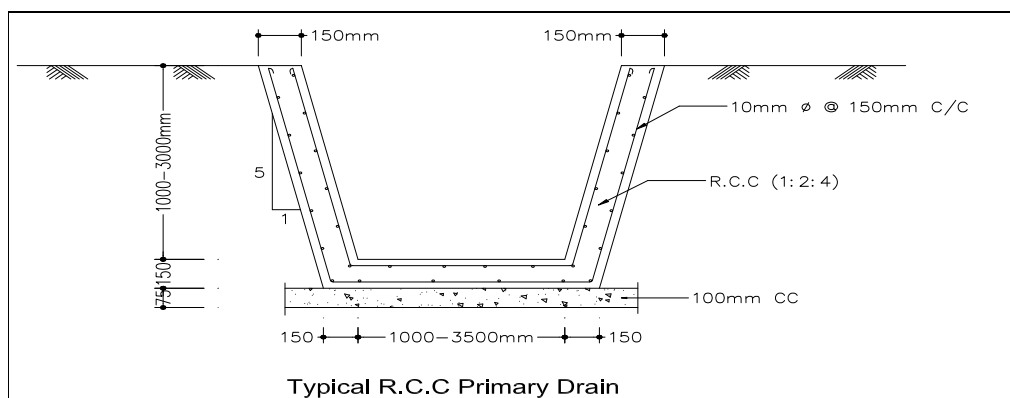
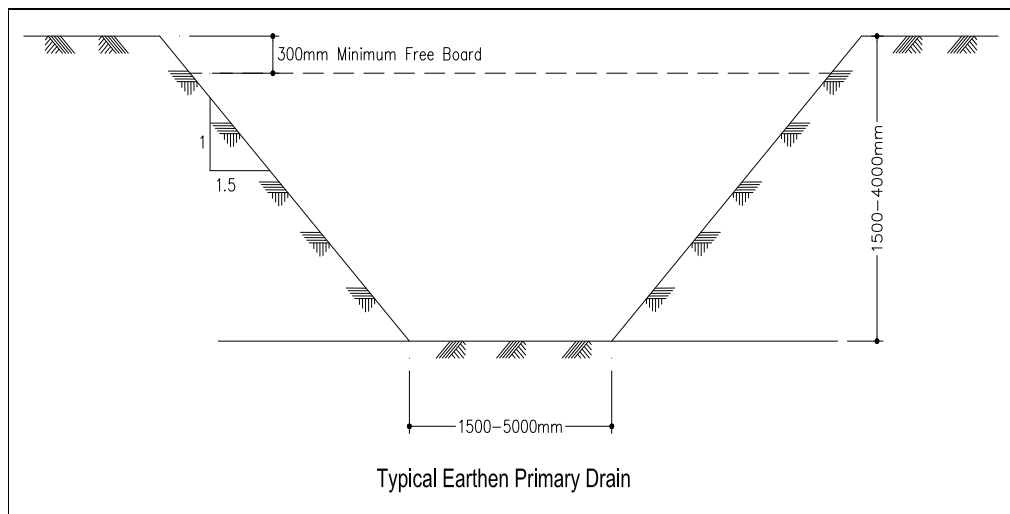
Plot Drains: Plot drains are provided around a building on a plot. In most cases, the drain is made of bricks and is rectangular in shape that can carry storm water generated in the plot and from the building. Plot drain is connected to the Block or Mohallah drain. The sketch below gives an impression of plot drain usually constructed in a plot and block drains that follow plot drain.



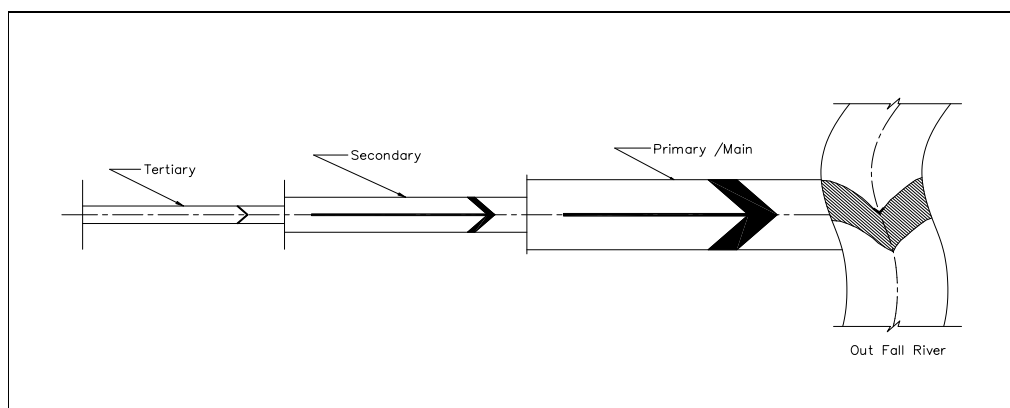
A Sketch Showing Plot Drain and Block Drain

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.

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.



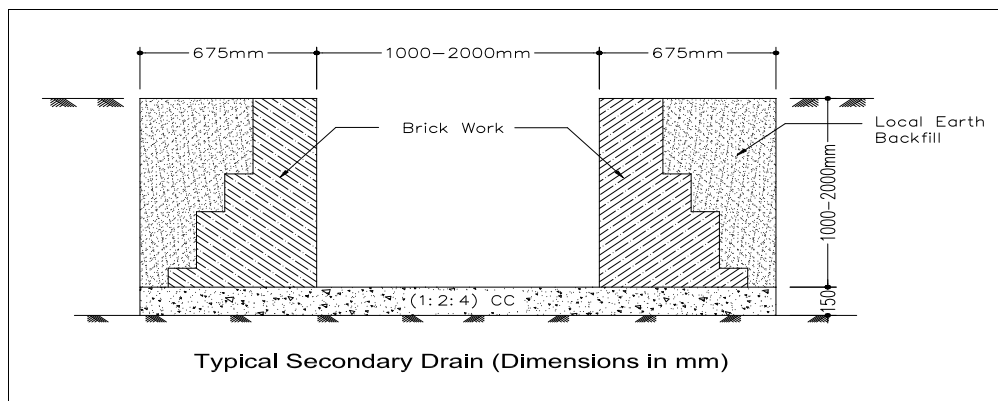
A schematic diagram showing the origin of Tertiary, Secondary and Primary drains and their destinations to the outfall river, presented above, are also presented here.



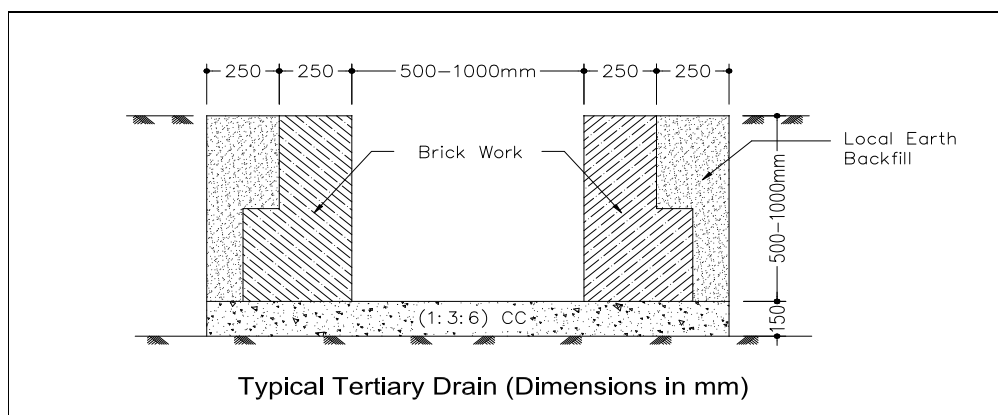
Schematic diagram of Tertiary, Secondary and Primary drains

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.

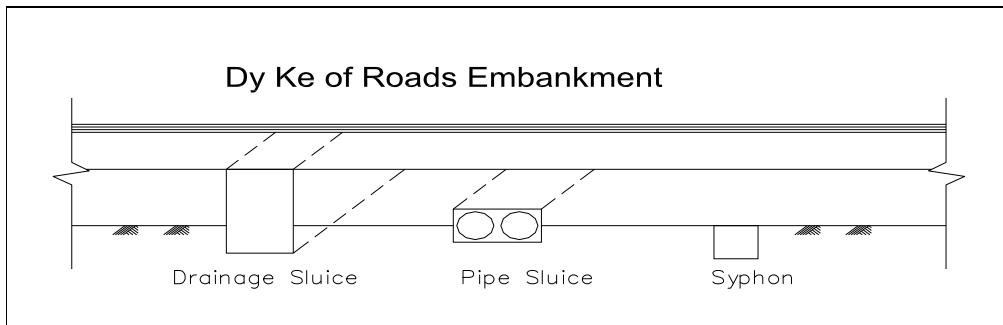


Tertiary Drain: Tertiary drain carry run-off or storm water received from the above mentioned plot drains and block or Mohallah drains. Their catchment area or storm water contributing area is bigger than Mohallah drains. In most Paurashava areas it is difficult to find such naming or classifications. 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.



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.



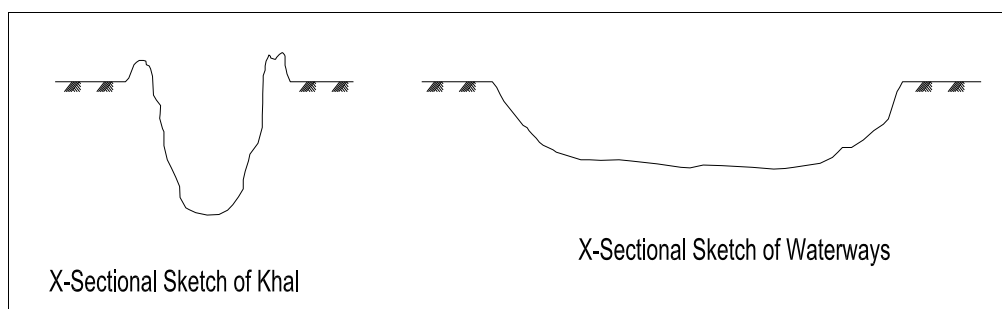
Rainfall is the source of storm drainage water irrespective of urban or rural catchments. Average annual rainfall in Sonargaon is about 2000mm. After infiltration, deep percolation and evaporation is about 50% of this rainfall water takes the form of drainage water for semi-urban and urban areas.

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.



12.2 Existing Drainage Network

12.2.1 Introduction

Existing drains in the Paurashava have not formed any network; only household centered construction to drain out waste water. Existing River, Canal, pond and ditches are trying to manage the drainage requirements. Lack of drainage network is causing water logging in the Paurashava area when it rains. All drainage networks require to be developed with primary, secondary and tertiary drains to mitigate the current water logging problem.

Further development of drain should follow the bulk density and construction is being proposed in the Drainage Plan. Length, width and depth of the drain have considered according to the density of population, road width and out falls. Slope of the drain should be maintained according to the slope of the area and the level of river water according to the seasons.

12.2.2 Existing Drainage System / Network

Natural Drainage System: There are 554 ponds, 312 ditches and 6 natural khals covering 329.94 acres area of Sonargaon Paurashava. Existing canals are trying to serve the drainage requirements of the Paurashava. The entire drainage network is required to be developed with primary, secondary and tertiary drains to mitigate the water logging problem. 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 garbage; as a result, the channel is not properly functioning.

Man-made Drains:

The existing man made drainage network condition in the Paurashava has been highlighted in Table 12.5. These man-made drains are both katcha and pucca. Out of these nine Wards, Ward No 03, 05, 07, 08 and 09 has pucca drains. The quality of these drains are very poor and without cover. It is mostly open drains. The total length is 1.13 km. Total of 1.04 km of pucca drain and around 0.09 km of katcha drain comprise in the man-made drainage network of Paurashava. Sonargaon Paurashava has also 29 bridges, 25 culverts and R.C.C pipe culverts for maintaining the flow of natural flow of rain water.

Table 12.4: Existing man-made drains of the Sonargaon Paurashava

Sl. No.	Types of Drain	Length (km)
1	Pucca Drain	1.04
2	Katcha Drain	0.09
Total		1.13

Source: Drainage and Environment Survey, 2009

Survey study demonstrates due to lack of proper planning of drainage central part, especially the bazaar road area, has the inundation problem. The average width of drain is 0.25 meter.

The drainage condition, the serviceability, structural conditions, obstruction, situation, blockage are all found in the man-made drain network. The bad or poor drains usually had damaged side walls, surfaces with obstruction, debris, solid waste, irregular water way etc.

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. This is the natural scenario of the country.

12.2.3 Analysis on Land Level Topographic Contour

A total of 28754 measurements have taken in the Paurashava area to ascertain the topographic condition of the Paurashava. The lowest land elevation has found in the Ward No. 8 and highest elevation in Ward No. 3. Maximum height of the land is found in the Chhota Silmandi mouza (10.97 meter) and minimum in the Chowdona mouza (2.78 meter). Average height of the Paurashava is 2.78 meter. Among the Wards, maximum height varies 4 meter to 10 meter. Details of Land Levels and spot value are shown in the Table-12.6 and Table-12.7 below:

Table 12.5: Spot Value and their Unit (Number of Spot (Z) Value and their Statistics)

Sl. No.	Spot Unit	Value
1	Total Spot Number	3166
2	Mean (Meter)	7.44
3	Maximum Height (Meter)	10.97
4	Minimum (Meter)	2.78
5	Standard Deviation	2.09

Source: Topographic Survey, 2010.

Table 12.6: Spot Interval and Frequency

Sl. No.	Spot Interval	Spot Number (Frequency)	Percentage (%)
1	2.78-5.55	944	29.82
2	5.56-7.40	54	1.71
3	7.41-8.29	296	9.35
4	8.30-8.52	113	3.57
5	8.53-8.67	669	21.13
6	8.68-8.84	706	22.30
7	8.85-8.88	03	0.09
8	8.89-9.47	179	5.65
9	9.48-10.06	122	3.85
10	10.07-10.97	80	2.53
		3166	100

Source: Topographic Survey, 2010.

From the spot level values having the x, y and z values being determined for the surveyed area, a contour map of the surveyed area has been prepared. The dense contour areas were generally high lands, which are shown in Map 12.2. Medium dense contour areas were medium high land and low land area generally less dense contour value lands.

It is quite true that there would be some similarity between contour description and appearance with land level. Wherever, the contour map showed very few contours, its appearance was then white or blank and these were flat land areas. The flat lands may be medium high, medium low and lowland. The medium high lands exist with medium spacing of contours in all over the surveyed area. From the map 12.2 it is shown that Topography of different wards of Sonargaon Paurashava is almost same to mean elevation. In this connection, average elevation for Ward No 1, 2, 3, 4, 5, 6, 7, 8 and 9 is 6.98m, 7.01m, 7.40m, 7.25m, 7.42m, 7.32m, 7.78m, 7.67m and 7.86 respectively. On the other hand highest value exists at Ward No 03 (10.97m) and lowest value at Ward No 08 (2.78m). Summary result of contours generated is presented in table 12.8.

Table 12.7: Contour derived from the spot elevation

Sl. No.	Contour Unit	Value
1	Total Contour Number	1767
2	Mean (Meter)	6.48
3	Maximum Height (Meter)	10.80
4	Minimum (Meter)	3.6
5	Standard Deviation	1.40

Source: Topographic Survey, 2009

Map 12.1: Existing Drainage Network of Sonargaon Paurashava

Map 12.2: Land Level of Sonargaon Paurashava

12.2.4 Analysis of Peak Hour Run off Discharge and Identification of Drainage Outfalls

Sonargaon Paurashava has three distinct seasons: winter (November-February), dry with temperature 12° to 20°C; the pre-monsoon season (March-May), some rain and hot with temperature reaching up to 40°C; and the monsoon (June-October), very wet with temperatures around 30°C. Sonargaon Paurashava experiences about 2,000 mm rain annually, of which about 80% falls during the monsoon.

No peak hour run off storm water discharge is found. During rainy season, rain water is being drained through the natural drains. All pucca drains are linked with the Canals, rivers, ponds and natural water bodies as an outfall. As a result, waters of the river, canals and other water bodies are polluting through those discharging elements.

12.3 Plan for Drainage Management and Flood Control

12.3.1 Plan for Drain Network Development

Drainage network in the Paurashava is mostly under govt. initiative. There is no well organized, well constructed drainage pattern / network encompassing all the Wards of the Paurashava. Whatever drainage network that exists is mostly constructed by the Paurashava authority. Drainage aspects plays a vital role in clearing waste water but the survey finds most of the drainage network unable to function due to poor maintenance, design, debris accumulations and faulty gradients. Drainage must receive image priority in Ward Action Plan as water logging within selected places of Paurashava is severe, therefore, planning options for drainage of the future Paurashava area including Water Development and Flood Control Projects, should be seriously pursued. The present inefficient drainage needs to be well designed encompassing all the Wards right from household level to main road. There is no drain for household storm waste. Existing open drains are being obstructed with rubbish and reduce the discharge facilities, creating health hazards.

12.3.1.1 Drain Network Plan

There is a need to develop a planned drainage network. 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, sizes and generalized locations for:

- Primary Drain
- Secondary and tertiary drain
- 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)

- Improvements and the removal of obstacles from existing drainage areas and link up of the missing link of existing drainage. Conservation of all ditches and ponds above 0.25 acres for retaining the storm water as per guideline '**Playfield, Open space, Park and Natural water reservoir Conservation Act, 2000**'.
- Construction of new secondary and tertiary canals in drainage where necessary. The provision of flood control regulators in drainage areas marked as in the map.

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 low-lands and river.
- For discharging of rainwater from commercial areas, covered surface drain may be constructed and they will be linked with the secondary and tertiary canals.

12.3.1.2 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. Except the core area the Paurashava has wide scope 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 north-west to south-east. Slope of all drains should maintain this direction.

Map 12.3: Proposed Drainage and Flood Control Components

12.3.1.3 List of Proposed New Drains

For the removal of existing drainage congestion and provisioning of effective drainage system, a planned drainage network has been proposed. which are shown in the map 12.3 shows. A number of new primary and secondary drains have been prescribed. In the Paurashava, existing length of the drain is 1.13 km. and about 73.88 km drain is being proposed of which 6.03 Km are primary drain, 28.58 Km are secondary drain and 39.27 Km are tertiary drain. To develop a network, all Wards have been considered and in some places emphasize has given providing on missing links rather than new. These network should be develop with the development of the road network. The details of drainage proposal with phasing of development are shown in **Annexure-F**.

Table 12.8: List of proposed new drains

Sl.No	Type	Length (m)	Length (km)	Width	Length (%)
1.	Primary	6,027.99	6.03	3meter and above	8.16
2.	Secondary	28,576.26	28.58	1 to 3Meter	38.68
3.	Tertiary	39,271.64	39.27	Upto 1 Meter	53.16
Total		73,875.89	73.88		100.00

12.3.1.4 List of Infrastructure Measures for Drainage and Flood Control Network

Different types of bridges and culverts have been identified from the physical feature survey. There are altogether 29 Bridge and 25 culverts (Box and Pipe culverts) in the Paurashava. Those culverts are located on the river, major canals and drainage channels.

No remarkable flood occurred during over the years at Sonargaon Paurashava. Water logging is common, dyke is an important issue for this Paurashava, but there is no dyke or embankment in the Paurashava.

Except the above infrastructure, more 3 bridges and 40 culverts will be needed on different proposed roads as presented in the map.

Table 12.9: List of existing and proposed infrastructures for drainage and flood control

Name of infrastructure	Existing (No.)	Proposed (No.)
Bridge	29	3
Culvert/PipeBox	25	40
Sluice Gate	1	0
Flood Wall	0	0
Road cum Embankment	0	0

The utility services and facilities which are related to drainage and environmental management are shown in the table 12.10.

Table: 12.10: Proposed new areas for Utility Services

Proposed Facilities	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Dumping Site-1	Ward No. 01	Garibardi	85-87, 88 part, 90 part, 91-96, 113-117, 121-122 part	3.951
Dumping Site-2	Ward No. 05	Sollapara	266-267, 271	1.657
Waste Transfer Station	Ward No. 06	Baghmahisha	259, 263 part, 264 part	0.297
Public Toilet-1	Ward No. 06	Baghmahisha	264 part	0.101
Public Toilet-2	Ward No. 03	Tipurdi	148 part	0.273
Water Pump House & Ward Community Clinic-1	Ward No. 06	Baghmahisha	83	0.382
Water Pump House & Ward Community Clinic-2	Ward No. 01	Raishdia	69	0.141
Water Pump House-3	Ward No. 05	Aminpur	272 part, 273, 274 part	0.227
Water Pump House-4	Ward No. 02	Goaldi	543	0.065
Slaughther House	Ward No. 08	Chowdona	522 part	0.093
		Sahapur	21 part	
Total				7.187

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 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 needed.

Evaluation

Monitoring and evaluation of on going and implemented projects is essential to keep the future course of action on the right track. An on going 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.

12.5 Environmental Management Plan

12.5.1 Introduction

The plan has documented Sonargaon 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).

12.5.2 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.

12.5.3 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 Existing Environmental Condition

12.6.1 Introduction

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: Sonargaon Paurashava falls in the region of old Brahmaputra and Meghan floodplain. In 1787, a remarkable change in the course of the Brahmaputra took place. In that year, the river shifted from a course around the eastern edge to the western side of the Madhupur Tract. This new portion of the Brahmaputra is named Jamuna. The old course (old Brahmaputra) between Bahadurabad and Bhairab shrank through silting into a small seasonal channel only two kilometer wide. The old river had already built up fairly high levees on either side over which the present river rarely spills. The Old Brahmaputra floodplain stretching from the southwestern corner of the Garo Hills along the eastern rim of the Madhupur Tract down to the Meghna exhibits a gentle morphology composed of broad ridges and depressions. The latter are usually flooded to a depth of more than one meter, whereas the ridges are subject to shallow flooding only in the monsoon season.

On the other hand, Geosynclinals Basin in the southeast is characterized by the huge thickness (maximum of about 20 km near the basin centre) of elastic sedimentary rocks, mostly sandstone and shale of Tertiary age. It occupies the greater Dhaka-Noakhali-Sylhet-Comilla-Chittagong areas. The huge thickness of sediments in the basin is a result of tectonic mobility or instability of the areas causing rapid subsidence and sedimentation in a relatively short span of geologic time. The geosynclinals basin is subdivided into two parts i.e. fold belt in the east and a fore deep to the west.

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 (of Bangshi Rivers) 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.

Again, in the filled up areas (along the National Highway, from Dhaka to Barisal via Sonargaon) there are mixtures of many coloured soils carried from different borrowing areas. Consistency of cohesive soil deposits (plastic silts and clays) and relative density of cohesion less soil deposits (non-plastic silts and sands) have been described in accordance with internationally accepted terms, which give approximate indication of strengths of the soil strata encountered at different depths.

Table 12.11: SPT N-Values

Consistency	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

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 12.12: 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 Paurashava of Sonargaon has a pronounced tropical monsoon climate. The mean temperature ranges from about 36°C in April to about 12.7°C in January. Mean annual temperature is about 24.35°C. Physically the Paurashava is characterized by alluvial formations caused by several rivers such as, Shitalakshya, Meghna and old Brahmaputra River.

Temperature

Sonargaon Paurashava has three distinct seasons: winter (November-February), dry with temperature 12° to 20°C; the pre-monsoon season (March-May), some rain and hot with temperature reaching up to 40°C; and the monsoon (June-October), very wet with temperatures around 30°C. The hottest months are March, April, May, June, July and August. From November to February, Paurashava experiences cool periods when minimum temperature varies from 14.1° C (December) to 12.7° C (January). Sonargaon Paurashava experiences about 2,000 mm rain annually, of which about 80% falls during the monsoon.

Humidity

Sonargaon Paurashava lies in the tropical monsoon climatic region and more specially, represents the climate of Dhaka district. Average annual rainfall is about 2550 mm of which occurs in six months from May to October. The dry season extends from November to February and is cool and almost rainless, receiving less than an average of 4 inches for the total 4 months period. March to May is the pre-monsoon season, with high temperatures and periodic thunderstorms.

Rainfall

Sonargaon Paurashava has three distinct seasons: winter (November-February), dry with temperature 12° to 20°C; the pre-monsoon season (March-May), some rain and hot with temperature reaching up to 40°C; and the monsoon (June-October), very wet with temperatures around 30°C. Sonargaon Paurashava experiences about 2,000 mm rain annually, of which about 80% falls during the monsoon.

Wind Directions

In Narayanganj 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

Khal and pond are the hydrological components of the Paurashava. Those components are occupying 18.61% (431.64 acres) land of the Paurashava. 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

Condition of solid waste management system is not satisfactory. In fact, there is no waste management system exist in the municipality. People are found to dispose their waste to the nearby low land, ditches, drains or in the vacant land. There is no dustbin allover the municipality. People are duping waste scatterdely, so the is need to develop a community based solid waste management system. Paurashava has not a planned dumping site. So there is risk of land and water pollution. There is good opportunity of involving NGO and CBO in this process.

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 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 Sonargaon 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 around 2.00 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.

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 8 % katcha toilet is found in the Paurashava and owner of those toilets are poor people.

12.6.3.7 Industry

Industrial/ Processing and Manufacturing activity in Sonargaon Paurashava mainly includes garments, melamine, poly and cable industries, handicraft, rice mill, saw mill, ice factory, seed processing industry, bakery factory and other manufacturing and processing activities. Major industrial/manufacturing concentration is seen in Ward No 03 and occupied 15.579 acres area.

The small 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.

12.6.4 Brick Field

There is only two brickfield 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 Canals.

12.6.6 Pollutions

Pollution is the introduction of contaminants into an environment that causes instability, disorder, harm or discomfort to the ecosystem i.e. physical systems or living organisms. Pollution can take the form of chemical substances, or energy, such as noise, heat or light energy. Pollutants, the elements of pollution, can be foreign substances or energies, or naturally occurring; when naturally occurring, they are considered contaminants when they exceed natural levels. The major forms of pollution are air pollution, water pollution, soil pollution and noise pollution.

Water Pollution

Water is considered polluted when it altered from the natural state in its physical condition or 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, lake or ocean) and into the ground.

Quite substantial amount of water bodies totaling of 431.642 acres are exist in the Paurashava area, which have an influence in the local microclimate. Wetland should be carefully protected in this Paurashava because it has been found that most of the big cities of Bangladesh lost their wetland for their development that resulted environmental degradation. There are total water bodies 948 in this Paurashava. Among these 554 is ponds and 312 is ditches, 2 is lake, 1 is beel/marshland and the rest is 6 khals. Total area of ponds and ditches is 204.97 and 76.29 acres respectively and for khals is 187.28 acres. There are various types of industries located in this Paurashava. The industrial wastes mix with water and create water pollution.

The Paurashava also have drainage problem which create water logging as well as water pollution. Sonargaon Paurashava has no sufficient number of waste bins and dumping place for garbage management so this creates severe air and water pollution.

Ground water pollution also exists in the Sonargaon Paurashava. The Paurashava authority and Department of Public Health and Engineering conducted a survey in 2004 that found 90% tube wells are contaminated by iron. No initiative has been made yet by any local authority/ GOs/ NGOs to reduce such problem.

Air Pollution

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 (Motor Cycle/Auto Rickshaw etc) 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. Only source of air pollution is heavy movement of vehicles on the Dhaka-Chittagong NHW and Mugrapara Intersection to Thana Road.

Air pollution depends of the level of concentration of pollutants in the air. In that consideration smoke of the vehicles cause little difference in the ambient air quality of Sonargaon Paurashava. Again industries that located in the Paurashava also cause air pollution in small scale. As an important highway passes through the Paurashava, a huge number of vehicles pollute the air of the Paurashava.

In the Paurashava area there has no brick field. But there are many saw and husking mills located within the Paurashava area. Saw mills releases wooden dust as effluent into the air and polluting the surroundings. The rice husking mills used to boil rice 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. These mills have not installed any treatment plant. The Paurashava authority has been not yet taken any initiatives to install effluent treatment plant (ETP) in the industry.

Soil 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 losing 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.

Noise Pollution

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, factory machinery, construction work, audio entertainment systems, loudspeakers and noisy people.

In the Paurashava, shallow engine driven vehicles like auto rickshaws are playing on roads as a mean of local transport. They are making above 1000 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 sound pollution. The Paurashava authority has already noticed them to restrict their movements. Heavy vehicles are found mostly at Dhaka-Chittagong NHW which creates sound pollution heavily. Generated sounds from saw mills at their operational time are also a source of sound pollution but there is no saw mill in Sonargaon Paurashava.

Arsenic Condition

The major sources of drinking water in this Paurashava are ground water, which is extracted in the household level by hand tube-well. Ground water quality in the study area is not influenced by arsenic. But presence of iron pollutant in ground water is identified. According to environmental study 2009 and collected data from Department of Public Health and Engineering (DPHE), water table fluctuates in the wet and dry season. In the wet season ground water table found within 12 ft and in the dry season it goes down to 30ft.

Other Pollution

From the field survey it is found that there is no arrangement for waste management. The people are 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.

12.6.7 Natural Calamities and Localized 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. There is no remarkable cyclone and earth quake occurred in Sonargaon Paurashava yet.

Water Logging (Area, Duration, Reason, Causes, Etc)

This municipality has 554 ponds, 312 ditches and 6 khals. There is an opportunity to use these for draining out the rainwater. According to the environmental survey 2009,

Sonargaon Paurashava does not suffer water logging so much in the rainy season. Water Most of the time water discharges to these water bodies.

Flood

No remarkable flood occurred during over the years at Sonargaon Paurashava.

Fire Hazard

No fire hazard record is found in the Sonargaon 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.

Other Hazards

There is no arrangement for clinical waste management. The clinics, hospitals and diagnostic centers 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. There is an up-coming issue of land filling in the Paurashava area which will cause serious problem in the future. Survey team found private initiatives of filling the low lands, water bodies in different places of the Paurashava for developing private housing without any planning intervention.

12.7 Plan for Environmental Management and Pollution Control

12.7.1 Proposals for Environmental Issues

In Sonargaon Paurashava, noise pollution is occurring from saw mills and rice husking mills.. 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 Water logging. 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 Sonargaon 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 Sonargaon 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 3.00 tons and most of those garbages throw to the nearby low lands. At present there is a duping site opposite side of the pourashava. A new dumping site with a area of 3.78 acres A 5.32 acre dumping site was proposed at the ward no-1 and northern side of the Paurashava.

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.

12.7.1.2 Open space, Wet-land and Relevant Features Protection Plan

- One central park cum stadium, 3 neighbourhood park has been proposed as open space for recreation of the city dwellers. Stadium and the areas for tourism development are prescribed in the extended areas.
- 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.

12.7.1.3 Pollution Protection Proposals

12.7.1.3.1 Industrial

Industrial/ Processing and Manufacturing activity in Sonargaon Paurashava mainly includes garments, melamine, poly and cable industries, handicraft, rice mill, saw mill, ice factory, seed processing industry, bakery factory and other manufacturing and processing activities. Major industrial/manufacturing concentration is seen in Ward No 03 and occupied 15.579 acres area. Following proposals have made for protection of industrial pollution:

- 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. Canal and ponds and other water bodies 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 northeast to 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.

1. Careful planning will be needed to minimize the change of topography.
2. Avoid water bodies during planning of roads, housing and industrial estates.
3. Practice good architectural/engineering design during planning of housing estates, buildings and the intersections of main roads.

4. Enhancement of plantation and gardening to increase the scenic beauty of the Paurashava.
5. Preserve the Beels 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.

1. Keep water bodies and productive agricultural land free from urban development as long as possible. Vertical development may be encouraged rather than horizontal.
2. Careful planning is necessary to reduce change of agricultural landuse and rural setup.
3. 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 nearest khal and water bodies. These water body is filling up, 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.

1. Make proper drainage network in new area considering the slope and local topographical condition.
2. Remove all unauthorized structures, which developed on drainage structures.
3. Prohibit the people in dumping of rubbish and solid waste in drain.
4. Regular cleaning and maintenance by the concerned authorities.
5. Demarcation of water bodies, which can act as retention pond to avoid water logging from heavy rainfall.

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.

1. Introduce rainwater harvesting system and use in the study area.
2. 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 rivers 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.

1. Stop using hydraulic horn in buses, trucks and other motor vehicles.
2. Declare some areas like hospitals, schools, parks, etc. as silent zone.
3. Control abnormally high noise from saw mill, old machines should be repaired or replaced.
4. Foundation of machines should be specially prepared to reduce noise.
5. Special type of silencer may be attached with the machines to reduce noise.
6. Welding and blacksmith workshops can be fenced with glasses to protect the passersby from possible pollution effects.
7. 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.

1. Use catalytic converter in buses, trucks, taxis and tempos.
2. Use CNG instead of petrol and diesel.

3. 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 man made 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.

1. Avoid critical ecological area and refugee sites from development activities.
2. Aware people for keeping some trees and bushes around the homesteads.
3. Increase tree plantation in roadsides and homesteads.
4. 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.

1. Regular mosquito eradication program in the project area.
2. 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.
3. Remove additional water of flower-tubs and refrigerator cans regularly.
4. Improve drainage system and remove waterlogged areas in the project.
5. Regular cleaning of drain and removal of water hyacinth and other aquatic plants are required from ponds, ditches, khals and Beels.
6. Use mosquito net during sleeping at both night and daytime.
7. 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 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 and canal 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 5 of the '**Playfield, Open space, Park and Natural water reservoir Conservation Act, 2000**' will be needed for the preservation of playfield, garden, open space and natural tank of the Paurashava.
4. 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.
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 needed.

Evaluation

Monitoring and evaluation of on going and implemented projects is essential to keep the future course of action on the right track. An on going 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

13.1.1 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 Sonargaon 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.

No strategies were included in that plan. Objectives of the Landuse / Master Plan was -

- To support local and sectoral agencies plan making effort.
- To rearrange existing population within the Upazila premises.
- To provide basic urban services to the Upazila Shahar.
- To provide administrative services to the doorsteps of the Upazila people.

Components of the plan were –

- Preparation of Landuse / Master Plan for the Upazila Shahar based on certain approaches, concepts and principles.
- Preparation of road and urban services development plan
- Preparation of a drainage plan.
- Proposal for future educational, social and other service facilities.
- Reservation of land as urban deferred for future requirements.
- Phasing and implementation procedure of the plan.

However, none of the plans prepared by the UDD was implemented. This is because UDD was responsible only for preparation of the plan. Absence of Gazette Notification in favour of those plans and no understanding of the concerned Upazila about the plan were the major problems of non-implementation of those plans.

The UDD was undertaken the tasks without well thought pre-project thinking about how and who will implement the plan prepared by the UDD. Quality of the plan was not pragmatic and directly implementable. In most Upazilas, no local government authorities

to become the custodian of the plan and take care of the implementation and follow-up actions. There was no resource mobilization effort for implementation. The funding proposal made in the plan was not practical in nature.

After completion of the Urban Area Plan under Paurashava Town Infrastructure Development Project, development of the Paurashava will be enhanced following some guiding principles.

13.1.2 Range and Content of the Urban Services

The Plan for Urban Services covers planning area of Sonargaon Paurashava for a ten years time-frame (from 2011 to 2021). It also comprises a report and maps.

The Plan concern where services will be located (expected development). It also indicates how the Structure Plan policies will govern the areas and the standard for services calculated (based on the population forecast).

Outline of the Plan gives guidance to the Paurashava how the urban services will be developed and be promoted, maintained with a coordinated manner.

The Plan has been divided into five main parts i.e. existing condition and demand of the services, implementation strategies, proposal, regulations needed for establishment and management of the services, monitoring and evaluation of the plan. Water supply, sewerage facility, electricity, telephone and gas supply are the major concern of this plan.

13.2 Analysis of Existing Condition and Demand of the Services

13.2.1 Introduction

The Paurashava is not enough financial capability for 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. People are dependent on hand tubewell for drinking water. 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.

13.2.2 Analysis and Projection on Existing and Proposed Urban Services

Water Supply: There is no piped water supply provision of Sonargaon Paurashava authority, the households themselves establish electric motor instead of hand tube well for piped water supply to meet individuals' water demand. In ownership of source, major portion of households have own water source. The households in Ward No. 1, 3 and 7 has propensity to use the water of river and pond. In Ward No. 3, 3.3% households use river water; in Ward No. 1, 3 and 7, 2.4%, 6.7% and 3.3% households use the water of pond. The table 3.6 represents the main water options for drinking and cooking.

Map 13-1: Existing Urban Services

Gas supply: Gas supply is not available in the Paurashava people are dependent on LPG for cooking and other use.

Solid waste management

Solid waste collection and disposal in Sonargaon Paurashava is the responsibility of Paurashava authority. The logistics for collection and disposal of solid wastes include 15 sweepers and 1 garbage truck is available at the Paurashava. There is no CBO or NGO based collection system and dumping site within the Paurashava area but there are 4 dustbins within the Paurashava area.

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 3 tons of domestic solid wastes per day according to Sonargaon Paurashava.

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.

Swelage facility:

The Sewerage system has not introduced in the Paurashava area. Maximum households build individual septic tanks for disposal of human excreta built on own initiatives. At present 92% people of the Paurashava use sanitary latrines. The sewerage system in the study area is to be developed in future with treatment plant.

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 network and the total number is 233. 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 electric poles (11 KV) containing transformers are 4 in number.

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 having a capacity of 500 lines maintained by Bangladesh Telecommunication Company Limited (BTCL) in the Paurashava area. At present, there are 230 land telephone users and 30 telephone poles in the area. There are also mobile phone networks of Grameenphone, Robi, Citycell, Banglalink, Airtel and Teletalk, which cover the entire study area. About 13 mobile towers are existed in this Paurashava.

Other urban services:

Waste transfer station, dumping site, slaughter house, pump house, public toilet should considered as urban services.

Projection

The projection of utility service depends on the population growth and need assessment of the Paurashava inhabitants. After completion of population projection it is found that, population of the planning area will be 64451 in the year 2031. Projection on utility services also depends on present condition of urban services 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. But in context of present scenario and practical situation proposal has been made.

Table 13.1: Standard of utility facilities and future need

Facility	Standard	Existing Facility (acre)	Requirement (acre) up to 2031	Proposed Facility including Existing
Drainage	As per requirement	-	-	-
Water supply	1.00 acre/ 20,000 population	0.00	3.22	0.00
Gas Station	1.00 acre/ 20,000 population	0.00	3.22	0.00
Solid waste disposal	4-10 acres/ Upazila HQ	0.00	4.00	5.61
Waste transfer station	0.25 acres/ per transfer station	0.00	0	0.30
Electric sub-station	1.00 acre/ 20,000 population	0.00	3.22	0.00
Telephone exchange	.5 acre/ 20,000 population	0.00	1.61	0.00
Fuel station	.5 acre/ 20,000 population	0.00	1.61	0.00
Slaughter House	As per requirement	0.00	0	0.10
Others	-	0.00	0	2.27
Total		-	16.88	8.28

13.3 Proposals for Addressing Urban Services and Implementation Strategies

13.3.1 Introduction

Following strategies will be followed for implementation urban services in the planning area:

- Cost for service development will be promoted in phases, based on comprehensive plan for the demarcated entire Paurashava areas. This process will reduce cost.
- Some areas will be targeted as new urban areas where urbanization is likely to be rapid and imminent.
- Except waste disposal all other services (Water Supply, Sewerage, Electricity, telephone and Gas) will be provided by the concerned service giving agencies.

Water supply: Location of **water treatment plant** may be on a large plot (on 0.30 acres of land) with good access, close to source of water. It should be located upstream of any polluting development. **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.

Sewerage facilities: Location of **sewerage treatment plant** may be on large plot (on 0.30 acres of 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.

Electricity: Existing **Electricity power station** may be developed into **132/33KV switching station**. These can be accommodated on the plots they serve (industries) or in road corridors.

Telephone: There is no need of **telephone exchange** for the Paurashava. If required, it will need a medium size plot (on 0.19 acres of 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.

Gas supply: The standard for **gas manifold station**, may be located on small to medium sized plot (on 0.30 acres of land) on the main ring. **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.

13.3.2 Proposals for Urban Services

For existing urban services, the Paurashava will need to establish a communication with each of the appropriate implementing agencies the following:

- Which of the existing services run, not currently in road corridors, could or should be relocated into road corridors to facilitate planned development bearing in mind the cost implications of doing this.
- The corridor reservations that should be applied to the service networks that cannot be moved.

- The means of establishing and maintaining these reservations, free from other development.
- For future expansions of the networks (in case of sewerage, possibly a new network), the Paurashava will need to establish with the appropriate implementing agency what the future requirements are, so that reservations can be applied and maintained. The Paurashava will need as part of this process:
- Try to ensure that secondary, tertiary and where possible primary networks are located within existing or proposed road corridors to minimize the requirement for separate land reservations. In most cases, it is known that this can be achieved. The likely exception will be primary electricity networks. The scale of this will demand separate land reservations.
- Where this cannot be achieved, agree with the relevant agency about the size of the reservation required, its alignment and approximate time-scale of implementation.
- To adopt the agreed reservation and ensure that it is maintained. When development applications are received which impinge upon this reservation, the Paurashava should not permit the development within the reservation, but ensure that it will be made to setback to the limit of the reservation.

Types of urban services that will need to be considered within the Paurashava are indicated below:

Water supply: Within all road area there should be provision of installation of water supply network and about 0.23 acres of land has earmarked for office or relevant activity.

Solid Waste Management: A community waste management system has proposed for this Paurashava. So, there is no need of transfer station only a dumping site which was proposed with an area of 3.78 acres will sufficient for this facility.

Sewerage facilities: 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: 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: 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: All gas line will be supplied by varying diameter underground pipes. These can be accommodated in road reserves.

Other urban services:

Waste transfer station, dumping site, pump house, slaughter house should considered as urban services.

Table: 13.2: Proposed new areas for Urban Services

Proposed Facilitiles	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Dumping Site-1	Ward No. 01	Garibardi	85-87, 88 part, 90 part, 91-96, 113-117, 121-122 part	3.951
Dumping Site-2	Ward No. 05	Sollapara	266-267, 271	1.657
Waste Transfer Station	Ward No. 06	Baghmahisha	259, 263 part, 264 part	0.297
Public Toilet-1	Ward No. 06	Baghmahisha	264 part	0.101
Public Toilet-2	Ward No. 03	Tipurdi	148 part	0.273
Water Pump House & Ward Community Clinic-1	Ward No. 06	Baghmahisha	83	0.382
Water Pump House & Ward Community Clinic-2	Ward No. 01	Raishdia	69	0.141
Water Pump House-3	Ward No. 05	Aminpur	272 part, 273, 274 part	0.227
Water Pump House-4	Ward No. 02	Goaldi	543	0.065
Slaughther House	Ward No. 08	Chowdona	522 part	0.093
		Sahapur	21 part	
Total				7.187

13.3.3 Regulations to Address the Proposals

According to the 2nd Schedule, Sl. No. 10 of **Local Government (Paurashava) Act, 2009** 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.

Map 13-2: Proposed Urban Services

13.3.4 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.

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 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 on going and implemented projects is essential to keep the future course of action on the right track. An on going 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.

CHAPTER 14

WARD ACTION PLAN

14 Introduction

Mere preparation of Ward Action Plan will not be sufficient due to resource constraint. Securing Right of Way (ROW) for circulation network and utility corridor needs huge funds which cannot be met from public exchequer. To minimize the cost of development Paurashava should involve the landowners in the development process. This can be achieved by declaring some of the developing corridors as concession for development through people's participation where landowners will become development partners and share the development cost through contribution of a portion of their land. Paurashava has to follow Ward Action Plan for those areas utilizing development techniques like Guided Land Development or Land Readjustment. Paurashava has to show strong determination and willingness as this is a very difficult task to accomplish involving hundreds of people. Paurashava has to increase its efficiency and do the work at the appropriate time.

14.1 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.

14.1.1 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.

14.1.2 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.

14.1.3 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 Prioritization

Immediate action is being needed for the development of Wards. Those actions are presented here according to the priority:

1st Priority: Traffic Management and Engineering

- Improvement of intersections on the regional road, including a ranked program of roundabout construction and a reduced role and operation of Zebra Crossing.
- Removal of bus and non-motorized vehicles stops from junctions, restrictions.
- Better traffic police enforcement and additional resources.
- Adoption of design guidelines for road improvement and for parking and access arrangements in new developments.
- Priority for footpath reinstatement, signing of national standards and corrections to serious local road surface irregularities such as pole-bases.
- Enforcement of development control on the National Highway.

2nd Priority: Improvement of transport services

- Encouragement of higher quality bus services by allowing higher fares for such services at least from Sonargaon to Dhaka.
- Designation of separate service road both side of Dhaka-Chittagong Road.

3rd Priority: Improvement of drainage congestion

- Improvement of drainage congestion as specified in the drainage plan especially in the areas where the drainage congestion is high.
- Control indiscriminate earth filling which may hamper natural drainage system of the Paurashava.
- Construction of box culverts before road construction/expansion as specified in the drainage plan.
- Remove encroachment from the natural drainage like ponds and rivers.
- Control earth filling activities on natural canals outside the Paurashava boundary.

4th Priority: Rainwater harvesting

- The ponds indiscriminately located in the Paurashava and their size is not less than 0.3 acre is proposed for rainwater harvesting. At the sametime, solar energy may be produced using those proposed lands.
- Implementation of the above mentioned components will be selected as priority project. The priority project comprises all those works identified for implementation during the plan period. These are urgently needed to alleviate existing monsoon flooding and to prevent the risk of inundation. As a result of questionnaire survey to locate areas of flooding and discussions with Paurashava, three areas of the Paurashava are suffering with more flooding and most of them are identified for priority treatment:
 - middle and northern part of the Paurashava under Ward No. 1,3 &6.
 - southern part of the Paurashava under Ward No. 7&8 and
 - northern part of the Paurashava under Ward No. 2.

The storm water drainage priority project includes the provision of adequately – sized silt traps, removal of obstructions. The major component of work is construction of missing-links to carry water from Paurashava Town Centre to Louhaganj River.

14.3 Ward-wise Action Plan for Next Five Years

The priority mentioned in the Clause 14.2.3 follows according to the Ward for next five years. Those priorities are the primary steps of development considering the year from 2011 to 2016.

Possible ways of financing the Master Plan assumes that:

- Funds for construction of regional road and undertaking flood defence works will be obtained from GoB in the usual way and these will not be directly recovered from the beneficiaries in Paurashava.
- Funds for providing storm water drainage and construction of local road will be provided by loans for capital expenditure. These will be recovered from the Paurashava dwellers, primarily from taxes on property. Various loan conditions have been considered, the most onerous of which is GoB's standard on lending rate is 12.5% per annum interest, repayable over 20 years, including a 5-year grace period. It has been assumed that maintenance costs are directly recovered through local taxation.
- The implementation of Master Plan component will require funding either from grant or from increased local taxes.

14.3.1 Action Plan for Ward No. 1

Existing Situation:

It is situated on the north-west part of the Paurashava, Ward No. 4 on the east and Ward No. 4 on the south-west. This area is mainly peripheral area of the Paurashava. Development pressure is comparatively low. Total planning area of the Ward is 391.71 acres and total population is 3860. Among the total planning area, 189.29 acres land is under agriculture use, 138.10 acres residential, 0.52 acres commercial and others are in different category. There is a total of 9.93 km road in this ward of which 3.61 km are katcha. Within educational institution there is 1 primary school and 1 madrasa.

Development proposals:

Landuse Development: For planned development considering the existing landuse and future demand landuse proposal has made. Within the total area 38.28% land proposed for residential use, only 0.18% are commercial use 1.27 % mixed use, 8.21% are education & research, 24.37% agricultural and others are in different category which are shown in the following table.

Table 14.1: Proposed landuse for Ward no-1

Land Use Type	Area (Acre)	Percentage (%)
Urban Residential Zone	162.85	41.57
Rural Settlement	22.67	5.79
Commercial Zone	0.48	0.12
Mixed Use Zone	4.98	1.27
General Industrial Zone	1.63	0.42
Education & Research Zone	32.16	8.21
Agricultural Zone	82.28	21.01
Water Body	43.13	11.01
Open Space	3.79	0.97
Circulation Network	30.86	7.88
Transportation Facilities	1.23	0.31
Utility Services	3.79	0.97
Health Services	0.23	0.06
Community Facilities	1.64	0.42
Total	391.72	100.00

The proposed facilities considering the demand of the ward were shown in the following table including phasing. The proposed facilities under different category of land uses are also shown in the following table.

Table 14.2: proposed facilities for ward no -1

Proposed Facilities	Phase	CS Mouza Name	Plot No.	Area in Acre
Residential				
Low Income Houseing Area	2 nd	Choto Maghbazar	3-46, 139	34.998
		Goaldi	43 part, 44-48, 59 part, 54, 59	
Re-Settlement Residential Zone	1 st	Darpat Thotalia	87-102, 104-119, 356-387, 737, 745-747	16.767
Commercial Facility				
Poura Market & Community Center	1 st	Aminpur	145	0.423
Transportation				
Tempo Stand	1 st	Raishdia	89-90 part, 91-93	1.226
Educational Institution				
College-2	2 nd	Darpat Thotalia	335-348, 350-352, 388-405	4.861
University College	3 rd	Darpat Thotalia	177-195, 200-241, 243, 245-256, 280, 283, 296-327	26.966
Open Spce				
Community Park	1 st	Choto Maghbazar	143, 145-147 part, 148-149	1.300
Utility & service facility				
Dumping Site-1	1 st	Garibardi	85-87, 88 part, 90 part, 91-96, 113-117, 121-122 part	3.951
Community Facilities				
Ward Center	1 st	Raishdia	95 part	0.220

Map 14.1: Landuse Proposal for Ward No. 01

Map 14.2: Proposed Road, Drainage and Utility Services Plan for Ward No. 01

Proposal for road development:

A total of 10.23 km road has proposed for road network development of this ward of which some are new and some are widening. Within all roads 5.20 km road will construct within 1st phase. Recommended road network are shown in the following table.

Table 14.3: Proposed road for ward no-1

Road ID	Width	Length(M)	Phase	Type
RS02	60	1754.57	2nd	W
RS04	60	461.41	2nd	N
RS04	60	170.34	2nd	W
RS06	60	293.16	2nd	W
RS10	60	242.76	1st	N
RS15	40	842.15	1st	W
RS29	40	16.85	1st	N
RS37	40	381.70	1st	N
RS38	40	583.11	1st	N
RS39	40	750.16	1st	N
RL54	30	431.19	3rd	W
RL85	30	679.53	2nd	W
RL86	30	494.04	3rd	W
RL87	30	489.35	3rd	W
RL101	30	244.45	3rd	W
RA109	20	834.31	1st	W
RA121	20	3.62	1st	W
RA145	20	247.20	1st	W
RA146	20	259.78	1st	W
RA148	20	316.14	1st	W
RA181	20	325.46	1st	W
RA182	20	406.22	1st	W
Total		10227.5		

*Note: W= widening, N= New Road

Proposal for drianage development:

A total of 10.22 km drain has proposed for drainage network development of this ward of which almost all are new. Within all drains 4.97 km drain will construct within 1st phase. Recommended drains are shown in the following table.

Table 14.4: Proposed drainage for ward no-1

Drain ID	Type	Length(M)	Phase
DS02	Secondary	1,754.57	2nd
DS04	Secondary	631.76	2nd
DP06	Primary	293.16	2nd
DS10	Secondary	242.76	2nd
DS15	Secondary	842.15	1st
DS29	Secondary	16.85	1st
DS37	Secondary	380.00	1st
DS38	Secondary	584.81	1st
DT39	Tertiary	750.16	1st
DT54	Tertiary	431.19	3rd
DT85	Tertiary	677.96	2nd
DT86	Tertiary	984.96	3rd
DT101	Tertiary	244.45	3rd
DT109	Tertiary	834.31	1st

Drain ID	Type	Length(M)	Phase
DT145	Tertiary	247.20	1st
DT146	Tertiary	259.78	1st
DT148	Tertiary	316.14	1st
DT182	Tertiary	731.68	1st
Total		10,223.89	

14.3.2 Action Plan for Ward No. 2

Existing Situation:

It is situated on the north-west part of the Paurashava and Ward No. 1 on the north and Ward No.3 on the north. It is the fringe area of the Paurashava and development pressure is comparatively low. Ward No. 2 is also important for vast agriculture land. Total planning area of the Ward is 262.00 acres and population is 3605 person (BBS 2011). Among the total planning area, 103.64 acres land is under agriculture use, 102.97 acres residential and 1.84 acres commercial and others are in different category. There is a total of 10.47 km road in this ward of which 5.30 km are katcha. Within educational institution there is 2 primary school, 1 high school and 2 madrasa.

Proposals and Plans for Ward No. 2

Landuse Development: For planned development considering the existing landuse and future demand landuse proposal has made. Within the total area 62.56% land proposed for residential use, 0.37% are commercial use, 0.67 % mixed use, only 0.98% agricultural and others are in different category which are shown in the following table.

Table 14.5: Proposed landuse for Ward no-2

Land Use Type	Area (Acre)	Percentage (%)
Urban Residential Zone	164.26	62.69
Commercial Zone	0.96	0.37
Mixed Use Zone	1.80	0.69
General Industrial Zone	0.30	0.11
Education & Research Zone	1.72	0.66
Agricultural Zone	2.53	0.97
Water Body	32.39	12.36
Open Space	6.94	2.65
Circulation Network	30.09	11.48
Utility Services	0.07	0.02
Health Services	0.81	0.31
Community Facilities	1.52	0.58
Urban Deferred	18.63	7.11
Total	262.00	100.00

The proposed facilities considering the demand of the ward were shown in the following table including phasing. The proposed facilities under different category of land uses are also shown in the following table.

Table 14.6: Proposed facilities for ward no -2

Proposed Facilitiles	Phase	CS Mouza Name	Plot No.	Area in Acre
Educational Institution				
High School	2 nd	Goaldi	361-362 part, 363, 365 part	0.508
Open Spce				
Central Park Cum Stadium	3 rd	Aminpur	4-5, 40, 43-44, 66-73, 110	5.632
		Goaldi	516-517	
Utility & service facility				
Water Pump House-4	1 st	Goaldi	543	0.065
Urban Deferred				
Urban Deferred	1 st	Bagh Nazirpur	1-33	18.632
		Goaldi	244-279, 285-291	
Community Facilities				
Ward Community Clinic	1 st	Goaldi	546	0.267
Ward center	1 st	Goaldi	478 part	0.200

Proposal of road development:

A total of 9.54 km road has proposed for road network development of this ward of which some are new and some are widening. Within all roads only 1.72 km road will construct within 1st phase. Recommended road network are shown in the following table.

Table 14.7: Proposed road for ward no-2

Road ID	Width (ft.)	Length (M)	Phase	Type
RS04	60	94.51	2nd	N
RS06	60	468.10	2nd	W
RS08	60	461.61	2nd	W
RS09	60	1332.66	2nd	N
RS10	60	1115.27	2nd	W
RS10	60	406.15	1st	N
RS29	40	391.62	1st	N
RS39	40	43.93	1st	N
RL45	30	1009.16	3rd	W
RL46	30	296.08	2nd	W
RL48	30	632.74	3rd	W
RL49	30	66.50	2nd	W
RL58	30	254.39	2nd	W
RL59	30	214.81	2nd	N
RL97	30	0.21	1st	W
RL98	30	267.31	3rd	W
RL99	30	270.93	2nd	W
RL100	30	357.58	2nd	N
RL101	30	36.08	3rd	W
RL102	30	81.93	2nd	W
RL103	30	221.20	2nd	W
RL104	30	183.91	3rd	W
RL106	30	2.82	1st	W
RA109	20	27.11	1st	W
RA133	20	304.87	1st	W
RA134	20	23.43	2nd	W
RA135	20	147.64	1st	W
RA136	20	27.88	2nd	W
RA137	20	56.88	1st	W
RA138	20	70.41	1st	W
RA139	20	181.57	2nd	W
RA142	20	248.84	1st	N
RA149	20	222.35	2nd	W
RA183	20	19.71	1st	W
Total		9540.19		

*Note: W= widening, N= New Road

Proposal for drianage development:

A total of 9.17 km drain has proposed for drainage network development of this ward of which almost all are new. Wihin all drains 1.02 km drain will construct within 1st phase. Recommanded drains are shown in the following table.

Table 14.8: Proposed drainage for ward no-2

Drain ID	Type	Length(M)	Phase
DS04	Secondary	73.33	2nd
DP06	Primary	468.10	2nd
DS08	Secondary	461.61	2nd
DS09	Secondary	1,332.66	2nd
DS10	Secondary	1,521.43	2nd
DS29	Secondary	391.62	1st
DT39	Tertiary	43.93	1st
DT45	Tertiary	1,009.16	3rd
DT46	Tertiary	296.08	2nd
DT48	Tertiary	632.74	3rd
DT49	Tertiary	66.50	2nd
DT58	Tertiary	254.39	2nd
DT59	Tertiary	214.81	2nd
DT97	Tertiary	0.21	1st
DT98	Tertiary	267.31	3rd
DT99	Tertiary	270.93	2nd
DT100	Tertiary	357.58	2nd
DT101	Tertiary	118.01	3rd
DT103	Tertiary	221.20	2nd
DT104	Tertiary	183.91	3rd
DT109	Tertiary	27.11	1st
DT133	Tertiary	304.87	1st
DT139	Tertiary	181.57	2nd
DT142	Tertiary	248.84	1st
DT149	Tertiary	222.35	2nd
Total		9,170.25	

Map 14.3 : Landuse Proposal for Ward No. 02

Map 14.4 : Proposed Road, Drainage and Utility Services Plan for Ward No. 02

14.3.3 Action Plan for Ward No. 3

Existing Situation:

The Ward is situated at weast side of the Paurashava. Dhaka-Chittagong highway at the west and Ward No. 7 at the southern part of this Ward. It is an urban fringe area. Total area of the Ward is 261.78 acres and population is 3899 person (BBS 2011). Among the total area, agriculture use is 95.74 acres, residential 94.13 acres and 1.79 acres are commercial area. There is a total of 9.24 km road in this ward of which 3.44 km are katcha. Within educational institution there is 1 primary school, 1 high school and 1 madrasa.

Proposals and Plans for Ward No. 3

Landuse Development: For planned development considering the existing landuse and future demand landuse proposal has made. Within the total area 43.08% land proposed for residential use, only 0.82% is commercial use, 1.34% mixed use, 11.88% heavy industrial zone, only 0.06% agricultural and others are in different category which are shown in the following table.

Table 14.9: Poposed landuse for Ward no-3

Land Use Type	Area (Acre)	Percentage (%)
Urban Residential Zone	112.68	43.04
Commercial Zone	2.28	0.87
Mixed Use Zone	3.72	1.42
General Industrial Zone	6.81	2.60
Heavy Industrial Zone	31.12	11.88
Education & Research Zone	0.60	0.23
Agricultural Zone	0.16	0.06
Water Body	30.60	11.69
Open Space	1.19	0.45
Circulation Network	28.19	10.77
Transportation Facilities	7.50	2.86
Utility Services	0.51	0.20
Health Services	10.09	3.85
Community Facilities	1.27	0.49
Urban Deferred	25.12	9.59
Total	261.82	100.00

The proposed facilities considering the demand of the ward were shown in the following table including phasing. The proposed facilities under different category of land uses are also shown in the following table.

Table 14.10: Proposed facilities for ward no -3

Proposed Facilitiles	Phase	CS Mouza Name	Plot No.	Area in Acre
Residential				
Planned Residential Area-3	3 rd	Tipurdi	86-102, 103 part, 108, 111 part, 112-115, 122-123, 161-208, 209-211 part, 212, 213 part, 309-310, 313 part	16.672
Commercial Facility				
Poura Market	2 nd	Choto Silmandi	93-94	1.007
		Padmalabhdi	34 part, 38 part, 40-41	
Transportation				
Inter city Bus Terminal	2 nd	Choto Silmandi	92, 97-98, 99 part	2.757
		Padmalabhdi	24-27, 34-37, 38 part	
Track Terminal & Loading& Unloading	2 nd	Mallikerpara	9 part, 10-15, 16 part	4.016
		Choto Silmandi	69-83	
Utility & service facility				
Fire Station	1 st	Choto Silmandi	99-100 Part, 101	0.207
Public Toilet-2	1 st	Tipurdi	148 part	0.273
Industrial				
Heavy Industrial Zone	3rd	Mallikerpara	35-36, 43, 45-76	30.130
		Chhata Silmandi	106-161	
Helath Facilities				
Hospital Zone	3rd	Tipurdi	124-126, 154-160, 209-213 part, 214-225, 254-259, 305, 305-306 part	10.090
Urban Deffard				
Urban Deffard	1 st	Choto Silmandi	48-56	25.116
		Tipurdi	1-75, 103-110, 116-118	
Community Facilities				
Ward Center	1 st	Goaldi	677 part	0.057

Map 14.5 : Landuse Proposal for Ward No. 03

Map 14.6 : Proposed Road, Drainage and Utility Services Plan for Ward No. 03

Proposal for road development:

A total of 7.77 km road has proposed for road network development of this ward of which some are new and some are widening. Within all roads only 3.25 km road will construct within 1st phase. Recommended road network are shown in the following table.

Table 14.11: Proposed road for ward no-3

Road ID	Width (ft.)	Length(M)	Phase	Type
RP01	200	547.15	3rd	W
RS06	60	128.22	2nd	W
RS08	60	1233.03	2nd	W
RS10	60	2.28	2nd	W
RS13	40	539.97	1st	W
RS19	40	383.62	2nd	N
RS20	40	204.15	3rd	W
RS41	40	178.82	1st	N
RS41	40	0.02	1st	N
RS42	40	242.73	1st	W
RS42	40	1.65	1st	W
RL49	30	41.72	2nd	W
RL50	30	338.53	1st	N
RL50	30	0.12	1st	N
RL52	30	321.91	1st	W
RL60	30	244.34	2nd	N
RL65	30	945.01	3rd	W
RL97	30	182.44	1st	W
RL104	30	428.36	3rd	W
RA107	20	327.21	1st	W
RA110	20	136.45	2nd	W
RA115	20	230.20	2nd	W
RA140	20	285.77	1st	W
RA141	20	88.66	1st	W
RA141	20	115.62	1st	W
RA153	20	217.40	1st	W
RA154	20	59.49	1st	W
RA180	20	245.35	1st	W
RA180	20	102.54	1st	W
Total		7772.76		

*Note: W= widening, N= New Road

Proposal for drianage development:

A total of 7.34 km drain has proposed for drainage network development of this ward of which almost all are new. Within all roads 3.25 km drain will construct within 1st phase. Recommended drains are shown in the following table.

Table 14.12: Proposed drainage for ward no-3

Drain ID	Type	Length(M)	Phase
DP01	Primary	547.15	3rd
DP06	Primary	128.22	2nd
DS08	Secondary	1,233.03	2nd
DS10	Secondary	2.28	2nd
DS13	Secondary	539.97	1st
DS19	Secondary	383.62	2nd
DS41	Secondary	178.82	1st

Drain ID	Type	Length(M)	Phase
DS41	Secondary	0.02	1st
DS42	Secondary	242.73	1st
DS42	Secondary	1.65	1st
DT49	Tertiary	41.72	2nd
DT50	Tertiary	338.53	1st
DT50	Tertiary	0.12	1st
DT52	Tertiary	321.91	1st
DT60	Tertiary	244.34	2nd
DT65	Tertiary	945.01	3rd
DT97	Tertiary	182.44	1st
DT104	Tertiary	428.36	3rd
DT107	Tertiary	327.21	1st
DT110	Tertiary	136.45	2nd
DT140	Tertiary	285.77	1st
DT141	Tertiary	204.27	1st
DT153	Tertiary	217.40	1st
DT154	Tertiary	59.49	1st
DT180	Tertiary	347.89	1st
Total		7,338.4	

14.3.4 Action Plan for Ward No. 4

Existing Situation:

It consists a vast agricultural area with a major portion urban fringe area. Ward 01 located at the western side of this Ward, Ward No. 5 at the south of the Ward. Total area of the Ward is 200.78 acres and total population is 2139 person(BBS 2011). Among the total area, agriculture use is 129.63 acres and residential 48.03 acres. There is a total of 5.97 km road in this ward of which 2.26 km are katcha. Within educational institution there is 2 primary school and 2 madrasa.

Proposals and Plans for Ward No. 4

Landuse Development: For planned development considering the existing landuse and future demand landuse proposal has made. Within the total area 39.60% land proposed for residential use, only 0.01 % is commercial use, 1.45% mixed use, 29.44% agricultural and others are in different category which are shown in the following table.

Table 14.13: Proposed land use for Ward no-4

Land Use Type	Area (Acre)	Percentage (%)
Urban Residential Zone	79.31	39.53
Commercial Zone	0.03	0.01
Mixed Use Zone	2.91	1.45
Education & Research Zone	21.67	10.80
Agricultural Zone	58.28	29.05
Water Body	15.38	7.67
Open Space	3.84	1.91
Circulation Network	18.08	9.01
Community Facilities	1.13	0.56
Total	200.63	100.00

The facilities considering the demand of the ward were shown in the following table including phasing. The proposed facilities under different category of land uses are also shown in the following table.

Table 14.14: Proposed facilities for ward no -4

Proposed Facilities	Phase	CS Mouza Name	Plot No.	Area in Acre
Residential				
Planned Residential Area-2	3 rd	Balia Dighirpur	188-230, 234-241, 246, 334-364, 368-369, 371-372	28.043
Educational Institution				
College-1	2 nd	Raishdia	263-264, 269-273, 280-297, 313-327	11.111
Vocational Training Institution	2 nd	Aminpur	7, 8, 9, 10, 11	3.227
Community Facilities				
Ward center	1 st	Balia Dighirpur	137 part	0.049

Proposal for road development:

A total of 5.93 km road has proposed for road network development of this ward of which some are new and some are widening. Within all roads only 1.85 km road will construct within 1st phase. Recommended road network are shown in the following table.

Table 14.15: Proposed road for ward no-4

Road ID	Width (ft.)	Length(M)	Phase	Type
RS02	60	841.19	2nd	W
RS06	60	419.76	2nd	W
RS11	40	354.49	1st	W
RS16	40	233.62	3rd	W
RS18	40	29.27	2nd	N
RS21	40	391.88	2nd	N
RS22	40	14.73	3rd	W
RS31	40	476.19	3rd	W
RS33	40	669.15	2nd	N
RS33	40	353.20	3rd	W
RS38	40	58.00	1st	N
RL67	30	7.60	2nd	N
RL77	30	449.48	2nd	N
RA111	20	449.91	1st	W
RA119	20	318.21	1st	W
RA120	20	291.66	1st	W
RA147	20	365.19	1st	W
RA156	20	14.29	1st	N
RA157	20	141.00	2nd	W
RA158	20	53.93	2nd	W
Total		5932.75		

*Note: W= widening, N= New Road

Proposal for drainage development:

A total of 5.92 km drain has proposed for drainage network development of this ward of which almost all are new. Within all roads 1.84 km drain will construct within 1st phase. Recommended drains are shown in the following table.

Table 14.16: Proposed drainage for ward no-4

Drain ID	Type	Length(M)	Phase
DS02	Secondary	841.19	2nd
DP06	Primary	419.76	2nd
DS11	Secondary	354.49	1st
DT16	Tertiary	233.62	3rd
DS18	Secondary	29.27	2nd
DS21	Secondary	391.62	2nd
DS22	Secondary	14.73	3rd
DS31	Secondary	476.19	3rd
DS33	Secondary	1,022.35	3rd
DS38	Secondary	58.00	1st
DT67	Tertiary	7.60	2nd
DT77	Tertiary	449.48	2nd
DT111	Tertiary	449.91	1st
DT119	Tertiary	318.21	1st
DT120	Tertiary	291.66	1st
DT147	Tertiary	365.19	1st
DT157	Tertiary	140.14	2nd
DT158	Tertiary	54.79	2nd
Total		5,918.2	

Map 14.7: Landuse Proposal for Ward No. 04

Map 14.8 : Proposed Road, Drainage and Utility Services Plan for Ward No. 04

14.3.5 Action Plan for Ward No. 5

Existing Situation:

It consists a major portion of builtup area. The historical Panam City, Paurashava Bhanban are located in this area. Ward 04 located at the north side of this Ward, Ward No. 1&2 at the weast and Ward 06 at the south of the Ward. Total area of the Ward is 231.27 acres and total population is 3289 person (BBS 2011). Among the total area, agriculture use is 48.98 acres, residential 115.05 acres and 2.32 acres are commercial area. There is a total of 8.41 km road in this ward of which 2.52 km are katcha. Within educational institution there is 2 primary school, 2 high school and a college.

Proposals and Plans for Ward No. 5

Landuse Development:For planned development considering the existing landuse and future demand landuse proposal has made. Within the total area 54.22% land proposed for residential use, 0.95% commercial use, only 0.16% mixed use, only 4.88% agricultural and others are in different category which is shown in the following table.

Table 14.17: Proposed land use for Ward no-5

Land Use Type	Area (Acre)	Percentage (%)
Urban Residential Zone	122.25	52.87
Commercial Zone	2.31	1.00
Mixed Use Zone	0.37	0.16
General Industrial Zone	0.45	0.19
Government Office	1.04	0.45
Education & Research Zone	3.23	1.40
Agricultural Zone	11.09	4.80
Water Body	38.72	16.75
Open Space	7.04	3.04
Recreational Facilities	4.19	1.81
Circulation Network	26.45	11.44
Transportation Facilities	1.52	0.66
Utility Services	1.47	0.64
Community Facilities	1.36	0.59
Historical & Heritage Site	9.76	4.22
Total	231.23	100.00

The facilities considering the demand of the ward were shown in the following table including phasing. The proposed facilities under different category of land uses are also shown in the following table.

Table 14.18: Proposed facilities for ward no -5

Proposed Facilities	Phase	CS Mouza Name	Plot No.	Area in Acre
Residential				
Planned Residential Area-1	2 nd	Sollapara	186-192, 193 part, 194-196, 197 part, 201-202, 205-239, 240 part, 241-246	21.144
Government Office				
Paurashava Office	2 nd	Aminpur	234	0.400
Sonargaon Pura Auditorium	2 nd	Aminpur	239,141-142	0.439
Commercial Facility				
Pura Supper Market	1 st	Aminpur	83-84	0.565
Sonargaon Pura Market	2 nd	Aminpur	269,271 part	0.199
Transportation				
Pura Bus Terminal	2 nd	Aminpur	324 part, 328-330, 334-335	1.519
Educational Institution				
Vocational Training Institution	2 nd	Raishdia	142-144, 154-166, 170-171, 261-262, 298-307, 311-312	10.480
Open Spce				
Sonargaon Pura Park	1 st	Aminpur	243, 259	1.085
Recreational				
Sonargaon Pura Tourist Complex	3 rd	Aminpur	286, 292-293, 323-295-298, 300-306, 323-324 part, 325, 326 part, 334-335 part, 337-340, 342	4.185
Utility & service facility				
Dumping Site-2	1 st	Sollapara	266-267, 271	1.657
Water Pump House-3	1 st	Aminpur	272 part, 273, 274 part	0.227
Community Facilities				
Ward center	2 nd	Aminpur	324 part, 328 part	0.186

Proposal for road development:

A total of 9.63km road has proposed for road network development of this ward of which some are new and some are widening. Within all roads 5.27 km road will construct within 1st phase. Recommended road network are shown in the following table.

Table 14.19: Proposed road for ward no-5

Road ID	Width (ft.)	Length(M)	Phase	Type
RS02	60	146.02	2nd	W
RS02	60	489.58	2nd	N
RS03	60	405.23	2nd	W
RS06	60	293.31	2nd	W
RS09	60	0.35	2nd	N
RS18	40	316.98	2nd	W
RS18	40	56.84	2nd	N
RS21	40	22.58	2nd	N
RS22	40	309.90	3rd	W
RS23	40	591.57	1st	N
RS23	40	537.52	1st	W
RS31	40	26.16	3rd	W
RS32	40	509.91	1st	W
RS33	40	106.48	2nd	N
RS34	40	262.16	1st	N
RS34	40	208.61	1st	W

Road ID	Width (ft.)	Length(M)	Phase	Type
RS36	40	429.41	2nd	W
RL53	30	10.90	2nd	W
RL61	30	501.70	2nd	W
RL62	30	268.03	2nd	N
RL66	30	282.27	3rd	W
RL67	30	267.08	2nd	N
RL90	30	228.18	3rd	W
RL106	30	757.15	1st	W
RA108	20	395.41	1st	W
RA109	20	21.94	1st	W
RA116	20	80.75	2nd	W
RA117	20	262.22	1st	N
RA117	20	164.06	1st	W
RA117	20	37.95	1st	W
RA121	20	73.39	1st	W
RA155	20	116.12	2nd	W
RA156	20	311.01	1st	N
RA159	20	235.33	1st	W
RA160	20	183.64	1st	W
RA161	20	38.81	1st	W
RA184	12	679.42	1st	W
Total		9627.97		

*Note: W= widening, N= New Road

Proposal for drianage development:

A total of 7.25 km drain has proposed for drianage network development of this ward of which almost all are new. Wihin all roads 4.00 km drain will construct within 1st phase. Recommanded drains are shown in the following table.

Table 14.20: Proposed drainage for ward no-5

Drain ID	Type	Length(M)	Phase
DS03	Secondary	405.23	2nd
DP06	Primary	293.31	2nd
DS09	Secondary	0.35	2nd
DS18	Secondary	348.31	2nd
DS18	Secondary	0.05	2nd
DS22	Secondary	309.90	3rd
DT23	Tertiary	1,129.10	1st
DS31	Secondary	2.91	3rd
DS32	Secondary	509.91	1st
DS33	Secondary	106.48	3rd
DS34	Secondary	470.77	1st
DS36	Secondary	429.41	2nd
DT53	Tertiary	10.90	2nd
DT61	Tertiary	501.70	2nd
DT62	Tertiary	268.03	2nd

DT67	Tertiary	267.08	2nd
DT90	Tertiary	228.18	3rd
DT108	Tertiary	395.41	1st
DT109	Tertiary	21.94	1st
DT116	Tertiary	80.75	2nd
DT117	Tertiary	464.23	1st
DT159	Tertiary	107.43	1st
DT160	Tertiary	184.64	1st
DT161	Tertiary	38.81	1st
DT184	Tertiary	679.42	1st
Total		7,254.25	

Map 14.9: Landuse Proposal for Ward No. 05

Map 14.10 : Proposed Road, Drainage and Utility Services Plan for Ward No. 05

14.3.6 Action Plan for Ward No. 6

Existing Situation:

Ward No. 6 is located at central area of the paurashava and major portion of the museum located in this ward. Ward 2&3 located at the west side of this Ward and Ward No. 7 at the southern side of the Ward. Total area of the Ward is 183.80 acres and population is 2319 person (BBS 2011). Among the total area, agriculture use is 49.86 acres and 63.37 acres is residential area. There is a total of 6.72 km road in this ward of which 2.12 km are katcha. Within educational institution there is only 2 primary school.

Proposals and Plans for Ward No. 6

Landuse Development: For planned development considering the existing landuse and future demand landuse proposal has made. Within the total area 55.73% land proposed for residential use, 19 % water body, 1.81 are community facility, 13.14 % historical and heritage site, no agricultural has proposed for this area.

Table 14.21: Proposed land use for Ward no-6

Land Use Type	Area (Acre)	Percentage (%)
Urban Residential Zone	102.45	55.74
General Industrial Zone	0.13	0.07
Government Office	0.00	0.00
Education & Research Zone	1.88	1.02
Water Body	35.69	19.42
Open Space	0.01	0.01
Circulation Network	15.10	8.22
Utility Services	0.40	0.22
Health Services	0.38	0.21
Community Facilities	3.61	1.97
Historical & Heritage Site	24.15	13.14
Total	183.79	100.00

The facilities considering the demand of the ward were shown in the following table including phasing. The proposed facilities under different category of land uses are also shown in the following table.

Table 14.22: proposed facilities for ward no -6

Proposed Facilities	Phase	CS Mouza Name	Plot No.	Area in Acre
Residential				
Sweeper Colony	2 nd	Baghmahisha	260-262, 263 part	1.117
Utility & service facility				
Waste Transfer Station	1 st	Baghmahisha	259, 263 part, 264 part	0.297
Public Toilet-1	1 st	Baghmahisha	264 part	0.101
Water Pump House & Ward Community Clinic-1	1 st	Baghmahisha	83	0.382
Community Facilities				
Poura Eidgah	1 st	Baghmahisha	79 part	1.910
Poura Graveyard	1 st	Baghmahisha	79 part	1.183
Ward Center	1 st	Baghmahisha	267 part	0.285

Proposal for road development:

A total of 3.96 km road has proposed for road network development of this ward of which some are new and some are widening. Within all roads 1.82 km road will construct within 1st phase. Recommended road network are shown in the following table.

Table 14.23: Proposed road for ward no-6

Road ID	Width (ft.)	Length(M)	Phase	Type
RS03	60	10.87	2nd	W
RS06	60	132.81	2nd	W
RS07	60	147.35	2nd	N
RS08	60	0.44	2nd	W
RS14	40	1.35	3rd	W
RS14	40	337.44	1st	W
RS14	40	548.03	1st	N
RS17	40	249.86	1st	N
RS26	40	520.11	1st	W
RS27	40	2.25	2nd	W
RS35	40	342.85	2nd	N
RS36	40	16.65	2nd	W
RL64	30	416.00	2nd	W
RL64	30	833.15	2nd	N
RL69	30	7.57	3rd	W
RL105	30	224.73	2nd	W
RA161	20	166.28	1st	W
Total		3957.74		

*Note: W= widening, N= New Road

Map 14.11 : Landuse Proposal for Ward No. 06

Map 14.12 : Proposed Road, Drainage and Utility Services Plan for Ward No. 06

Proposal for drianage development:

A total of 3.96 km drain has proposed for drainage network development of this ward of which almost all are new. Wihin all drains 1.82 km drain will construct within 1st phase. Recommanded drains are shown in the following table.

Table 14.24: Proposed drainage for ward no-6

Drain ID	Type	Length(M)	Phase
DS03	Secondary	10.87	D03
DP06	Primary	132.81	D06
DS07	Secondary	147.35	D07
DS08	Secondary	0.44	D08
DS14	Secondary	886.82	D14
DS17	Secondary	249.86	D17
DS26	Secondary	520.11	D26
DT27	Tertiary	2.25	D27
DT35	Tertiary	342.85	D35
DS36	Secondary	16.65	D36
DT64	Tertiary	833.69	D64
DT64	Tertiary	415.46	D64
DT69	Tertiary	7.57	D69
DT105	Tertiary	224.73	D105
DT161	Tertiary	166.28	D161
Total		3957.74	

14.3.7 Action Plan for Ward No. 7

Existing Situation:

Ward No. 7 is the fringe area and corridore of the Paurashava and major portion of the museum located in this ward. Ward 2 & 3 located at the west side of this Ward and Ward No. 7 at the southern side of the Ward.Total area of the Ward is 201.06 acres and total population is 4847 acre (BBS-2011). Among the total area, agriculture use is 21.63 acres and 101.13 acres are residential area. There is a total of 8.19 km road in this ward of which 2.03km are katcha. Within educational institution there is only one primary school.

Proposals and Plans for Ward No. 7

Landuse Development: For planned development considering the existing landuse and future demand landuse proposal has made. Within the total area 48.26% land proposed for residential use, only 0.65% are commercial use, 5.78% mixed use, only 0.08% agricultural and others are in different category which are shown in the following table.

Table 14.25: Proposed land use for Ward no-7

Land Use Type	Area (Acre)	Percentage (%)
Urban Residential Zone	97.15	48.32
Commercial Zone	1.31	0.65
Mixed Use Zone	11.75	5.84
General Industrial Zone	2.27	1.13
Government Office	3.52	1.75
Education & Research Zone	0.21	0.10
Agricultural Zone	0.16	0.08
Water Body	53.11	26.42

Open Space	0.35	0.17
Circulation Network	21.24	10.57
Community Facilities	0.51	0.25
Historical & Heritage Site	9.48	4.72
Total	201.06	100.00

The facilities considering the demand of the ward were shown in the following table including phasing. The proposed facilities under different category of land uses are also shown in the following table.

Table 14.26: Proposed facilities for ward no -7

Proposed Facilities	Phase	CS Mouza Name	Plot No.	Area in Acre
Government Office				
Administration Area	3 rd	Ichapur	202-204, 206-209, 212-213, 288-295	3.508
Community Facilities				
Ward Center	1 st	Ichapur	330 part	0.204

Map 14.13 : Landuse Proposal for Ward No. 07

Map 14.14 : Proposed Road, Drainage and Utility Services Plan for Ward No. 07

Proposal for road development:

A total of 6.79 km road has proposed for road network development of this ward of which some are new and some are widening. Within all roads 3.34 km road will construct within 1st phase. Recommended road network are shown in the following table.

Table 14.27: Proposed road for ward no-7

Road ID	Width (ft.)	Length(M)	Phase	Type
RS06	60	857.32	2nd	W
RS06	60	123.56	2nd	W
RS06	60	326.37	2nd	W
RS07	60	194.10	2nd	N
RS07	60	277.97	2nd	N
RS12	40	640.66	1st	W
RS13	40	396.01	1st	W
RS25	40	306.16	2nd	W
RS26	40	90.40	1st	W
RS40	40	77.41	2nd	W
RS43	40	261.54	1st	W
RL50	30	2.36	1st	W
RL50	30	247.88	1st	W
RL51	30	263.18	2nd	W
RL52	30	139.50	1st	W
RL70	30	271.94	2nd	N
RA118	20	312.00	1st	N
RA131	20	75.45	2nd	W
RA132	20	131.59	2nd	W
RA141	20	103.18	1st	N
RA152	20	440.18	2nd	W
RA162	20	432.34	1st	N
RA167	20	58.39	1st	W
RA177	20	234.49	1st	W
RA178	20	421.31	1st	W
RA179	20	104.38	2nd	W
Total		6789.67		

*Note: W= widening, N= New Road

Proposal for drainage development:

A total of 6.71 km drain has proposed for drainage network development of this ward of which almost all are new. Within all roads 1.30 km drain will construct within 1st phase. Recommended drains are shown in the following table.

Table 14.28: Proposed drainage for ward no-7

Drain ID	Type	Length(M)	Phase
DP06	Primary	1,307.25	2nd
DS07	Secondary	472.06	2nd
DS12	Secondary	640.66	1st
DS13	Secondary	396.01	1st
DS25	Secondary	306.16	2nd
DS26	Secondary	90.40	1st
DS40	Secondary	77.41	2nd
DS43	Secondary	261.54	1st
DT50	Tertiary	250.24	1st
DT51	Tertiary	263.18	2nd

Drain ID	Type	Length(M)	Phase
DT52	Tertiary	139.50	1st
DT70	Tertiary	271.94	2nd
DT118	Tertiary	312.00	1st
DT132	Tertiary	131.59	2nd
DT141	Tertiary	103.18	1st
DT152	Tertiary	440.18	2nd
DT162	Tertiary	432.34	1st
DT167	Tertiary	58.39	1st
DT177	Tertiary	235.53	1st
DT178	Tertiary	420.27	1st
DT179	Tertiary	104.38	2nd
Total		6,714.21	

14.3.8 Action Plan for Ward No. 8

Existing Situation:

Ward No.8 is the built-up area of the Paurashava consisting a major portion of core area. Sonargaon Thana and part of Upazilla Complex are located in this ward and located at the south-east side of the paurashava. Total area of the Ward is 232.60 acres and total population is 4293 acre (BBS-2011). Among the total area, agriculture use is 31.49 acres, 141.93 acres are residential area and and 4.08 acres are commercial area. There is a total of 11.19 km road in this ward of which 2.08 km are katcha. Within educational institution there is 3 primary school, 1 high school and 3 madrasa.

Proposals and Plans for Ward No. 8

Landuse Development: For planned development considering the existing landuse and future demand landuse proposal has made. Within the total area 58.52% land proposed for residential use 1.91 % are commercial use, 6.35% mixed use, only 0.21% agricultural and others are in different category which are shown in the following table.

Map 14.15 : Landuse Proposal for Ward No. 08

Map 14.16 : Proposed Road, Drainage and Utility Services Plan for Ward No. 08

Table 14.29: Proposed land use for Ward no-8

Land Use Type	Area (Acre)	Percentage (%)
Urban Residential Zone	142.14	58.74
Commercial Zone	4.66	1.93
Mixed Use Zone	15.26	6.31
General Industrial Zone	3.06	1.26
Government Office	6.78	2.80
Education & Research Zone	4.28	1.77
Agricultural Zone	0.24	0.10
Water Body	31.93	13.20
Open Space	1.11	0.46
Circulation Network	29.94	12.37
Transportation Facilities	0.21	0.09
Utility Services	0.17	0.07
Health Services	0.13	0.05
Community Facilities	2.07	0.85
Total	241.97	100.00

The facilities considering the demand of the ward were shown in the following table including phasing. The proposed facilities under different category of land uses are also shown in the following table.

Table 14.30: Proposed facilities for ward no -8

Proposed Facilities	Phase	CS Mouza Name	Plot No.	Area in Acre
Government Office				
Administration Area	3 rd	Chowdona	202-206 part, 207-209, 212-213	3.130
Open Spce				
Cremation	1 st	Chowdona	501-502	0.189
Community Facilities				
Ward Center	1 st	Chowdona	362 part	0.065

Proposal for road development:

A total of 11.24 km road has proposed for road network development of this ward of which some are new and some are widening. Within all roads 4.82 km road will construct within 1st phase. Recommended road network are shown in the following table.

Table 14.31: Proposed road for ward no-7

Road ID	Width (ft.)	Length(M)	Phase	Type
RS03	60	977.51	2nd	W
RS07	60	460.44	2nd	N
RS07	60	479.53	2nd	W
RS14	40	59.61	1st	W
RS17	40	324.59	1st	N
RS24	40	224.11	2nd	W
RS25	40	822.72	2nd	W
RS26	40	458.79	1st	W
RS27	40	150.40	2nd	W
RS28	40	412.41	1st	N
RS28	40	302.39	1st	W
RS40	40	187.90	2nd	N

Road ID	Width (ft.)	Length(M)	Phase	Type
RS44	40	50.47	3rd	W
RL53	30	94.21	2nd	W
RL55	30	112.58	3rd	W
RL56	30	258.93	2nd	W
RL63	30	420.41	3rd	W
RL68	30	135.16	3rd	W
RL69	30	223.02	3rd	W
RL72	30	282.99	2nd	W
RL72	30	167.01	2nd	W
RL73	30	107.20	2nd	W
RL76	30	96.21	3rd	W
RL88	30	120.14	3rd	W
RL89	30	324.35	2nd	W
RL91	30	310.94	2nd	N
RA112	20	100.82	2nd	W
RA113	20	132.57	1st	W
RA114	20	51.03	1st	W
RA118	20	8.26	1st	W
RA122	20	66.11	1st	W
RA123	20	224.73	1st	W
RA125	20	54.88	1st	W
RA127	20	94.90	2nd	W
RA128	20	85.06	2nd	W
RA129	20	78.42	2nd	W
RA130	20	53.92	2nd	W
RA144	20	120.92	1st	W
RA150	20	10.43	1st	W
RA162	20	74.26	1st	W
RA163	20	102.79	1st	W
RA164	20	65.35	1st	W
RA165	20	161.87	1st	W
RA166	20	349.53	1st	W
RA167	20	118.83	1st	W
RA168	20	100.52	1st	W
RA169	20	93.53	1st	W
RA170	20	292.68	1st	W
RA171	20	71.01	1st	W
RA172	20	189.09	1st	W
RA173	20	76.34	1st	W
RA174	20	162.59	1st	W
RA175	20	61.45	1st	W
RA176	20	678.26	1st	W
Total		11244.17		

*Note: W= widening, N= New Road

Proposal for drianage development:

A total of 10.98 km drain has proposed for drainage network development in this ward of which almost all are new. Wihin all roads 4.33 km drain will construct within 1st phase. Recommended drains are shown in the following table.

Table 14.32: Proposed drainage for ward no-8

Drain ID	Type	Length(M)	Phase
DS03	Secondary	977.51	2nd
DS07	Secondary	939.97	2nd
DS14	Secondary	59.61	1st
DS17	Secondary	324.59	1st
DS24	Secondary	224.11	2nd
DS25	Secondary	822.72	2nd
DS26	Secondary	458.79	1st
DT27	Tertiary	150.40	2nd
DS28	Secondary	714.80	1st
DS40	Secondary	187.90	2nd
DT44	Tertiary	50.47	3rd
DT53	Tertiary	94.21	2nd
DT55	Tertiary	112.58	3rd
DT56	Tertiary	258.93	2nd
DT63	Tertiary	420.41	3rd
DT68	Tertiary	135.16	3rd
DT69	Tertiary	223.02	3rd
DT72	Tertiary	450.00	2nd
DT73	Tertiary	107.20	2nd
DT76	Tertiary	96.21	3rd
DT88	Tertiary	120.14	3rd
DT89	Tertiary	324.35	2nd
DT91	Tertiary	310.94	2nd
DT112	Tertiary	100.82	2nd
DT113	Tertiary	132.57	1st
DT114	Tertiary	51.03	1st
DT118	Tertiary	8.26	1st
DT122	Tertiary	66.11	1st
DT123	Tertiary	224.73	1st
DT125	Tertiary	54.88	1st
DT127	Tertiary	94.90	2nd
DT128	Tertiary	85.06	2nd
DT144	Tertiary	120.92	1st
DT150	Tertiary	10.43	1st
DT162	Tertiary	72.33	1st
DT163	Tertiary	104.72	2nd
DT165	Tertiary	162.63	2nd
DT166	Tertiary	348.77	1st
DT167	Tertiary	119.46	1st
DT168	Tertiary	99.89	2nd
DT169	Tertiary	92.95	1st
DT170	Tertiary	293.26	1st
DT171	Tertiary	71.01	1st
DT172	Tertiary	189.08	1st
DT173	Tertiary	75.70	1st
DT174	Tertiary	163.23	1st
DT176	Tertiary	678.26	1st
Total		10985.02	

14.3.9 Action Plan for Ward No. 9

Existing Situation:

Ward No.8 is the built-up area of the Paurashava consisting a major portion of core area. Sonargaon thana health complex and part of Upazilla Complex are located in this ward and located at the south-east side of the paurashava. Total area of the Ward is 141.51 acres and total population is 4545 person (BBS-2011). Among the total area, agriculture use is 26.39 acres, 75.20 acres are residential area and 18.56 acres are commercial area. There is a total of 6.55 km road in this ward of which 2.58 km are katcha. Within educational institution there is 2 primary school and 2 madrasa.

Proposals and Plans for Ward No. 9

Landuse Development: For planned development considering the existing landuse and future demand landuse proposal has made. Within the total area 45.85% land proposed for residential use, 3.13% are commercial use, 15.96% mixed use, 11.69% agricultural and others are in different category which are shown in the following table.

Table 14.33: Proposed land use for Ward no-9

Land Use Type	Area (Acre)	Percentage (%)
Urban Residential Zone	60.63	45.89
Commercial Zone	4.29	3.25
Mixed Use Zone	21.12	15.98
General Industrial Zone	0.78	0.59
Education & Research Zone	0.87	0.66
Agricultural Zone	15.44	11.68
Water Body	14.38	10.88
Open Space	0.10	0.08
Circulation Network	11.16	8.45
Health Services	2.40	1.82
Community Facilities	0.95	0.72
Total	132.12	100.00

The facilities considering the demand of the ward were shown in the following table including phasing. The proposed facilities under different category of land uses are also shown in the following table.

Table 14.34: Proposed facilities for ward no -9

Proposed Facilities	Phase	CS Mouza Name	Plot No.	Area in Acre
Community Facilities				
Ward Center	1 st	Sahapur	231 part	0.058

Proposal for road development:

A total of 4.73 km road has proposed for road network development of this ward of which some are new and some are widening. Within all roads 3.34 km road will construct within 1st phase. Recommended road network are shown in the following table.

Table 14.35: Proposed road for ward no-9

Road ID	Width (ft.)	Length(M)	Phase	Type
RS24	40	669.77	2nd	W

Road ID	Width (ft.)	Length(M)	Phase	Type
RL47	30	538.84	3rd	W
RL53	30	918.08	2nd	W
RL55	30	214.40	2nd	N
RL55	30	73.50	3rd	W
RL56	30	32.84	2nd	W
RL71	30	316.09	2nd	N
RL71	30	91.20	3rd	W
RL74	30	167.17	3rd	W
RL75	30	240.99	3rd	W
RL88	30	15.78	3rd	W
RL89	30	133.09	2nd	W
RA113	20	59.51	1st	W
RA114	20	129.87	1st	W
RA114	20	146.61	1st	N
RA126	20	353.16	2nd	W
RA143	20	181.51	1st	W
RA150	20	156.12	1st	W
RA151	20	296.07	1st	W
Total		4734.6		

*Note: W= widening, N= New Road

Proposal for drianage development:

A total of 4.32 km drain has proposed for drainage network development of this ward of which almost all are new. Wihin all roads 0.79 km drain will construct within 1st phase. Recommended drains are shown in the following table.

Table 14.36: Proposed drainage for ward no-9

Drain ID	Type	Length(M)	Phase
DS24	Secondary	669.77	2nd
DT47	Tertiary	538.84	3rd
DT53	Tertiary	918.08	2nd
DT55	Tertiary	287.89	3rd
DT56	Tertiary	32.84	2nd
DT71	Tertiary	407.29	3rd
DT74	Tertiary	167.17	3rd
DT75	Tertiary	240.99	3rd
DT88	Tertiary	112.00	3rd
DT89	Tertiary	36.88	2nd
DT113	Tertiary	59.51	1st
DT114	Tertiary	276.49	1st
DT126	Tertiary	116.93	2nd
DT150	Tertiary	156.12	1st
DT151	Tertiary	296.07	1st
Total		4316.87	

Map 14.17 : Landuse Proposal for Ward No. 09

Map 14.18 : Proposed Road, Drainage and Utility Services Plan for Ward No. 09

Map 14.19 : Landuse Proposal for Extension Area 01

Map 14.20 : Proposed Road, Drainage and Utility Services Plan for Extension Area 01

Map 14.21 : Landuse Proposal for Extension Area 02

Map 14.22 : Proposed Road, Drainage and Utility Services Plan for Extension Area 02

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:

1. Residential development up to four-storied.
2. Small-scale shops.
3. Primary schools/kindergartens.
4. Mosques (or other religious facilities) servicing a local area plus small graveyard if required.
5. Recreational development.
6. Local health facilities (clinics rather than hospital).
7. Small-scale office (may be public or private) development.
8. Workshops (small-scale workshops with operations only) in daylight hours and low traffic generators.
9. Open space (playgrounds, parks, etc.)
10. Access roads.
11. Utilities; and
12. Drainage channels.

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:

1. 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.
2. 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.
3. 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.

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.

4. 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.
5. 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:

1. 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.
- 2. Is the use in conformity with the surrounding uses or with those that are compatible with a site in a predominantly residential area?
- 3. 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.
- 4. 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.
- 5. 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.
- 6. 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.
- 7. 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

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.

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.

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.

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 place according to the Master Plan.

ANNEXURE-A
Paurashava Gazette

ANNEXURE-B

Proposed Land Use Categories and permitted use

Urban Residential Landuse

Landuse Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table No. A.1: Landuse Permitted

Permitted
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
Temporary Tent
Temporary Pandle 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

Permission of Neighborhood Center Facilities in absence of formal neighborhood should be subject to Landuse Permit CommitteeSource: *Compiled by the Consultants*

Landuse 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. A.2: Landuse Conditionally Permitted

Conditional
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
Graveyard \ Cemetery

Conditional
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.

General Industrial Zone

Landuse Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table No. A.3: Landuse Permitted

Permitted
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

Landuse 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 No. A.4: Landuse Conditionally Permitted

Conditional
Amusement and Recreation (Indoors)
Appliance Store
Plantation (Except Narcotic Plant)
Cyber Café

Conditional
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 uses except permitted and conditionally permitted uses.

Commercial Zone (Business)

Landuse Permitted

Commercial office zone is mainly intended for supporting the official works. There are several functions that are permitted in this zone.

Table No. A.5: Landuse Permitted

Permitted
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
Auto Parts and Accessory Sales (Indoors)

Permitted
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
Parking Lot (Commercial)

Permitted
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

Landuse Conditionally Permitted

Some functions are permitted with some condition in this zone.

Table No. A.6: Landuse Conditionally Permitted

Conditional
Amusement and Recreation (Indoors)
Bicycle Assembly, Parts and Accessories
Broadcast Studio \ Recording Studio (No Audience)

Conditional
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

Restricted Uses

All uses except permitted and conditionally permitted uses.

Rural Settlement Zone

Landuse Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table No. A.7: Landuse Permitted

Permitted
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 Farm 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

Landuse 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. A.8: Landuse Conditionally Permitted

Conditional
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.

Mixed use zone

Landuse Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table No. A.11: Landuse Permitted

Permitted
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

Permitted
Fast Food Establishment \ Food Kiosk
Funeral Services
General Store
Grocery Store
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

Landuse Conditionally Permitted

The following uses may be permitted or disallowed in this zone after review and approval by the authority/committee.

Table No. A.12: Landuse Conditionally Permitted

Conditional
Agricultural Chemicals, Pesticides or Fertilizers Shop
Amusement and Recreation (Indoors)

Conditional
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
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

Conditional
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.

Institutional Zone

Landuse Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table No. A.13: Landuse Permitted

Permitted
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

Permitted
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

Landuse Conditionally Permitted

The following uses may be permitted or denied in this zone after review and approval by the authority/committee.

Table No. A.14: Landuse Conditionally Permitted

Conditional
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

Conditional
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.

Administrative Zone

Landuse Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table No. A.15: Landuse Permitted

Permitted
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
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

Landuse Conditionally Permitted

The following uses may be permitted or denied in this zone after review and approval by the authority/committee.

Table No. A.16: Landuse Conditionally Permitted

Conditional
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
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.

Agricultural Zone

Landuse Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table No. A.17: Landuse Permitted

Permitted
Food Grain Cultivation

Permitted
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

Landuse Conditionally Permitted

Table No. A.18: Landuse Conditionally Permitted

Conditional
Graveyard \ Cemetery
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.

Open Space

Landuse Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table No. A.19: Landuse Permitted

Permitted
Botanical Garden & Arboretum
Bus Passenger Shelter
Caravan Park \ Camping Ground
Carnivals and Fairs
Circus
Plantation (Except Narcotic Plant)
Landscape and Horticultural Services
Open Theater

Permitted
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 No. A.20: Landuse Conditionally Permitted

Conditional
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.

Water Retention Area

Retaining water is the main purpose of this type of Landuse.

Landuse Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table No. A.21: Landuse Permitted

Permitted
Aquatic Recreation Facility (Without Structure)

Permitted
Fishing Club
Utility Lines
Water Parks
Memorial Structure

Source: Compiled by the Consultants

Landuse Conditionally Permitted

The following uses may be permitted or denied in this zone after review and approval by the authority/committee.

Table No. A.22: Landuse Conditionally Permitted

Conditional
Plantation (Except Narcotic Plant)
Marina \ Boating Facility
Motorized Recreation

Source: Compiled by the Consultants

Water body

Landuse Permitted

The following uses in the tables are proposed to be applicable for this zone only.

Table No. A.23: Landuse Permitted

Permitted
Aquatic Recreation Facility (Without Structure)
Fishing Club
Utility Lines
Water Parks
Memorial Structure

Source: Compiled by the Consultants

Landuse Conditionally Permitted

The following uses may be permitted or denied in this zone after review and approval by the authority/committee.

Table No. A.24: Landuse Conditionally Permitted

Conditional
Plantation (Except Narcotic Plant)
Marina \ Boating Facility
Motorized Recreation

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted.

ANNEXURE-C

Resolution of Final Consultation Meeting and Attendance List.

ANNEXURE-D

Detailed of Road Network Proposal

Road ID	Width (ft.)	Length	Ward No	Phase	Type
RP01	200	547.15	Ward No. 03	3rd	W
RP01	200	1960.32	Extension Area 01	3rd	W
RS02	60	841.19	Ward No. 04	2nd	W
RS02	60	1754.57	Ward No. 01	2nd	W
RS02	60	146.02	Ward No. 05	2nd	W
RS02	60	489.58	Ward No. 05	2nd	N
RS03	60	405.23	Ward No. 05	2nd	W
RS03	60	10.87	Ward No. 06	2nd	W
RS03	60	977.51	Ward No. 08	2nd	W
RS04	60	461.41	Ward No. 01	2nd	N
RS04	60	94.51	Ward No. 02	2nd	N
RS04	60	170.34	Ward No. 01	2nd	W
RS05	60	446.65	Extension Area 01	3rd	W
RS05	60	94.37	Extension Area 01	3rd	W
RS05	60	269.71	Extension Area 01	3rd	N
RS06	60	419.76	Ward No. 04	2nd	W
RS06	60	293.16	Ward No. 01	2nd	W
RS06	60	468.10	Ward No. 02	2nd	W
RS06	60	128.22	Ward No. 03	2nd	W
RS06	60	293.31	Ward No. 05	2nd	W
RS06	60	132.81	Ward No. 06	2nd	W
RS06	60	857.32	Ward No. 07	2nd	W
RS06	60	123.56	Ward No. 07	2nd	W
RS06	60	575.41	Extension Area 01	2nd	W
RS06	60	326.37	Ward No. 07	2nd	N
RS07	60	147.35	Ward No. 06	2nd	N
RS07	60	194.10	Ward No. 07	2nd	N
RS07	60	460.44	Ward No. 08	2nd	N
RS07	60	277.97	Ward No. 07	2nd	W
RS07	60	479.53	Ward No. 08	2nd	W
RS08	60	461.61	Ward No. 02	2nd	W
RS08	60	1233.03	Ward No. 03	2nd	W
RS08	60	0.44	Ward No. 06	2nd	W
RS09	60	1332.66	Ward No. 02	2nd	N
RS09	60	0.35	Ward No. 05	2nd	N
RS10	60	1115.27	Ward No. 02	2nd	W
RS10	60	2.28	Ward No. 03	2nd	W
RS10	60	242.76	Ward No. 01	1st	N
RS10	60	406.15	Ward No. 02	1st	N
RS11	40	354.49	Ward No. 04	1st	W
RS12	40	640.66	Ward No. 07	1st	W
RS13	40	539.97	Ward No. 03	1st	W
RS13	40	396.01	Ward No. 07	1st	W
RS13	40	202.41	Extension Area 01	1st	W
RS14	40	1.35	Ward No. 06	3rd	W
RS14	40	337.44	Ward No. 06	1st	W
RS14	40	59.61	Ward No. 08	1st	W
RS14	40	548.03	Ward No. 06	1st	N
RS15	40	842.15	Ward No. 01	1st	W
RS16	40	233.62	Ward No. 04	3rd	W
RS17	40	249.86	Ward No. 06	1st	N

Road ID	Width (ft.)	Length	Ward No	Phase	Type
RS17	40	324.59	Ward No. 08	1st	N
RS18	40	316.98	Ward No. 05	2nd	W
RS18	40	29.27	Ward No. 04	2nd	N
RS18	40	56.84	Ward No. 05	2nd	N
RS19	40	383.62	Ward No. 03	2nd	N
RS20	40	204.15	Ward No. 03	3rd	W
RS20	40	42.40	Extension Area 01	3rd	W
RS21	40	391.88	Ward No. 04	2nd	N
RS21	40	22.58	Ward No. 05	2nd	N
RS22	40	14.73	Ward No. 04	3rd	W
RS22	40	309.90	Ward No. 05	3rd	W
RS23	40	591.57	Ward No. 05	1st	N
RS23	40	537.52	Ward No. 05	1st	W
RS24	40	224.11	Ward No. 08	2nd	W
RS24	40	669.77	Ward No. 09	2nd	W
RS25	40	306.16	Ward No. 07	2nd	W
RS25	40	81.64	Extension Area 01	2nd	W
RS25	40	822.72	Ward No. 08	2nd	W
RS26	40	520.11	Ward No. 06	1st	W
RS26	40	90.40	Ward No. 07	1st	W
RS26	40	458.79	Ward No. 08	1st	W
RS27	40	2.25	Ward No. 06	2nd	W
RS27	40	150.40	Ward No. 08	2nd	W
RS28	40	412.41	Ward No. 08	1st	N
RS28	40	302.39	Ward No. 08	1st	W
RS29	40	16.85	Ward No. 01	1st	N
RS29	40	391.62	Ward No. 02	1st	N
RS30	40	366.02	Extension Area 01	3rd	W
RS31	40	476.19	Ward No. 04	3rd	W
RS31	40	26.16	Ward No. 05	3rd	W
RS32	40	509.91	Ward No. 05	1st	W
RS33	40	669.15	Ward No. 04	2nd	N
RS33	40	106.48	Ward No. 05	2nd	N
RS33	40	353.20	Ward No. 04	3rd	W
RS34	40	262.16	Ward No. 05	1st	N
RS34	40	208.61	Ward No. 05	1st	W
RS35	40	342.85	Ward No. 06	2nd	N
RS36	40	429.41	Ward No. 05	2nd	W
RS36	40	16.65	Ward No. 06	2nd	W
RS37	40	381.70	Ward No. 01	1st	N
RS38	40	58.00	Ward No. 04	1st	N
RS38	40	583.11	Ward No. 01	1st	N
RS39	40	750.16	Ward No. 01	1st	N
RS39	40	43.93	Ward No. 02	1st	N
RS40	40	77.41	Ward No. 07	2nd	N
RS40	40	187.90	Ward No. 08	2nd	N
RS41	40	178.82	Ward No. 03	1st	N
RS41	40	221.17	Extension Area 01	1st	N
RS41	40	0.02	Ward No. 03	1st	N
RS41	40	0.02	Extension Area 01	1st	N
RS42	40	242.73	Ward No. 03	1st	W
RS42	40	560.07	Extension Area 01	1st	W
RS42	40	1.65	Ward No. 03	1st	W
RS42	40	1.65	Extension Area 01	1st	W

Road ID	Width (ft.)	Length	Ward No	Phase	Type
RS43	40	261.54	Ward No. 07	1st	N
RS43	40	327.93	Extension Area 01	1st	N
RS44	40	50.47	Ward No. 08	3rd	W
RL45	30	1009.16	Ward No. 02	3rd	W
RL46	30	296.08	Ward No. 02	2nd	W
RL47	30	538.84	Ward No. 09	3rd	W
RL48	30	632.74	Ward No. 02	3rd	W
RL49	30	66.50	Ward No. 02	2nd	W
RL49	30	41.72	Ward No. 03	2nd	W
RL50	30	338.53	Ward No. 03	1st	N
RL50	30	2.36	Ward No. 07	1st	N
RL50	30	98.91	Extension Area 01	1st	N
RL50	30	247.88	Ward No. 07	1st	W
RL50	30	0.12	Ward No. 03	1st	N
RL50	30	0.12	Extension Area 01	1st	N
RL51	30	263.18	Ward No. 07	2nd	W
RL52	30	321.91	Ward No. 03	1st	W
RL52	30	139.50	Ward No. 07	1st	W
RL53	30	10.90	Ward No. 05	2nd	W
RL53	30	94.21	Ward No. 08	2nd	W
RL53	30	918.08	Ward No. 09	2nd	W
RL54	30	431.19	Ward No. 01	3rd	W
RL55	30	214.40	Ward No. 09	2nd	N
RL55	30	112.58	Ward No. 08	3rd	W
RL55	30	73.50	Ward No. 09	3rd	W
RL56	30	258.93	Ward No. 08	2nd	W
RL56	30	32.84	Ward No. 09	2nd	W
RL58	30	254.39	Ward No. 02	2nd	W
RL59	30	214.81	Ward No. 02	2nd	N
RL60	30	244.34	Ward No. 03	2nd	N
RL61	30	501.70	Ward No. 05	2nd	W
RL62	30	268.03	Ward No. 05	2nd	N
RL63	30	420.41	Ward No. 08	3rd	W
RL64	30	416.00	Ward No. 06	2nd	W
RL64	30	833.15	Ward No. 06	2nd	N
RL65	30	945.01	Ward No. 03	3rd	W
RL66	30	282.27	Ward No. 05	3rd	W
RL67	30	7.60	Ward No. 04	2nd	N
RL67	30	267.08	Ward No. 05	2nd	N
RL68	30	135.16	Ward No. 08	3rd	W
RL69	30	7.57	Ward No. 06	3rd	W
RL69	30	223.02	Ward No. 08	3rd	W
RL70	30	271.94	Ward No. 07	2nd	N
RL71	30	316.09	Ward No. 09	2nd	N
RL71	30	91.20	Ward No. 09	3rd	W
RL72	30	282.99	Ward No. 08	2nd	W
RL72	30	167.01	Ward No. 08	2nd	W
RL73	30	107.20	Ward No. 08	2nd	W
RL74	30	167.17	Ward No. 09	3rd	W
RL75	30	240.99	Ward No. 09	3rd	W
RL76	30	96.21	Ward No. 08	3rd	W
RL77	30	449.48	Ward No. 04	2nd	N
RL78	30	121.28	Extension Area 01	3rd	W
RL78	30	107.03	Extension Area 01	3rd	W

Road ID	Width (ft.)	Length	Ward No	Phase	Type
RL79	30	127.86	Extension Area 01	3rd	W
RL80	30	135.53	Extension Area 01	3rd	W
RL81	30	291.60	Extension Area 01	3rd	W
RL82	30	207.42	Extension Area 01	3rd	W
RL82	30	149.07	Extension Area 01	3rd	W
RL83	30	219.41	Extension Area 01	3rd	W
RL84	30	242.30	Extension Area 01	3rd	W
RL85	30	679.53	Ward No. 01	2nd	W
RL86	30	494.04	Ward No. 01	3rd	W
RL87	30	489.35	Ward No. 01	3rd	W
RL88	30	120.14	Ward No. 08	3rd	W
RL88	30	15.78	Ward No. 09	3rd	W
RL89	30	324.35	Ward No. 08	2nd	W
RL89	30	133.09	Ward No. 09	2nd	W
RL90	30	228.18	Ward No. 05	3rd	W
RL91	30	310.94	Ward No. 08	2nd	N
RL92	30	275.72	Extension Area 01	3rd	W
RL93	30	170.51	Extension Area 01	3rd	W
RL94	30	245.21	Extension Area 01	3rd	W
RL95	30	236.09	Extension Area 01	1st	N
RL96	30	335.29	Extension Area 01	1st	N
RL96	30	197.68	Extension Area 01	1st	W
RL97	30	0.21	Ward No. 02	1st	W
RL97	30	182.44	Ward No. 03	1st	W
RL98	30	267.31	Ward No. 02	3rd	W
RL99	30	270.93	Ward No. 02	2nd	W
RL100	30	357.58	Ward No. 02	2nd	N
RL101	30	244.45	Ward No. 01	3rd	W
RL101	30	36.08	Ward No. 02	3rd	W
RL102	30	81.93	Ward No. 02	2nd	W
RL103	30	221.20	Ward No. 02	2nd	W
RL104	30	183.91	Ward No. 02	3rd	W
RL104	30	428.36	Ward No. 03	3rd	W
RL105	30	224.73	Ward No. 06	2nd	W
RL106	30	2.82	Ward No. 02	1st	W
RL106	30	757.15	Ward No. 05	1st	W
RA107	20	327.21	Ward No. 03	1st	W
RA108	20	395.41	Ward No. 05	1st	W
RA109	20	834.31	Ward No. 01	1st	W
RA109	20	27.11	Ward No. 02	1st	W
RA109	20	21.94	Ward No. 05	1st	W
RA110	20	136.45	Ward No. 03	2nd	W
RA111	20	449.91	Ward No. 04	1st	W
RA112	20	100.82	Ward No. 08	2nd	W
RA113	20	132.57	Ward No. 08	1st	W
RA113	20	59.51	Ward No. 09	1st	W
RA114	20	51.03	Ward No. 08	1st	W
RA114	20	129.87	Ward No. 09	1st	W
RA114	20	146.61	Ward No. 09	1st	N
RA115	20	230.20	Ward No. 03	2nd	W
RA116	20	80.75	Ward No. 05	2nd	W
RA117	20	262.22	Ward No. 05	1st	N
RA117	20	164.06	Ward No. 05	1st	W
RA117	20	37.95	Ward No. 05	1st	W

Road ID	Width (ft.)	Length	Ward No	Phase	Type
RA118	20	312.00	Ward No. 07	1st	W
RA118	20	8.26	Ward No. 08	1st	W
RA119	20	318.21	Ward No. 04	1st	W
RA120	20	291.66	Ward No. 04	1st	W
RA121	20	3.62	Ward No. 01	1st	W
RA121	20	73.39	Ward No. 05	1st	W
RA122	20	66.11	Ward No. 08	1st	W
RA123	20	224.73	Ward No. 08	1st	W
RA125	20	54.88	Ward No. 08	1st	W
RA126	20	353.16	Ward No. 09	2nd	W
RA127	20	94.90	Ward No. 08	2nd	W
RA128	20	85.06	Ward No. 08	2nd	W
RA129	20	78.42	Ward No. 08	2nd	W
RA130	20	53.92	Ward No. 08	2nd	W
RA131	20	75.45	Ward No. 07	2nd	W
RA132	20	131.59	Ward No. 07	2nd	W
RA133	20	304.87	Ward No. 02	1st	W
RA134	20	23.43	Ward No. 02	2nd	W
RA135	20	147.64	Ward No. 02	1st	W
RA136	20	27.88	Ward No. 02	2nd	W
RA137	20	56.88	Ward No. 02	1st	W
RA138	20	70.41	Ward No. 02	1st	W
RA139	20	181.57	Ward No. 02	2nd	W
RA140	20	285.77	Ward No. 03	1st	W
RA141	20	88.66	Ward No. 03	1st	W
RA141	20	103.18	Ward No. 07	1st	W
RA141	20	115.62	Ward No. 03	1st	W
RA142	20	248.84	Ward No. 02	1st	N
RA143	20	181.51	Ward No. 09	1st	W
RA144	20	120.92	Ward No. 08	1st	W
RA145	20	247.20	Ward No. 01	1st	W
RA146	20	259.78	Ward No. 01	1st	W
RA147	20	365.19	Ward No. 04	1st	W
RA148	20	316.14	Ward No. 01	1st	W
RA149	20	222.35	Ward No. 02	2nd	W
RA150	20	10.43	Ward No. 08	1st	W
RA150	20	156.12	Ward No. 09	1st	W
RA151	20	296.07	Ward No. 09	1st	W
RA152	20	440.18	Ward No. 07	2nd	W
RA153	20	217.40	Ward No. 03	1st	W
RA154	20	59.49	Ward No. 03	1st	W
RA155	20	116.12	Ward No. 05	2nd	W
RA156	20	14.29	Ward No. 04	1st	N
RA156	20	311.01	Ward No. 05	1st	N
RA157	20	141.00	Ward No. 04	2nd	W
RA158	20	53.93	Ward No. 04	2nd	W
RA159	20	235.33	Ward No. 05	1st	W
RA160	20	183.64	Ward No. 05	1st	W
RA161	20	38.81	Ward No. 05	1st	W
RA161	20	166.28	Ward No. 06	1st	W
RA162	20	432.34	Ward No. 07	1st	W
RA162	20	74.26	Ward No. 08	1st	W
RA163	20	102.79	Ward No. 08	1st	W
RA164	20	65.35	Ward No. 08	1st	W

Road ID	Width (ft.)	Length	Ward No	Phase	Type
RA165	20	161.87	Ward No. 08	1st	W
RA166	20	349.53	Ward No. 08	1st	W
RA167	20	58.39	Ward No. 07	1st	W
RA167	20	118.83	Ward No. 08	1st	W
RA168	20	100.52	Ward No. 08	1st	W
RA169	20	93.53	Ward No. 08	1st	W
RA170	20	292.68	Ward No. 08	1st	W
RA171	20	71.01	Ward No. 08	1st	W
RA172	20	189.09	Ward No. 08	1st	W
RA173	20	76.34	Ward No. 08	1st	W
RA174	20	162.59	Ward No. 08	1st	W
RA175	20	61.45	Ward No. 08	1st	W
RA176	20	678.26	Ward No. 08	1st	W
RA177	20	234.49	Ward No. 07	1st	W
RA178	20	421.31	Ward No. 07	1st	W
RA179	20	104.38	Ward No. 07	2nd	W
RA180	20	245.35	Ward No. 03	1st	W
RA180	20	102.54	Ward No. 03	1st	W
RA181	20	325.46	Ward No. 01	1st	W
RA182	20	406.22	Ward No. 01	1st	W
RA183	20	19.71	Ward No. 02	1st	W
RA184	12	679.42	Ward No. 05	1st	W
Total length =78138.15 meter(78.14 km)					

**Note: W= widening, N= New Road*

ANNEXURE-E

Detailed of Drainage Network Proposal

ID	Type	Length	Ward No	Phase
DP01	Primary	547.15	Ward No. 03	3rd
DP01	Primary	1,862.82	Extension Area 01	3rd
DS02	Secondary	841.19	Ward No. 04	2nd
DS02	Secondary	1,754.57	Ward No. 01	2nd
DS03	Secondary	405.23	Ward No. 05	2nd
DS03	Secondary	10.87	Ward No. 06	2nd
DS03	Secondary	977.51	Ward No. 08	2nd
DS04	Secondary	631.76	Ward No. 01	2nd
DS04	Secondary	73.33	Ward No. 02	2nd
DS05	Secondary	810.72	Extension Area 01	3rd
DP06	Primary	419.76	Ward No. 04	2nd
DP06	Primary	293.16	Ward No. 01	2nd
DP06	Primary	468.10	Ward No. 02	2nd
DP06	Primary	128.22	Ward No. 03	2nd
DP06	Primary	293.31	Ward No. 05	2nd
DP06	Primary	132.81	Ward No. 06	2nd
DP06	Primary	1,307.25	Ward No. 07	2nd
DP06	Primary	575.41	Extension Area 01	2nd
DS07	Secondary	147.35	Ward No. 06	2nd
DS07	Secondary	472.06	Ward No. 07	2nd
DS07	Secondary	939.97	Ward No. 08	2nd
DS08	Secondary	461.61	Ward No. 02	2nd
DS08	Secondary	1,233.03	Ward No. 03	2nd
DS08	Secondary	0.44	Ward No. 06	2nd
DS09	Secondary	1,332.66	Ward No. 02	2nd
DS09	Secondary	0.35	Ward No. 05	2nd
DS10	Secondary	242.76	Ward No. 01	2nd
DS10	Secondary	1,521.43	Ward No. 02	2nd
DS10	Secondary	2.28	Ward No. 03	2nd
DS11	Secondary	354.49	Ward No. 04	1st
DS12	Secondary	640.66	Ward No. 07	1st
DS13	Secondary	539.97	Ward No. 03	1st
DS13	Secondary	396.01	Ward No. 07	1st
DS13	Secondary	202.41	Extension Area 01	1st
DS14	Secondary	886.82	Ward No. 06	1st
DS14	Secondary	59.61	Ward No. 08	1st
DS15	Secondary	842.15	Ward No. 01	1st
DT16	Tertiary	233.62	Ward No. 04	3rd
DS17	Secondary	249.86	Ward No. 06	1st
DS17	Secondary	324.59	Ward No. 08	1st
DS18	Secondary	348.31	Ward No. 05	2nd
DS18	Secondary	29.27	Ward No. 04	2nd
DS18	Secondary	0.05	Ward No. 05	2nd
DS19	Secondary	383.62	Ward No. 03	2nd
DS21	Secondary	391.62	Ward No. 04	2nd
DS22	Secondary	14.73	Ward No. 04	3rd
DS22	Secondary	309.90	Ward No. 05	3rd
DT23	Tertiary	1,129.10	Ward No. 05	1st
DS24	Secondary	224.11	Ward No. 08	2nd
DS24	Secondary	669.77	Ward No. 09	2nd
DS25	Secondary	306.16	Ward No. 07	2nd

ID	Type	Length	Ward No	Phase
DS25	Secondary	81.64	Extension Area 01	2nd
DS25	Secondary	822.72	Ward No. 08	2nd
DS26	Secondary	520.11	Ward No. 06	1st
DS26	Secondary	90.40	Ward No. 07	1st
DS26	Secondary	458.79	Ward No. 08	1st
DT27	Tertiary	2.25	Ward No. 06	2nd
DT27	Tertiary	150.40	Ward No. 08	2nd
DS28	Secondary	714.80	Ward No. 08	1st
DS29	Secondary	16.85	Ward No. 01	1st
DS29	Secondary	391.62	Ward No. 02	1st
DS30	Secondary	327.70	Extension Area 01	3rd
DS31	Secondary	476.19	Ward No. 04	3rd
DS31	Secondary	2.91	Ward No. 05	3rd
DS32	Secondary	509.91	Ward No. 05	1st
DS33	Secondary	1,022.35	Ward No. 04	3rd
DS33	Secondary	106.48	Ward No. 05	3rd
DS34	Secondary	470.77	Ward No. 05	1st
DT35	Tertiary	342.85	Ward No. 06	2nd
DS36	Secondary	429.41	Ward No. 05	2nd
DS36	Secondary	16.65	Ward No. 06	2nd
DS37	Secondary	380.00	Ward No. 01	1st
DS38	Secondary	58.00	Ward No. 04	1st
DS38	Secondary	584.81	Ward No. 01	1st
DT39	Tertiary	750.16	Ward No. 01	1st
DT39	Tertiary	43.93	Ward No. 02	1st
DS40	Secondary	77.41	Ward No. 07	2nd
DS40	Secondary	187.90	Ward No. 08	2nd
DS41	Secondary	178.82	Ward No. 03	1st
DS41	Secondary	223.06	Extension Area 01	1st
DS41	Secondary	0.02	Ward No. 03	1st
DS41	Secondary	0.02	Extension Area 01	1st
DS42	Secondary	242.73	Ward No. 03	1st
DS42	Secondary	558.19	Extension Area 01	1st
DS42	Secondary	1.65	Ward No. 03	1st
DS42	Secondary	1.65	Extension Area 01	1st
DS43	Secondary	261.54	Ward No. 07	1st
DS43	Secondary	327.93	Extension Area 01	1st
DT44	Tertiary	50.47	Ward No. 08	3rd
DT45	Tertiary	1,009.16	Ward No. 02	3rd
DT46	Tertiary	296.08	Ward No. 02	2nd
DT47	Tertiary	538.84	Ward No. 09	3rd
DT48	Tertiary	632.74	Ward No. 02	3rd
DT49	Tertiary	66.50	Ward No. 02	2nd
DT49	Tertiary	41.72	Ward No. 03	2nd
DT50	Tertiary	338.65	Ward No. 03	1st
DT50	Tertiary	250.24	Ward No. 07	1st
DT50	Tertiary	99.03	Extension Area 01	1st
DT51	Tertiary	263.18	Ward No. 07	2nd
DT52	Tertiary	321.91	Ward No. 03	1st
DT52	Tertiary	139.50	Ward No. 07	1st
DT53	Tertiary	10.90	Ward No. 05	2nd
DT53	Tertiary	94.21	Ward No. 08	2nd
DT53	Tertiary	918.08	Ward No. 09	2nd
DT54	Tertiary	431.19	Ward No. 01	3rd

ID	Type	Length	Ward No	Phase
DT55	Tertiary	112.58	Ward No. 08	3rd
DT55	Tertiary	287.89	Ward No. 09	3rd
DT56	Tertiary	258.93	Ward No. 08	2nd
DT56	Tertiary	32.84	Ward No. 09	2nd
DT58	Tertiary	254.39	Ward No. 02	2nd
DT59	Tertiary	214.81	Ward No. 02	2nd
DT60	Tertiary	244.34	Ward No. 03	2nd
DT61	Tertiary	501.70	Ward No. 05	2nd
DT62	Tertiary	268.03	Ward No. 05	2nd
DT63	Tertiary	420.41	Ward No. 08	3rd
DT64	Tertiary	833.69	Ward No. 06	2nd
DT64	Tertiary	415.46	Ward No. 06	2nd
DT65	Tertiary	945.01	Ward No. 03	3rd
DT67	Tertiary	7.60	Ward No. 04	2nd
DT67	Tertiary	267.08	Ward No. 05	2nd
DT68	Tertiary	135.16	Ward No. 08	3rd
DT69	Tertiary	7.57	Ward No. 06	3rd
DT69	Tertiary	223.02	Ward No. 08	3rd
DT70	Tertiary	271.94	Ward No. 07	2nd
DT71	Tertiary	407.29	Ward No. 09	3rd
DT72	Tertiary	450.00	Ward No. 08	2nd
DT73	Tertiary	107.20	Ward No. 08	2nd
DT74	Tertiary	167.17	Ward No. 09	3rd
DT75	Tertiary	240.99	Ward No. 09	3rd
DT76	Tertiary	96.21	Ward No. 08	3rd
DT77	Tertiary	449.48	Ward No. 04	2nd
DT78	Tertiary	228.32	Extension Area 01	3rd
DT79	Tertiary	127.86	Extension Area 01	3rd
DT81	Tertiary	291.60	Extension Area 01	3rd
DT82	Tertiary	356.49	Extension Area 01	3rd
DT83	Tertiary	219.41	Extension Area 01	3rd
DT84	Tertiary	242.30	Extension Area 01	3rd
DT85	Tertiary	677.96	Ward No. 01	2nd
DT86	Tertiary	984.96	Ward No. 01	3rd
DT88	Tertiary	120.14	Ward No. 08	3rd
DT88	Tertiary	112.00	Ward No. 09	3rd
DT89	Tertiary	324.35	Ward No. 08	2nd
DT89	Tertiary	36.88	Ward No. 09	2nd
DT90	Tertiary	228.18	Ward No. 05	3rd
DT91	Tertiary	310.94	Ward No. 08	2nd
DT92	Tertiary	274.32	Extension Area 01	3rd
DT93	Tertiary	171.92	Extension Area 01	3rd
DT94	Tertiary	245.21	Extension Area 01	3rd
DT95	Tertiary	236.90	Extension Area 01	1st
DT96	Tertiary	532.15	Extension Area 01	1st
DT97	Tertiary	0.21	Ward No. 02	1st
DT97	Tertiary	182.44	Ward No. 03	1st
DT98	Tertiary	267.31	Ward No. 02	3rd
DT99	Tertiary	270.93	Ward No. 02	2nd
DT100	Tertiary	357.58	Ward No. 02	2nd
DT101	Tertiary	244.45	Ward No. 01	3rd
DT101	Tertiary	118.01	Ward No. 02	3rd
DT103	Tertiary	221.20	Ward No. 02	2nd
DT104	Tertiary	183.91	Ward No. 02	3rd

ID	Type	Length	Ward No	Phase
DT104	Tertiary	428.36	Ward No. 03	3rd
DT105	Tertiary	224.73	Ward No. 06	2nd
DT107	Tertiary	327.21	Ward No. 03	1st
DT108	Tertiary	395.41	Ward No. 05	1st
DT109	Tertiary	834.31	Ward No. 01	1st
DT109	Tertiary	27.11	Ward No. 02	1st
DT109	Tertiary	21.94	Ward No. 05	1st
DT110	Tertiary	136.45	Ward No. 03	2nd
DT111	Tertiary	449.91	Ward No. 04	1st
DT112	Tertiary	100.82	Ward No. 08	2nd
DT113	Tertiary	132.57	Ward No. 08	1st
DT113	Tertiary	59.51	Ward No. 09	1st
DT114	Tertiary	51.03	Ward No. 08	1st
DT114	Tertiary	276.49	Ward No. 09	1st
DT116	Tertiary	80.75	Ward No. 05	2nd
DT117	Tertiary	464.23	Ward No. 05	1st
DT118	Tertiary	312.00	Ward No. 07	1st
DT118	Tertiary	8.26	Ward No. 08	1st
DT119	Tertiary	318.21	Ward No. 04	1st
DT120	Tertiary	291.66	Ward No. 04	1st
DT122	Tertiary	66.11	Ward No. 08	1st
DT123	Tertiary	224.73	Ward No. 08	1st
DT125	Tertiary	54.88	Ward No. 08	1st
DT126	Tertiary	116.93	Ward No. 09	2nd
DT127	Tertiary	94.90	Ward No. 08	2nd
DT128	Tertiary	85.06	Ward No. 08	2nd
DT132	Tertiary	131.59	Ward No. 07	2nd
DT133	Tertiary	304.87	Ward No. 02	1st
DT139	Tertiary	181.57	Ward No. 02	2nd
DT140	Tertiary	285.77	Ward No. 03	1st
DT141	Tertiary	204.27	Ward No. 03	1st
DT141	Tertiary	103.18	Ward No. 07	1st
DT142	Tertiary	248.84	Ward No. 02	1st
DT144	Tertiary	120.92	Ward No. 08	1st
DT145	Tertiary	247.20	Ward No. 01	1st
DT146	Tertiary	259.78	Ward No. 01	1st
DT147	Tertiary	365.19	Ward No. 04	1st
DT148	Tertiary	316.14	Ward No. 01	1st
DT149	Tertiary	222.35	Ward No. 02	2nd
DT150	Tertiary	10.43	Ward No. 08	1st
DT150	Tertiary	156.12	Ward No. 09	1st
DT151	Tertiary	296.07	Ward No. 09	1st
DT152	Tertiary	440.18	Ward No. 07	2nd
DT153	Tertiary	217.40	Ward No. 03	1st
DT154	Tertiary	59.49	Ward No. 03	1st
DT157	Tertiary	140.14	Ward No. 04	2nd
DT158	Tertiary	54.79	Ward No. 04	2nd
DT159	Tertiary	107.43	Ward No. 05	1st
DT160	Tertiary	184.64	Ward No. 05	1st
DT161	Tertiary	38.81	Ward No. 05	1st
DT161	Tertiary	166.28	Ward No. 06	1st
DT162	Tertiary	432.34	Ward No. 07	1st
DT162	Tertiary	72.33	Ward No. 08	1st
DT163	Tertiary	104.72	Ward No. 08	2nd

ID	Type	Length	Ward No	Phase
DT165	Tertiary	162.63	Ward No. 08	2nd
DT166	Tertiary	348.77	Ward No. 08	1st
DT167	Tertiary	58.39	Ward No. 07	1st
DT167	Tertiary	119.46	Ward No. 08	1st
DT168	Tertiary	99.89	Ward No. 08	2nd
DT169	Tertiary	92.95	Ward No. 08	1st
DT170	Tertiary	293.26	Ward No. 08	1st
DT171	Tertiary	71.01	Ward No. 08	1st
DT172	Tertiary	189.08	Ward No. 08	1st
DT173	Tertiary	75.70	Ward No. 08	1st
DT174	Tertiary	163.23	Ward No. 08	1st
DT176	Tertiary	678.26	Ward No. 08	1st
DT177	Tertiary	235.53	Ward No. 07	1st
DT178	Tertiary	420.27	Ward No. 07	1st
DT179	Tertiary	104.38	Ward No. 07	2nd
DT180	Tertiary	347.89	Ward No. 03	1st
DT182	Tertiary	731.68	Ward No. 01	1st
DT184	Tertiary	679.42	Ward No. 05	1st
Total Length 73,875.89 meter = 73.87 Km				

ANNEXURE-F

Mouza Schedule of Development Proposals

Proposed Facilities	Ward Name	CS Mouza Name	Plot No.	Area in Acre
Residential				
Low Income Houseing Area	Ward No. 01	Choto Maghbazar	3-46, 139	34.998
		Goaldi	43 part, 44-48, 59 part, 54, 59	
Re-Settlement Residential Zone	Ward No. 01	Darpat Thotalia	87-102, 104-119, 356-387, 737, 745-747	16.767
Sweeper Colony	Ward No. 06	Baghmahisha	260-262, 263 part	1.117
Planned Residential Area-1	Ward No. 05	Sollapara	186-192, 193 part, 194-196, 197 part, 201-202, 205-239, 240 part, 241-246	21.144
Planned Residential Area-2	Ward No. 04	Balia Dighirpur	188-230, 234-241, 246, 334-364, 368-369, 371-372	28.043
Planned Residential Area-3	Ward No. 03	Tipurdi	86-102, 103 part, 108, 111 part, 112-115, 122-123, 161-208, 209-211 part, 212, 213 part, 309-310, 313 part	16.672
Commercial				
Wholesale Market	Extension Area 01	Choto Sadipur	66-77, 81-82, 85-90, 110 part, 111-113	5.640
Poura Supper Market	Ward No. 05	Aminpur	83-84	0.565
Poura Market & Community Center	Ward No. 01	Aminpur	145	0.423
Sonargaon Poura Market	Ward No. 05	Aminpur	269,271 part	0.199
Poura Market	Ward No. 03	Choto Silmandi	93-94	1.007
		Padmalabhdi	34 part, 38 part, 40-41	
		Padmalabhdi	34 part, 38 part, 40-41	
Industrial				
General Industrial Zone	Extension Area 01	Ratandi	90-125, 140-141, 143-156, 158-168, 172-183, 189-234	31.617
		Choto Bandara	19-21	
		Choto Sadipur	1 part, 2, 11-13, 19-22, 27-29, 37-43	
Heavy Industrial Zone	Ward No. 03	Mallikerpara	35-36, 43, 45-76	30.130
		Chhata Silmandi	106-161	
	Extension Area 01	Ratandi	1, 3-86	38.318
		Choto Bandara	1-18	
Government Office				
Administration Area	Ward No. 07	Ichapur	202-204, 206-209, 212-213, 288-295	3.508
	Ward No. 08	Chowdona	202-206 part, 207-209, 212-213	3.130
Paurashava Office	Ward No. 05	Aminpur	234	0.400

Sonargaon Poura Auditorium	Ward No. 05	Aminpur	239,141-142	0.439
Educational Institution				
Primary School	Extension Area 01	Bandara	84, 85 part, 89-92	1.529
High School	Ward No. 02	Goaldi	361-362 part, 363, 365 part	0.508
College-1	Ward No. 04	Raishdia	263-264, 269-273, 280-297, 313-327	11.111
College-2	Ward No. 01	Darpat Thotalia	335-348, 350-352, 388-405	4.861
University College	Ward No. 01	Darpat Thotalia	177-195, 200-241, 243, 245-256, 280, 283, 296-327	26.966
Vocational Training Institution	Ward No. 04	Aminpur	7, 8, 9, 10, 11	3.227
	Ward No. 05	Raishdia	142-144, 154-166, 170-171, 261-262, 298-307, 311-312	10.480
Open Spaces				
Central Park Cum Stadium	Ward No. 02	Aminpur	4-5, 40, 43-44, 66-73, 110	5.632
		Goaldi	516-517	
Sonargaon Poura Park	Ward No. 05	Aminpur	243, 259	1.085
Community Park	Ward No. 01	Choto Maghbazar	143, 145-147 part, 148-149	1.300
Inter city Bus Terminal	Ward No. 03	Choto Silmandi	92, 97-98, 99 part	2.757
		Padmalabhdi	24-27, 34-37, 38 part	
Poura Bus Terminal	Ward No. 05	Aminpur	324 part, 328-330, 334-335	1.519
Track Terminal & Loading& Unloading	Ward No. 03	Mallikerpara	9 part, 10-15, 16 part	4.016
		Choto Silmandi	69-83	
Tempo Stand	Ward No. 01	Raishdia	89-90 part, 91-93	1.226
Recreational Facilities				
Sonargaon Poura Tourist Complex	Ward No. 05	Aminpur	286, 292-293, 323-295-298, 300-306, 323-324 part, 325, 326 part, 334-335 part, 337-340, 342	4.185
Utility Facilities				
Dumping Site-1	Ward No. 01	Garibardi	85-87, 88 part, 90 part, 91-96, 113-117, 121-122 part	3.951
Dumping Site-2	Ward No. 05	Sollapara	266-267, 271	1.657
Waste Transfer Station	Ward No. 06	Baghmahisha	259, 263 part, 264 part	0.297
Public Toilet-1	Ward No. 06	Baghmahisha	264 part	0.101
Public Toilet-2	Ward No. 03	Tipurdi	148 part	0.273
Water Pump House & Ward Community Clinic-1	Ward No. 06	Baghmahisha	83	0.382
Water Pump House & Ward Community Clinic-2	Ward No. 01	Raishdia	69	0.141
Water Pump House-3	Ward No. 05	Aminpur	272 part, 273, 274 part	0.227
Water Pump House-4	Ward No. 02	Goaldi	543	0.065
Slaughter House	Ward No. 08	Chowdona	522 part	0.093
		Sahapur	21 part	
Health Service				
Health Center	Ward No. 03	Tipurdi	124-126, 154-160, 209-213 part, 214-225, 254-259, 305, 305-306 part	10.090
Community Facilities				
Cremation	Ward No. 08	Chowdona	501-502	0.189
Poura Eidgah	Ward No. 06	Baghmahisha	79 part	1.910

Poura Graveyard	Ward No. 06	Baghmahisha	79 part	1.183
Fire Station	Ward No. 03	Choto Silmandi	99-100 Part, 101	0.207
Ward Community Clinic	Ward No. 02	Goaldi	546	0.267
Ward Center	01	Raishdia	95 part	0.220
	02	Goaldi	478 part	0.200
	03	Goaldi	677 part	0.057
	04	Balia Dighirpur	137 part	0.049
	05	Aminpur	324 part, 328 part	0.186
	06	Baghmahisha	267 part	0.285
	07	Ichapur	330 part	0.204
	08	Chowdona	362 part	0.065
	09	Sahapur	231 part	0.058

ANNEXURE-G

Mouza Schedule of Proposed Water Retention Pond

Ward No	CS Mouza Name	Plot No.	Area in Acres
Ward No. 01	Arjundi_154_00	113, 1, 152, 1, 8, 10, 101, 106, 107, 111, 113, 12, 121, 127, 13-15, 57, 133,1, 152 ,1, 8, 10, 101, 106, 107, 111, 113, 12, 121, 127, 13-15, 57 , 133, 138, 140, 20, 22, 25, 26, 27, 3, 31, 4-5, 9, 16 , 46, 53-54, 56, 60, 94	16.864
	Choto Maghbazar_153_00	76, 105, 114, 125, 126, 165, 54, 56, 60, 71	6.492
	Darpat Thotalia_152_00	174, 176, 127, 140-142, 135, 265, 147-149, 242, 261, 274-278, 265, 286, 291, 292, 352, 425, 427, 440, 449, 496-498, 499-500, 534, 535, 536, 591, 613-614, 653, 660, 734, 750	13.244
	Garibardi_146_00	123-124, 1, 102, 102, 120, 120, 137, 9	2.664
	Raishdia_155_00	14, 22-23, 35, 33, 65, 67	3.946
Ward No. 02	Adampur_160_00	7,1, 39, 82,40,429,76,8	3.455
	Arjundi_154_00	147-148	0.092
	Bagh Nazirpur_167_00	40,37,37, 39	0.955
	Goaldi_166_00	7, 109, 110-111, 115, 123, 123, 125-126, 128, 150, 139-140, 14-16, 144, 154, 159-160, 165, 186, 169, 186, 203, 21, 217-218, 220, 231-232, 233, 234, 297-298, 306, 322, 329, 337, 35-36, 359, 365, 379, 391, 393, 374-375, 395, 398-399, 402, 403, 414, 423-424, 433, 442-444, 469, 47, 495, 536, 540, 542, 541, 545, 564-657, 595, 598, 609, 609, 621-623, 641, 644, 672, 70, 93, 419	28.182
Ward No. 03	Adampur_160_00	21, 31, 17, 25, 30, 27, 32, 686	2.351
	Choto Silmandi_211_00	47, 105, 122, 57	3.196
	Goaldi_166_00	662, 621-626, 541, 544, 643, 658, 668-669, 669, 674, 677, 680-681, 684, 684	3.973
	Ichapar_165_00	31, 111-112, 116, 118, 22, 23-25, 28, 63, 29, 31, 32, 32, 36, 39-41, 38, 43-45, 5	6.930
	Mallikerpara_176_00	34, 1, 29, 28, 77, 37	4.123
	Padmalabhdi_175_00	8, 11-12, 1, 27-28, 30, 29, 29, 31	1.441
	Tipurdi_174_00	331-332, 119-120, 122-123, 127, 417-418, 397, 393, 13, 13, 105, 175, 13, 29, 149-150, 152,197, 200, 202-203, 258, 313,234, 282, 236, 243, 244, 260-261, 302, 269-270, 277, 280-281, 287-291, 282, 301, 320-321, 337, 386-388, 408, 410, 413, 413, 429, 50-51, 130-135	12.949
Ward No. 04	Balia Dighirpar_157_00	365-367, 370, 374,1,2,115-121, 44, 161, 206, 220, 220, 255-256, 267-269, 287, 318, 359, 423-424, 461, 66, 69, 86, 179, 184	9.725
	Raishdia_155_00	223, 230, 231, 236, 109, 118, 136, 138, 177, 150, 190, 241, 208, 218, 226, 214-216, 219, 224-225, 245, 255-257	5.661
	Sollapara_162_00	108	0.010
Ward No. 05	Aminpur_158_00	226, 102-105, 107, 111, 321, 322, 12,1-2, 121, 137, 146, 151, 183-185, 212, 226, 227, 230, 228, 253, 264, 294, 294, 341, 351, 37, 113-115, 42, 50-51, 80-81, 83, 61, 72, 200, 202-204, 240, 94, 351	15.692
	Panam Dulalpur_159_00	141, 12, 125, 128-130, 138, 187, 187, 4, 54-55, 66, 71, 70, 73-93, 158-160, 164-180, 9, 99-100	6.270
	Sollapara_162_00	283,108,115,119-121, 168,13,148,148,15,161,179,183,183, 203,183, 273,251-252, 171,256-257,260,262,70, 83-84,75,75,82,91	11.520

Ward No	CS Mouza Name	Plot No.	Area in Acres
Ward No. 06	Adampur_160_00	104, 108	0.601
	Baghmahisha_161_00	307, 103, 112, 113, 124, 127, 131-132, 135, 147, 148, 181, 230, 159, 173, 178-179, 181, 228-229, 198, 200, 201, 206-207, 216-218, 222, 224-225, 207, 229, 231, 252, 232-234, 240-242, 235, 237, 243, 258, 250, 250, 253, 299-301, 250, 301, 251-252, 271, 275, 304, 305, 308, 309, 311, 313-314, 4, 181, 184, 186, 195, 5, 5, 10, 15-16, 57, 76, 84, 85, 91, 92	29.373
	Chowdona_164_01	32, 162, 116-118, 128, 128-129, 130-131, 133, 136, 139, 33, 37, 134, 39-42, 71-72, 256, 76, 9, 92, 92, 149, 111, 124	5.711
Ward No. 07	Chilarbagh_227_00	55, 11, 25, 136-137, 143, 145, 147-148, 163-165, 167, 20-21, 203-210, 211, 40, 42-45, 41, 53-54, 64-67, 71, 59, 72, 84, 86-88, 92, 107, 110, 113-114, 117-118, 120, 89-90, 90, 91, 119, 121, 122, 125-127, 133, 94, 96	15.895
	Ichapar_165_00	366-367, 103, 103, 108-109, 132-133, 136, 147, 219-221, 144, 146, 147, 156, 149, 173, 185, 193, 194-195, 196-199, 204, 208, 320, 226, 274-277, 237, 239, 24, 33, 37, 241-143, 145-247, 250, 253, 244, 252, 254, 254, 260, 263, 278, 281, 296, 261-262, 266, 267, 272, 316, 322, 328, 330, 33, 334, 336, 338, 352-355, 358-362, 376-378, 38, 94-95, 97, 101-102	37.200
Ward No. 08	Chowdona_164_02	491, 165, 320, 166, 175-179, 200, 207, 233, 268, 269, 309, 319, 165, 323, 324, 326, 358-359, 369, 372-374, 486, 487, 505, 507, 520	18.111
	Sahapur_121_00	4-5, 1, 3-4, 13-14, 25, 29, 9, 13	1.789
	Sonargaon_163_00	28, 1, 277, 278, 10, 14, 18, 171, 115, 117, 119, 124, 130, 141, 145-146, 156, 183, 273, 21-23, 216, 236, 258, 273, 275, 277, 279, 280, 39, 39, 196, 408, 456-458, 465-466, 470, 53-57, 68, 82-83, 83, 99, 103	12.108
Ward No. 09	Sahapur_121_00	83-84, 86, 13, 22, 132, 134, 136, 14, 22, 26, 33, 181, 210, 22, 224, 224, 226, 29-30, 99, 102, 116-117	6.133
	Sonargaon_163_00	228, 236, 244, 254, 258, 357, 385, 259, 260, 261, 262, 277, 319, 299, 301, 303-304, 312, 327-328, 331, 314, 319, 322, 340, 385, 398, 405-407, 408, 481, 524	8.214
Extension Area 01	Bandara_226_00	25, 35, 121, 134	1.488
	Bari Mojlish_221_00	25, 104, 2-3, 10-11, 20, 55, 23-24, 26, 31, 41-44, 52, 54, 55, 83, 92-95	4.668
	Choto Sadipur_223_00	17-18, 1, 1, 103, 114, 25, 25-26, 4+5, 7, 925	1.685
	Hobibpur_220_00 (Part)	198, 116-117, 83, 119, 328, 83, 85, 88-89, 96-107, 116-117, 322-326	10.425
	Ratandi_225_00	186-188, 15-16, 25-28, 38-39, 87, 1-6, 87, 32	6.511
Extension Area 02	Sreenibashdi_173_00	201-203, 209	0.907

ANNEXURE-H

List of Photographs

Sonargaon Paurashava Final Consultation Meeting (09/11/2013)



