Government of the People's Republic of Bangladesh

Ministry of Local Government, Rural Development & Cooperatives

Local Government Division

SHAILKUPA PAURASHAVA

MASTER PLAN: 2011-2031

March 2015

Technical Assistance: Local Government Engineering Department (LGED)

Government of the People's Republic of Bangladesh

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SHAILKUPA 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

SHAILKUPA PAURASHAVA

SHAILKUPA, JHENAIDAH

SHAILKUPA 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, Shailkupa 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 Shailkupa Paurashava.

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

(Kazi Ashraful Ajom)
Mayor

Shailkupa 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 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 Structure Plan, Urban Area Plan (*Landuse Plan, Transportation and Traffic Management Plan, Drainage and Environmental 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.

The Shailkupa Paurashava was established in 12th May, 1992 under the jurisdiction of Shailkupa Upazila of Jhenaidah zila, between $23^0$41′00′′ north latitude and $89^0$15′00′′ east longitude. Shailkupa Paurashava is located within the Jhenaidah Zila at a distance about 24 km. The Paurashava is **'A'** category and consists with 9 Wards and 11 mouzas. Shailkupa Paurashava has 20.80 sq. km (5138.60 acres) area. It is about 294 km road distance from the capital city Dhaka. For the preparation of Master Plan, an area of 5138.60 acres (20.80 sq. km.) consider as Planning and Structure Plan area. According to the Census Year 2011, 35,271 populations are living in the planning area with gross density 7 persons per acre and it will be 44,159 (*Annual growth rate 1.13%, Source: BBS-2011*) in 2031 with gross density 9 persons per acre.

Shailkupa Paurashava bears rural influences and agriculture is the major source of income. Average monthly income per household is Tk. 9000. No substantial saving of the income is found. The project area is located in the bank of Kumar River. The average elevation of the land of the land of the Paurashava area is 9.09 mPWD. The physical feature survey reveals that there are in total 11,840 structures exist in the Paurashava of which residential structures are the highest (89.26%) and commercial structures are second highest (7.50%). In total, the Paurashava has 93 small bridges/ culverts and 120.66 km of roads. The Paurashava has 524 ponds, 32 ditches, 1 beel, 11 khals and 1 river as well. In Shailkupa Paurashava in total 36.87 km of drain exists.

The project area is predominantly rural in character. Land use survey reveals that agriculture is the most dominant land use category of the Shailkupa Paurashava which comprises 61.95% of the total land area of the Paurashava. Residential and Circulation Network comprises 28.61% and 2.15% respectively.

The structure plan (Part-A) area consist of different zones (*Core Area, Peripheral Area, New Urban Area, Agriculture, Water body and Major Circulation*). Agriculture Area (2578.86 acres) is the highest percentage of land (50.19%) followed by New Urban Area (20.47%) followed by Peripheral Urban Area (9.88%) and Major Circulation (7.91%).

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 Shailkupa Paurashava. Urban Area Plan is the first phase illustration of the Structure Plan intended to be implemented over a time span of 10 years that includes 1st phase (1st-5th year) and 2nd phase (6th -10th year) of development programs.

The components of Urban Area Plan include Land Use Plan, Transportation and Traffic Management Plan, Drainage and Environmental Management Plan, Plan for Urban Services. The future housing area estimates on a recommended planning standard of 100 persons per acre. With this standard, the maximum land required to accommodate total projected population (44,159) in the year 2031 will be 441.59 acres. Total commercial land in 2031 has been fixed at 54.07 acres, Education 66.82 acres, Open space 103.05 acres and transport 4.42 acres. But in the time of land use proposal of Shailkupa Paurashava it is not possible to maintain the all standard due to insufficient land. In land use proposal 836.55 acres of land is for Urban Residential Zone and 482.23 acres is for rural settlement. The commercial lands have been proposed 53.03 acres, Education & Research Zone 63.12 acres, Open Space 116.30 acres, Transportation Facilities 5.52 acres, Community Facilities 11.88 acres, Mixed Use 57.85 acres and Health Services 21.06 acres.

The Transportation and Traffic Management Plan covers the scope improvement of the existing network and system and plan proposals for new development. The proposals on improvement and new development are made for the project area up to 2031. The existing road network of Shailkupa Paurashava is 120.66 km and the proposed road network is 96.81 km. The primary roads have been proposed 100ft (*RoW*), the secondary roads have been proposed 80-60ft (*RoW*) and minimum width of road 20ft (*RoW*) in entire Paurashava. The main intention of transport plan is to ensured proper functional linkage within other regional centres. One truck terminal, one parking area, one bus terminal and four tempo stands are proposed to cover the whole area.

The purpose of the Drainage Plan is to make an assessment of the present drainage facilities and to improve future development. This Plan shall be a planning tool and shall be used as a guideline for Shailkupa Paurashava that shall be responsible for the approval of drainage improvements. Natural canal and river in Shailkupa Paurashava are acting as a critical role in entire Paurashava. The natural drainage network is composed with 524 ponds, 32 ditches, 1 beel, 11 khals and 1 river. Total area devoted to water bodies in Shailkupa Paurashava is around 259.57 acres. Present man-made drain is about 2.63 km. The proposed drain of Shailkupa Paurashava is about 62.818 km where 25.37 km secondary drain and 37.44 km tertiary drain. This will designated up to 2031.

Shailkupa Paurashava is lacking for sewerage system and people are used to dispose household sewer to the surface drains or surface water bodies. This Paurashava does not possess good solid waste management system. There is only one designated dumping area in Shailkupa Paurashava. In proposed plan 10.96 acres of land is reserved for dumping ground and it is located in ward no. 6. Total 04 waste transfer stations have been proposed.

In Part-C of the report contains Ward Action Plan of each individual Ward and this Development Proposals will be implemented within planning period. The Ward Action Plans (Part-C) are prepared under the framework of Structure Plan and Urban Area Plan. The Ward Action Plans contain details of development proposals at Ward level including the problems and opportunities existing there in and also include the proposals made in the upper level plan that is in the Urban Area Plan. The Ward Action Plans have been formulated for execution within a period of 5 years.

Finally, The Paurashava is self sufficient neither in preparation of plan nor in implementation of plan proposals; is dependence on central government for technical and financial assistance huge. This dependence might hinder the overall plan making and implementation process. Besides, plan implementation would require the Paurashava to have a good coordination among various stakeholders and with the Ministry of Local Government, Rural Development and Cooperative in place. Therefore a right kind of Institutional arrangement, and implementation framework would be required for successful implementation of the plan proposals and its future updating. However, the current project regarding Preparation of Master Plan for Shailkupa Paurashava under “UTIDP” emphasizes on having proper guidelines and planning standards by the Paurashava for ensuring sustainable and planned development of the Paurashava.

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List of Abbreviations and Acronyms

BM	Bench Mark
BTM	Bangladesh Transverse Mercator
CBD	Central Business District
CNG	Compressed Natural Gas
CS	Cadastral survey
DGPS	Differential Global Positioning System
DLRS	Directorate of Land Records and Survey
DPA	Demarcation of Planning Area
DPHE	Department of Public Health and Engineering
GCP	Ground Control Point
GIS	Geographic Information System
GPS	Global positioning system
K.P.H	Kilometers Per Hour
K.M.	Kilometer
LGED	Local Government Engineering Department
MSL	Mean Sea Level
O-D	Origin and destination Survey
PCU	Passenger Car Unit
PWD	Public Works Department
RHD	Roads and Highway Department
RTK-GPS	Real Time Kinematics Global Positioning System
SoB	Survey of Bangladesh
TCP	Temporary Control Points
TIC	Tentative points
TS	Total Station
UTIDP	Upazila Towns Infrastructure Development Project

Local Words

Khal : Canal

Tempo : Human hauler

Bazar : Trade Centre

Hat : Weekly an occasional Market

Paurashava: Municipality

CHAPTER-1

INTRODUCTION

1.1 Introduction

In Bangladesh, the present average urban growth rate is about 4.5%. Present trend of population increase indicates that by 2020 about 40% of the total population will live in urban areas. According to a recent survey, it was revealed that 45% of urban populations have access to potable water while have limited access to sewerage facilities. In addition inefficient transport management greatly contributes to the problems in traffic and transportation system. These aspects are not only influence our urban life but also arrest the national economic growth of the country. On the other hand, demand for urban service facilities has increased substantially because of the population expansion in urban areas. The expansion of urban economy leads to the growth of urban population and concomitant haphazard urban spatial growth without planning.

The urban centres are going to be the focus of future employment and economic regeneration. The population and economic growth, particularly, in large urban centres is likely to boost in next few decades creating increased burden on them. The smaller urban centres imbued with opportunities for investment and livable environment can help release pressure on big cities at the same time serve as growth poles for development of undeveloped hinterlands. Without adequate infrastructure and services provision to support the increasing population and activities the small urban centres, it would be difficult to turn urban centres as environmentally congenial livable places. Planned development of infrastructure and services and development control through land use plan is essential.

The present infrastructure provisions in Paurashavas are in a precarious state. Drains are mostly clogged that can not drain out water during heavy rains, 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 keep pace with the growing demand for movement; as a result congestion becomes a common problem. Road networks has 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 inorganized and unplanned, which is a major source of environment deterioration. Building Construction Rules, 1996 has not effectively enforced in Paurashavas.

It is high time to think about problems that might be emerged in future if they are not addressed now. To overcome all likely problems to come in future, the Paurashava

should go for planned development through preparation of a master plan and move the development forward accordingly. 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 aims to prepare master plan for 223 Paurashava Upazila as for a period of next 20 years. The project keeps provision for a separate plan for land use control, drainage and environment, traffic and transportation management and improvement. The project aims to prepare a Ward Action Plan to ensure systematic execution of infrastructure development projects in future. There is also aim to prepare proposals to enhance Paurashava revenue so that it becomes more capable of meeting its own capital needs. The Master Plan of Shailkupa Paurashava will suggest development of new roads and bridges/culverts, drainage facilities, streetlights, markets, bus stands, solid waste management, sanitation, water supply and other infrastructure facilities to face future needs.

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

The objectives of Paurashava Master Plan are to:

- Find out development issues and potentials of the Shailkupa Paurashava and make a 20-year development vision for the Paurashava and prepare a Master Plan in line with the vision for the development;
- Plan for the people of Shailkupa 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;
- 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;
- Provide controls for private sector development, with clarity and security in regard to future development;

- Provide guideline for development considering the opportunity and constrains of future development of the Upazila Town; and
- Prepare a 20-year Master Plan to be used as a tool to ensure and promote growth of the Shailkupa Paurashava in line with the guiding principles of the Master Plan and control any unplanned growth by any private and public organization.

1.4 Approach and Methodology

The approach and methodology of planning that has been followed is worth mentioning here. Various studies are the integral part of the planning process, while the planning method covers a wide range of issues duly considered during the process of planning. In this Master Plan Preparation exercise, following several-phases of planning methodology have been followed.

The methodology related for preparing the Master Plan/ Urban Area Plan including Land Use Plan, Transportation and Traffic Management Plan, Drainage and Environmental Plan and Ward Action Plan for Shailkupa Paurashava was taken under the following sequential way.

Phase 1: Preliminary Visit to the Paurashava

At first, the planning goals and objectives were conceived, preparations were made. A preliminary visit was made by the team of consultants to acquire basic idea about the areas to be planned. The goal in this step was to conceptualize the planning process and the operational activities.

Phase 2: Organize Inception Seminar

After conceptualize the planning inception, Seminar was held at the Shailkupa Paurashava in which stakeholders was informed about the scope and Terms of Reference (*ToR*) for the preparation of Master Plan and the output in this step was the preparation of an Inception Report.

Phase 3: Delineation of the Planning Area

Under the project (*UTIDP*), basing on existing condition, demand of Shailkupa Paurashava and potential scope for future development, study area have been delineated. Methodology involved in the process of establishment of Bench Marks (*BM*) and demarcation of existing Paurashava boundary and proposed planning area for Shailkupa Paurashava is as follows:

a) Collection of Paurashava Gazette to identify the Existing Paurashava Area

b) Reconnaissance survey about Paurashava Growth Trend

c) Establishment of Bench Marks (*BM*)

- Site selection

- Construction and Installation of BM pillars
- Establishment of Coordinate of BM Pillars (*x,y,z i.e. Northing, Easting and RL in meter*)

d) Establishment of Ground Control Points (*GCPs*)

e) Demarcation of Paurashava and Planning Area

- Collection, Scanning and Digitizing of Mouza Maps
- Edit Plot Checking of Digitized Mouza Maps
- Geo-referencing of Mouza Maps
- Joining and Edge-matching of Mouza Maps

f) Participation of Paurashava in the Demarcation of Paurashava and Planning Area.

g) Preparation of GIS Map Layout.

Phase 4: Carry out Detailed Survey for Shailkupa Paurashava

A number of studies were conducted in order to prepare a database and get an insight into the existing conditions. The studies, however, have focused on three different but inter-related aspects; the physical condition of the town, the economic and social conditions of the people, and their perceptions about the problems and prospects of the town.

Data and information collected includes topography, physical features, physical infrastructures, land use, socio-economic and traffic and transportation situation of the study area. Detail Socio-economic, Physical Feature, Traffic and Transport, Environment survey of Shailkupa Paurashava area have been conducted according to the approved format of *ToR*. Other relevant data have also been collected from primary and secondary sources. These surveys and analysis of data and information have helped to find out possible area of intervention to accommodate future population of the Paurashava.

Total station based advanced technology for topographic, physical features; land use surveys done along with household sample survey for socio-economic information were used in the study. The Physical Feature Surveys were conducted covering the entire area under the jurisdiction of Shailkupa Paurashava. The stepwise works for survey and mapping are as follows:

- Reconnaissance survey;
- Collection of Mouza maps;
- Identification of Ground Control Point (*GCP*) on the Mouza maps;
- Geo-referencing of Mouza maps;
- Preparation of Arc/Info coverage;
- Preparation Edit Plot of Mouza maps;

- Planning Area Demarcation from Paurashava Gazette and detail information from the Paurashava authority;
- Establishment of Reference Bench Marks in the Project area;
- Detailed Physical feature Survey (*Point, Line, Closed boundary*);
- Spot level/Land level survey
- Detailed Land Use, Socio-economic, Drainage & Environment, Traffic and Transport survey;
- Survey Data processing and Preparation of GIS database;
- Preparation of GIS based physical feature survey Map layout;
- Verification of map at field level;
- Map production (*all Categories*).

All these information were collected using the modern survey equipments (*i.e. Total Station, RTK-GPS, etc.*). As per *ToR*, to collect the topographic information, RTK-GPS and Total Station (*TS*) were used as advanced survey techniques.

The following variables were measured in topographic survey: Land level/spot level at an interval of 50m in general cases but for high undulated areas this regular interval were decreased as necessary. Alignment and crest levels (*not exceeding 50m*) of road, embankment and drainage divides were also considered during taking spot levels. Contour map was prepared using 0.3m contour interval. Besides, alignment of rivers, lakes, canals drainage channels and outline of bazars, water body, swamps etc. were also recorded in the physical feature survey.

Land use survey covered different uses of land i.e. agricultural, residential, commercial, industrial, community services, educational, transport and communication, water body, vacant land and circulation network etc. Land Use Surveys were conducted by recording the current use of the land within the project area. Physical feature survey data and maps were used as the basis for land use survey.

The drainage information was primarily collected from the topographic and physical feature surveys. Some additional information has also been collected through key Informant Survey of knowledgeable personal of the Paurashava using an unstructured questionnaire.

Through the socio-economic survey data on population, family size, distribution of age/sex, occupation, household structure, dwelling occupancy, migration pattern, education status, Income and expenditure level, land ownership pattern, land value, health facilities, recreational facilities etc. were collected. Detailed traffic and transportation survey was conducted through traffic volume survey, origin destination (*O-D*) survey and speed survey, Congestion point, inventory of road networks etc.

Phase 5: Preparation of Base Maps and Survey Report

After conducting the all sorts of survey, processing and analysis of survey data of the planning area, base maps incorporating all the natural features and man-made infrastructures along with their alignment and essential attribute were prepared by the consultant. The final outcome of this phase is preparation of survey report which illustrates the components of survey in order to understand the existing condition of the project area.

Phase 6: Preparation of Interim Report

This is an intermediary phase towards preparation of Master Plan for Shailkupa Paurashava which involves projection of population and landuse, thorough review of existing policies relevant to the different development sectors, assessment of institutional capacity of the Paurashava. An overview of recent past budget and the list of existing/recent past infrastructure related development schemes undertaken by the Paurashava have also been reviewed at this phase to get an idea of financial capacity of the Paurashava Authority.

Phase 7: Analysis and Projection of Existing and Future Condition

This phase involves analysis of existing trend of growth based on maps, BBS data and other primary and secondary data relevant to the project area and projection of future requirement through assessing the growth direction, planning standards provided by LGED and the projected population for the planning period.

Phase 8: Public Consultation Meeting

The eighth phase of the methodology of Master Plan is to conduct '*Public Consultation Meeting*' where discussion on existing facilities and services, future requirements, identification of proposals on maps and field verification have been conducted. The proposals have been finalized after conforming and incorporating the views and ideas of the stakeholders.

Phase 9: Preparation of Master Plan for Shailkupa Paurashava

The ninth phase of the methodology is '*Preparation of Master Plan Report*'. This portion of the methodology is directly linked with three different issues, which are–Structure Plan, Urban Area Plan and Ward Action Plan.

In the ***Structure Plan***, Paurashava's existing trend of growth and the development problems are identified; whereas, the future land use, future population and the future growth by 2031 of Shailkupa is projected. Finally, a Policy Zoning Map is prepared and optimum use of urban resource strategy is taken to implement and ensure better urban environment.

The ***Urban Area Plan*** is composed with four parts, which are Land Use Plan, Transportation and Traffic Management Plan, Drainage and Environmental Management Plan and Plan for Urban Services.

Land requirements for each broad category of land uses have been determined based on projected population for a time period of 20 years and the recommended Planning Standards provided by LGED in the ***Land Use Plan***. After estimating land requirements, allocation of uses is made based on land suitability. A land suitability analysis is performed on a qualitative basis through field visits, consultation meeting, analysis of topographic map, physical feature map and soil condition to justify the suitability of land for a specific use. Land allocation is a process which depends on the demand and supply of land. Whereas land suitability yields information on supply, land requirements indicate demand of land available for development. Final land allocation or land use recommendation for competing uses is then shown on proposed land use plan map and described in detail in the explanatory report.

The first step of the methodology of ***Transportation and Traffic Management Plan*** is to identify the existing transport condition, which is the result of O-D survey, traffic survey at intersection, traffic survey at links and speed study; have already described in the survey report. In the next step, the future projection of transportation network and traffic demand is identified, which is described in the interim report. The third phase of the study is to adopt new traffic and transportation management plan, which is prepared based on future projection. After that, some strategies on transportation system management (*TSM*) are undertaken. Finally, plan implementation strategies are espoused based on both transportation management plan and transportation system management.

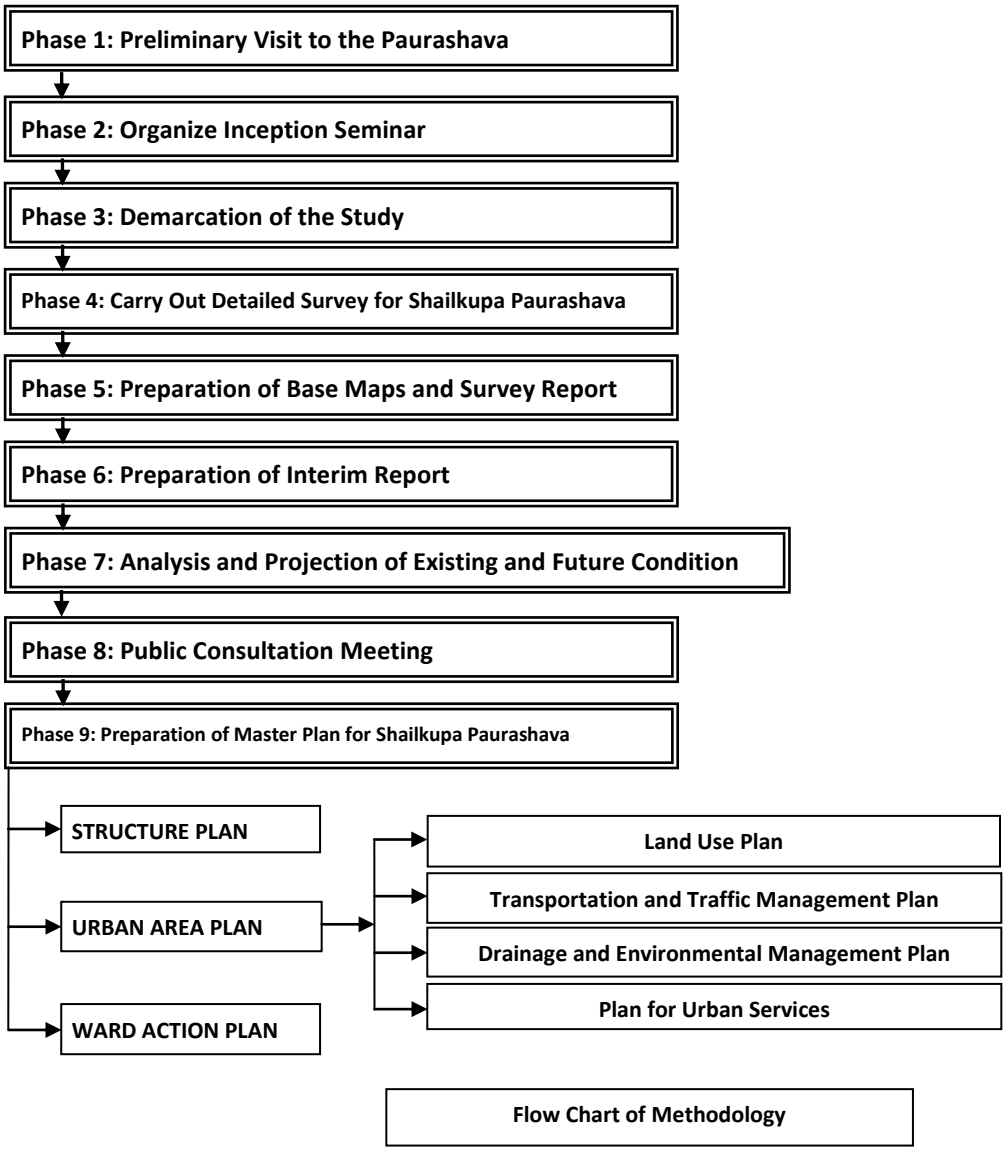
Preparation of the ***Drainage Plan*** involves (I) analyzing the existing conditions related to drainage facilities and the flood management (II) identifying major drainage outfalls and on the basis of the outfalls splitting the total drainage area into a number of drainage zones (III) defining all pertinent design criteria and (IV) defining drainage facility requirements and sizing. 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 runoff of a particular area.

The ***Environmental Management Plan*** consists of the Supplementary Living Environment Survey, the Comprehensive Ecological Survey and the Water Quality Survey. The Supplementary Living Environment includes water supply, land pollution, sewerage and sanitation, solid waste management, and resettlement of population due to construction of canals and primary drains. The Comprehensive Ecological Survey aims at facilitating comprehensive environmental assessment by subsequent urbanization and implementation of the drainage on the ecological elements of fauna and flora, agricultural and aqua cultural resources etc. The Water Quality Survey is the sampling and analysis of surface water from rivers, natural canals, ponds etc., and from ground

water. These are required to be done to ensure necessary urban environment enhancement measures.

In case of ***Urban Services***, the existing condition of urban services is analyzed. After that, future urban service requirement is estimated and some proposal has provided. Finally, to implement the proposal some strategies are undertaken.

The last step of the methodology is ***Ward Action Plan***, conceptualize the content and background of the plan. In the next step, the linkage with Structure Plan & Urban Area Plan is identified. The final phase of the study is to adopt ward action plan in details. The proposal and planning, priority tasks and cost estimation are incorporated here to get a pictorial view of the Ward Action Plan.



Flow Chart of Methodology

1.5 Scope of Work

The scope of work under this Consultancy services will cover all aspects related to the preparation of Master Plan/ Urban Area Plan which will include, land Use Plan, Traffic

Management Plan, Drainage and Environment Plan and Ward Action Plan for the listed Upazila Town. In order to prepare plan the activity will contain but not limited to the following:

- Visit the Paurashava included under the package work and list the passive name of Paurashava that will undertake preparation of Master Plan. In case if any Paurashava has already prepared Master Plan it has no need for Paurashava of Master Plan then it will be excluded from the package, written opinion of the concerned Chairman of the Paurashava whether or not Master plan Preparation will be included. A copy of list of Paurashavas feasible for preparation of Master Plan will be submitted to the office of the PD, UTIDP.
- Organize an inception Seminar at the Paurashava level and inform of the Paurashava about the scope and terms of reference for the preparation of Master Plan. Make a thorough investigation and based on potential scope and opportunities available in the Paurashava develop a 20 years development vision for the Paurashava liking the ideas and view of the Paurashava.
- Determine the study area based on exciting condition, demand of the Paurashava and potential scope for future development. Carry out detailed socio-economic Demographic and Topographic survey of the Paurashava area following approved format and collect data from primary and secondary sources. Analyze such data and information, find out possible area of intervention to forecast future population of such Paurashava (*15-20 years*), *vis-a-vis* assess their requirement for different services, physical and social infrastructure facilities, employment generation, housing right of way and land requirement for the existing and proposed roads, drains, play grounds, recreation centres and other environmental and social infrastructure.
- Identify and investigate the existing natural and man-made drains, natural river system, assess the extend and frequency of flood, determine area of intervention. Study the contour and topographic map produced by the relevant agencies and also review any previous Drainage Master plan available for the Paurashava.
- Prepare a comprehensive (*storm water*) Drainage master plan for a plan period of 20 years. In such exercise consider all relevant issues including discharge calculation, catchment area, design of main and secondary drains along with their sizes, types and gradients and retention areas with primary cost estimates for the proposed drainage system.

- Recommend Planning, institution and legal mechanism to ensure provision of adequate land for the establishment of proper right of way of (*storm water*) drainage system in the Paurashava.
- Collect and assess the essential data relating to existing transport land use Plan, relevant regional and natural highway development plan, accident statistics, number and type of vehicle registered of each Paurashava.
- Assess requirements of critical data and collect data through reconnaissance and traffic survey, which should estimate present traffic volume, forecast the future traffic growth, identification travel pattern, areas of traffic conflict and their underlying cause.
- Study the viability of different solution for traffic management and develop a practical short-term traffic management plan, including one way systems, restricted access for large vehicles, improved signal system traffic islands, roundabouts, pedestrians crossing, deceleration lanes for turning traffic, suitable turning radius, parking policies and separation of pedestrians and rickshaws etc.
- Assess the non-pedestrian traffic movements that are dominated by cycle rickshaw. Special recommendations should be made of as to how best to utilize this form to transport without causing unnecessary to other vehicles. Proposal should also consider pedestrians and their safety, with special children.
- Assess the current land use with regard to road transportation, bus & truck station, railway station etc, and recommend action to optimize this land use.
- Prepare a road net work plan based on topographic and base map prepared under the project. Recommend road development standards, which will serve as a guide for the long and short-term implementation of road. Also suggest Traffic and transportation management plan and also suggest a traffic enforcement measure to be taken.
- Prepare the Master Plan with all the suitable intervention, supported by appropriate strategic policy, outline framework, institutional arrangement and possible source of fund for effective implementation of the plan.
- Prepare a plan to set out proposed Master Plan at three-levels namely Structure Plan, Urban Area plan and Ward Action Plan.
- At the first level, work out frame strategy policy for the preparation of a structure plan for each Paurashavas under the package. as a follow up of structure Plan prepare a master plan consisting a land use plan. Transportation and traffic Management Plan, Drainage and Environment Management Plan and Ward Action plan.

- Make a total list of primary and secondary roads, drains, and other social infrastructures for each Paurashava for a plan period of 20 years. Examine and classify according to the existing condition, propose long, medium and short-term plan and estimate cost for improvement of the drain and alignment and other infrastructures.
- In line with the proposed Master Plan propose a Ward Action Plan with list of Priority schemes for the development of roads, drain, traffic management and other social infrastructures for implementation during the first five years of the period.
- Organize with the help of concerned Paurashava at least two public consultation meeting/seminar one for discussion on interim report and the other on draft final Report on the proposed Master plan. Integrate beneficiary's point of view in the plan with utmost careful consideration.
- Prepare and submit Master plan and Report with required standards as required by 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 Shailkupa 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) Plan for Urban Services.

PART–C: *Ward Action Plan* presents ward wise detailed proposals for implementation within 5 years of the Master Plan period.

CHAPTER-2

STRUCTURE PLAN

The 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 Shailkupa Paurashava Master Plan (*Structure Plan, Urban Area Plan and Ward Action Plan*)". **Part-A** of this report describes the Structure Plan of Shailkupa Paurashava and **Chapter-2** describes the conceptual issues related to the preparation of Structure Plan for Shailkupa Paurashava.

2.1 Background of the Paurashava

Shailkupa Paurashava is located within the Jhenaidah Zila at a distance about 24 km. from district headquarter. Along with other important areas, the Upazila is bounded on the north by Kushtia Sadar Upazila, on the south by Sadar Upazila and Magura Sadar Upazila. It lies between $23^0$01´00´´ north latitude and $89^0$15´00´´ east longitude. It is about 294 km road distance from the capital city Dhaka. Location of the Paurashava is shown in **Map-2.1** (*Location Map of the Paurashava*).

According to the BBS, 2011 (*Jhenaidah District*), the population of Shailkupa Paurashava as per recorded in 2011 is 35,271 of which 17,671 (50.10%) are male and 17,600 (49.90%) are female. The Population of Shailkupa are Muslim, Hindu, Christian, Buddhist and other. In 2011, the density of population was 1,696 per sq.km. Location Map in Context of District is shown in **Map-2.2** (*Location Map in Context of District*).

Shailkupa Paurashava consists of 11 mouzas with an area of 20.80 sq km. It covers part/full mouza of Shailkupa, Shampur, Haridevpur, Satgachi, Fazelpur, Pathanpara, Aushia, Habibpur, Khalkula, Jhaudia and Kabirpur. The Paurashava is divided in to total 9 wards. The Paurashava came into existence on 1992. It is an class **"A"** type Paurashava. Planning Area Map is shown in **Map-2.3** (*Planning Area Map*).

The development scenario of Shailkupa Paurashava shows a very grave situation. The main and secondary drains and natural streams in the Paurashava Town do not function 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 are very few roadside drains only in the central part of the town. The existing roadside drains are inadequate and of insufficient capacities and incorrect gradients.

Equally, the traffic and transportation problem in Shailkupa has been continuously increasing as the development and management of road network has not been commensurate with the increasing demand for its usage. Traffic congestion, 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 Shailkupa. 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 Shailkupa Paurashava unsuitable and inhabitable. There is no proper Master Plan for development of Shailkupa. In the absence of proper Master Plan construction of all types of infrastructure like houses, roads, drains, markets are going on in unplanned pattern. This situation is creating an adverse effect in the original landscape thereby creating environmental hazards.

Map 2.1: Location Map of the Paurashava

Map-2.2: Location Map in Context of District

Map-2.3: Planning Area Map

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.

2.3 Objectives of the Structure Plan

The purpose of the Structure Plan is to outline a preferred pattern of development from the perspective of the Paurashava as a service provider and planning authority. The objectives of the Structure Plan are identified as follows:

- 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 Shailkupa 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 Shailkupa 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.

2.4 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 tertiary 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*), Shailkupa. 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. No extended area was selected in consultation with the Paurashava 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.

2.5 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. Duration of the structure Plan period is equal to two Urban Area Plans for the time period of 10 years each and is equal to four Ward Action Plan for the time period of 5 years each. There is a provision of revision of the plan every five years.

2.6 Structure Plan Area

The total area of Shailkupa Structure Plan is 5138.60 acres (20.80 sq. km) that include total area of Shailkupa Paurashava, and there is no extension area in the structure plan of Shailkupa Paurashava. All the nine wards of the Paurashava are covered by Structure Plan area.

CHAPTER-3

EXISTING DEVELOPMENT STATUS OF SHAILKUPA PAURASHAVA

3.1 Social development

Shailkupa Paurashava is inhabited by *cent percent* local people who have been inherited their land for a long time. The social composition is from rich to poor and different religious groups are living together.

Shailkupa Paurashava was established in 1992 before the date of conducting the BBS Census, 2011. Thus socio-economic data of Shailkupa Paurashava is available from BBS. However, some social data of the Paurashava is presented below.

Population

According to BBS 2011 (*Jhenaidah District*), the total population of Shailkupa Paurashava is 35,271 of which 17,671 (50.10%) is male and 17,600 (49.90%) female. The sex ratio is 100 and density is 1696 per sq. km.

Household

According to BBS 2011 the total household of Shailkupa Paurashava is 8,507 with average household size is 4.15.

Education

Increasing trend of literacy is observed in the Shailkupa Paurashava over the decades. The literacy rate is 47.20% in 2011 against 43.70% in 2001. It appears that the literacy rate has increased 3.50% for both sexes in 2011 over 2001.

Income Level

From socio-economic sample survey it reveals that about 28.30% household has monthly income of between Tk. 9,001-12,000. The high income people with income ranging from Tk. 12,000 and above constitute 19.50% household.

Religion

According to BBS (2011), 88.54% of the population of this Paurashava belongs to Muslim community and 11.40% to Hindu community. Population belonging to other religions are Christian, Buddhist and other.

Main Source of Household Income

According to BBS 2011, the main source of household income in Shailkupa Paurashava are as: service 48.36%, agricultural labour 49.04%, industry 2.60%.

Ownership of land

Most of the inhabitants (89.70%) of the Paurashava were found to live in their own houses. However, mainly in the core part of the Paurashava i.e., in Ward Nos. 2, 3, 4, 5, 7, 8 and 9 around 7.50% inhabitants were found to live in rented houses.

Occupancy Type

Household ownership pattern indicates the socio-economic status of the inhabitants. According to BBS 2011, 89.70% families live in their own houses. 7.50% families live in rental accommodations and other housing accommodates about 2.70% of the population. From the home ownership pattern migration status of the population can be ascertained. It also reveals the financial strength of the people as wealthy people tend to construct pucca houses. From the survey it has been found that majority of people of each income group and each professional group has their own residence.

3.2 Economic Development

Economic activity is the lifeblood of any urban centre. The higher is the economic activity, the higher will be the level of employment and consequent physical growth. So, before going for a development plan, it is necessary to assess the current level, constraint and prospects of economic activities of the Paurashava. The principal criterion to judge the economy of an urban centre is to learn about its main sources of employment. Besides, the number of productive enterprises and tertiary level activities are also the indicators of the pattern and level of economic activities in any area. It is revealed from the sample survey on all categories of people, although 61.95% of the Paurashava area is under agriculture 56.61% are farmers and 9% is agricultural labourers. So a minor portion of people is engaged in agriculture for their livelihood. About 9.72% are engaged in public and private sector services. And 4.60% is not engaged in formal earning activities. Again, 1.44% is housewives and 2.30% unemployed. So, the economic picture of the Paurashava is not very bright. Poverty haunts over one third of its population and activities in the service sector have not yet gained momentum.

3.2.1 Economic Activities

Economic development is the increase in the standard of living of people. Its scope includes the process and policies by which a nation improves the economic, political, and social well-being of its people. Economic development typically involves improvements in a variety of indicators such as rates, life expectancy, and poverty rates. A country's economic development is related to its human development, which encompasses, among other things, health and education. These factors are closely related to economic growth so that development and growth often go together.

Industry

The town actually has a strong industrial base. There are a number of mills, rice mills, chemical mill and saw mills in the town that may grow in the future, and should choose suitable locations in the Master Plan.

Commerce

The commercial activities in the Paurashava are dominated by retail business. The Shailkupa bazar is the largest bazar of the Paurashava. The retailers mostly collect their goods from this bazar, which is also the largest wholesale market.

Services

The household survey shows, 24% of the male adults are engaged in service of different kinds as employment. Among them, 8% work in different public sectors agencies, while 16% serve in private enterprises that include shops and other business enterprises.

Agriculture

Sample survey by the consultant reveals that about 36% of the male income earners in the Paurashava are engaged in farming occupation. Besides about 4% are farm laborers living in the Paurashava. The farmers and farm laborers work in farm lands, both, within and outside the Paurashava. It is evident from land use survey of the Paurashava that about 61.95% of the Paurashava lands are still under agriculture.

Agro-based

As the Paurashava is mostly urban in nature at present, with effective agricultural extension services, the agricultural output can be increased many times to serve the agro-based industries in future. In this backdrop, the major challenge is to strike a balance between urbanization and maintenance of rural nature of the project area.

Informal Sector Economic Activities

Informal sector study was not a part of *ToR*, so the consultant did not conduct any formal study on the informal sector. It can be considered that the informal sector characteristics at Upazila level Paurashava are same all over Bangladesh. It is more prominent, where the concentration of people takes place. Informal sector is a part and parcel of urban economy in developing countries. They have small capital and are usually self-employed. In Shailkupa, the concentration of informal businesses is found around the bazar area, transport terminal and stoppage areas and near the Upazila Complex.

3.2.2 Existing Employment Pattern

The existing employment pattern shows a bias towards trading. Out of the employed male population, more than 19.25% is engaged in business. Since secondary sector employment is seriously lacking in the town, people move to self employment like trading. Trading has been found feasible as employment in the town, mainly, because of

higher level of affordability of the people powered by remittance they receive from abroad regularly.

About 2.30% of the working force is unemployed. The scenario is unlikely to change unless there is any major investment in the industrial sector that can pool a large number of workers and render the local economy more vibrant services.

It is evident from the household survey that there is insignificant employment in the service sector. Of the total 4727 males are employed in government/autonomous organizations, only 273 being female. It is observed that a number of few female population is employed in private company. It is unlikely that public sector jobs will show any major improvement in future. But with the increase in business, and industry there is possibility that private sector jobs will show further increase. Remittance is an important source of income in this region.

3.3 Population

According to Population Census 2011, the total population of Shailkupa Paurashava is 35,271 of which 17,600 (50.10%) is male and 17,600 (49.90%) is female. Ward-wise distribution of population is shown in **Table-3.1**. The population of Shailkupa are Muslim, Hindu, Christian, Buddhist and other. In 2011 the density of population was 1696 per sq.km. As per Population Census 2011, total household of Shailkupa Paurashava is 8,507 and sex ratio is 100. During the period 2001 to 2011, population increased in Shailkupa Upazila at the rate of 1.13% per annum. The Population growth trend of Shailkupa Paurashava is shown in **Table-3.2**.

Table 3.1: Ward-wise Distribution of Population

Ward No.	Area (In Acre)	Population' 2011						Gross Density (ppa)
		Male		Female		Total		
		No.	%	No.	%	No.	%	
1	619.69	1,616	51.73	1,508	48.27	3,124	8.86	5
2	451.01	1,621	50.89	1,564	49.11	3,185	9.03	7
3	426.86	1,442	49.83	1,452	50.17	2,894	8.21	7
4	872.07	2,936	50.24	2,908	49.76	5,844	16.57	7
5	555.20	2,489	49.62	2,527	50.38	5,016	14.22	9
6	1004	1,802	50.17	1,790	49.83	3,592	10.18	4
7	636.85	1,977	49.81	1,992	50.19	3,969	11.25	6
8	195.90	1,427	49.34	1,465	50.66	2,892	8.20	15
9	377.01	2,361	49.65	2,394	50.35	4,755	13.48	13
Total/Avg.	5138.59	17,671	50.10	17,600	49.90	35,271	100	7

Source: BBS, 2011

Table 3.2: Population Growth Trend

Census Year	1991	2001	2011
Population	25,909	31,515	35,271

Source: BBS, 1991, 2001, 2011

3.4 Physical infrastructure development

Physical infrastructures includes different type of natural features e.g. water bodies and man-made structures e.g. buildings, roads, bridges, culverts, canals, drains, embankments, sewerage lines, industries, offices, institutions, health centres, storage/ godowns etc.

From survey report, one river (*Kumar*) and 11 khals were identified as natural water bodies. The length of the river was measured as 3.74 km. In the Shailkupa Paurashava over the last few decades as many as 11,840 number of structures has been developed of which 10,568 residential buildings, 888 commercial buildings, 55 industrial buildings, administrative structures 45, 94 educational buildings, 73 religious structures, 120.66 km roads and 4 bridges, 87 culverts, 2 pipe culverts and 36.87 km drain has been developed. It is found that the physical growth of the town is mainly formed through the circulation network in a linear pattern. There is a cluster of development in the core part of the Paurashava surrounding the main bazar area.

3.5 Utility Services

The following paragraphs present the existing condition of utility services in the Paurashava.

Electricity: The Rural Electrification Board (*REB*) at present is providing electricity facility within the Paurashava area. There is no existing substation within the Paurashava or even in the entire Shailkupa Thana. The power is being distributed from Palli Biddyut Samiti sub-station through transmission line to the Paurashava area.

Electricity poles of different sizes exist in the study area to carry HT and LT line and the total number of poles is 392. 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 6 in number.

Water Supply: Water supply network covers a small the Paurashava area. Only 21% of the total household is under the municipal water supply network and 89.8% of the households are using hand tube wells as main source of water supply for drinking and cooking purpose. 84.4% of the residents use pond water for washing and bathing purpose. About 22 tube wells (*20 shallow & 2 deep*) are available in the entire Paurashava area. According to Paurashava source, the tube well water is contaminated by iron in some areas of the Paurashava.

Telecommunication: There is a telephone exchange having a capacity of 256 lines maintained by Bangladesh Telecommunication Company Limited (*BTCL*) in the Paurashava area. At present there are very few land telephone users in the area. There are also mobile phone networks of GrameenPhone, Robi, Citycell, Banglalink and Teletalk which cover the entire study area.

Solid Waste Management: Solid waste collection and disposal in Shailkupa Paurashava is the responsibility of Paurashava authority. The Paurashava has 2 garbage trucks for collection and transportation of solid waste and there is one dumping site in the Paurashava. There are 20 dustbins spreads over the whole municipality but they are not properly placed and maintained.

Gas Supply: Gas supply is not available in the entire Paurashava area. Few households have been found using Liquid Petroleum Gas (*LPG*) for domestic purpose. There are some LPG retail shops within the Paurashava area serving the local demands.

Drains: Paurashava has 36.87 km drainage network. This drainage network serves mainly Shailkupa Bazar area. Maximum people of the Paurashava deprived from drainage facility.

3.6 Environmental Issues

The term environmental includes rainfall, geological condition, surface and ground water pollution, water bodies, drinking water quality, sanitation, land pollution, air pollution, noise pollution, flooding, water logging, drainage blockage, natural and manmade disasters, collection and disposal of solid waste. Environmental growth is means to minimize the adverse environmental impacts on land pollution, water and air quality and biodiversity resources by energy usage, transport network, waste management, slum improvement, disaster mitigation etc. The urban environment of the Shailkupa Paurashava includes both built and natural environment. Built environment includes waste management, water, air quality, energy usage, transport network, slum improvement and disaster mitigation. The urbanization where the built environment overburdens the natural environment cannot be sustainable.

So in every phase of planning processes all these environmental issues will be evaluated and proper measure will be taken to minimize the adverse environmental impacts on land pollution, water and air quality, biodiversity resources, transport network, waste management, slum improvement, disaster mitigation etc.

3.7 Institutional capacity

In general terms, capacity can be defined as "*the ability to perform functions, solve problems and set and achieve objectives*". Capacity is systemic, so, in some sense, all dimensions of institutional capacity deserve attention. Shailkupa Paurashava consists of 9 wards. It has one elected Mayor, 9 elected councilors and 3 reserve women councilors. There are total 29 numbers of employees in Paurashava (**Table-3.3**).

Table 3.3: List of Existing Manpower

Designation	Existing Manpower
Executive Engineer	1 Person
Secretary	1 Person
Asst. Engineer	1 Person

Designation	Existing Manpower
Sub Asst. Engineer	1 Person
Accountant	1 Person
License Inspector	3 Persons
Tax Collector	1 Person
Typist	1 Person
Conservancy Supervisor	1 Person
Vaccinator	6 Persons
Electrician	3 Persons
Surveyor	1 Person
MLSS	4 Persons
Store Keeper	1 Person
Driver	2 Persons
Night Guard	1 Person

Source: Shailkupa Paurashava, 2012

Existing logistic support of Shailkupa Paurashava is not satisfactory. To run the Paurashava smoothly with its multilateral function, the existing logistic support/ equipment should be improved in such a way that no function can be left. However the existing logistic support/ equipment of Shailkupa Paurashava are given in **Table-3.4** below:

Table 3.4: Logistic support/Equipment of Shailkupa Paurashava

Sl. No.	Type of Equipment	Number
1.	Road Roller (*5-7 Tons*)	2
2.	Garbage Truck	2
3.	Van	2
4.	Computer	7

Source: Shailkupa Paurashava, 2012

The institutional capacity of the Shailkupa Paurashava at present is very limited. It is observed that the staff numbers are not sufficient with regards to work volume (*duty and responsibility*) of Paurashava. To commensurate with the modern scientific advancement the Paurashava is lagging behind in terms of logistics. Its computer facility, GIS software, use of satellite image, modern survey equipment, internet etc. are deplorable. To run the Paurashava smoothly with its multilateral function, the existing logistic support/ equipment should be improved in such a way that no function can be left.

The Paurashavas or Municipalities are classified according to financial strength/ Annual Revenue Earning by the Ministry of Local Government, Rural Development and Cooperative. The existing classification of all municipalities and their criteria are shown in **Table-3.5**. Shailkupa falls under **A-Class** Paurashava having revenue earning of greater than Tk. 6 million by the classification of the Ministry. The total earning of the Paurashava for the fiscal year 2011-2012 is Tk. 204004750 and expenditure Tk. 12581138. The details are given in **Table-3.6**.

Table 3.5: Hierarchy of Paurashavas (Municipalities)

Category of Paurashavas (Municipalities)	Annual Revenue Earning
Class-A	6 million +
Class-B	2 million
Class-C	Less than 2 million

Source: LGED, 2005

Table 3.6: Budget for the Financial Year 2011-2012

Type of Earning	Total Amount (Taka)	Type of Expenditure	Total Amount (Taka)
Revenue Earning	193323301	Revenue Expenditure	2172008
Development Earning	8509441	Development Expenditure	8399130
Capital Earning	2172008	Capital Expenditure	2010000
Total	204004750	Total	12581138

Source: Shailkupa Paurashava, 2012

At present there is no Town Planning personnel in Shailkupa Paurashava. All town planning works have been performed by the Engineering Section headed by one Sub-Assistant Engineer. At least three Town Planners are required to perform the planning works as well as guide and control physical development of the Paurashava in a planned manner. The existing institutional capacity of the Paurashava should be enhanced.

3.8 Urban Growth Area

Shailkupa Paurashava came into existence on 2013 as an class **"A"** type Paurashava. Since the inception of Paurashava people started to migrate from the neighbouring Upazilas to Shailkupa Paurashava with a view to get better urban facilities. From that time different Govt. offices have been established and at the same time business also have been expanded.

Physical growth has been taken place radially following the connecting transport networks. Till now as many as 11,840 structures have been established. During delineation of Paurashava area and physical feature survey it is observed that, the physical growth is mainly proceeding towards east-west direction of existing Paurashava beside Kumar river, the gradual physical growth of Shailkupa Paurashava town also identified along all the transport routes.

Shailkupa Paurashava area and its boundary have been clearly defined by the Government through gazette notification at the time of declaration of Paurashava. In the gazette notification of 12th May 1992 the covered area are shown by the full/part mouza maps together with individual plot numbers covering an area of 20.80 sq. km. Therefore, Paurashava area and boundary is well defined.

3.9 Catchment area

Catchment area of any urban centre is the area over which its influence extends. From observation, it is learnt that the zone of influence of such towns do not extend beyond a few kilometers wherefrom people commute to the town to purchase their daily necessities and for administrative, legal and other businesses. The zone of influence of

Shailkupa is very likely to be overlapped because of the proximity of other small towns nearby.

However, the influencial area of Shailkupa Paurashava is delineated along the transport routes as Shailkupa-Garaganj road, Shailkupa-Santidanga road, Dhubrakul-Chandat road, Shailkupa-Gobindapur road and Shailkupa-Sreepur road. Shailkupa Paurashava area and 15 Union Parishads of Shailkupa Upazila fall under the catchment area of the town.

3.10 Land use and Urban Services

Shailkupa urban centre and the peripheral and fringe areas of this urban centre are in continuous process of changes. As such, the land use character of the area is expected to be of non-rural in nature and found to comprise activities commensurating with urban living. The spatial structure and land use pattern of the project area have been mostly the result of natural growth. Here although a development took place during the last decade yet the project area is still predominantly agricultural in character. Urban growth is found in mainly middle and southern part of the project area. Residential rural settlements are also found along the major roads and in almost scattered manner in the peripheral area.

Agricultural Land Use

Agricultural use is dominant land use in Shailkupa Paurashava. Around 3183.62 acres of land of the Paurashava is under agricultural use. It appears from field survey that Ward 6 has maximum agricultural land (763.63 acres), which is 24.01% of the total agricultural land of the Paurashava. Lowest amount of agricultural land is found in Ward 8 (0.48%).

Residential Land Use

Total residential land of Shailkupa Paurashava is 1469.93 acres, which is 28.61% of total area. Ward No. 4 contains the highest amount of residential land use (221.76 acres) where as Ward No. 8 covers the lowest (102.04 acres) of residential lands.

Commercial Land Use

The commercial activities have been occupied 33.72 acres of land in the project area, which is insufficient covering about 0.66% of the total land of the project area. It includes wholesale market, retail sale market, kitchen market, corner shops etc.

Water body

In all 233.51 acres of land are covered by water bodies which represents about 4.54% of the project area. Water bodies include beel, ponds, ditches, khal, irrigation canal and river. Major water bodies of the area are the ponds, ditches and khals, which are distributed scatteredly all over the project area.

Circulation Network

Circulation Network occupies 2.15% land of the project area. Total area under this use amounts to 110.58 acres. The main circulation network is road.

Education and Research Land Use

Educational facility occupied 0.24% of the project area that covered 12.17 acres of land. Educational institutions are generally kindergarten, government and non-government primary school, high schools, college, madrasha, computer training institute, tutorial coaching centre etc.

Industrial Land Use

Manufacturing and Processing land use occupies 25.88 acres of land and which is 0.50% of the total land of the project area. Chemical, Saw and Rice mils are the main industry of Shailkupa Paurashava, which cover almost full part of this category.

Transportation Facilities

A total of 2.57 acres of land are occupied by Transportation facilities which is 0.05% of the project area.

Urban Green Space

The existing land under urban green space is 2.06 acres covering 0.04% of the total area.

Essential Utilities

Essential utilities and services which the Shailkupa Paurashava has been performing may be considered as urban service. Those utilities are Electric supply, Water supply, Solid waste management and Telecommunication.

3.11 Paurashava's Functional Linkage with the Regional and National Network

Any development initiative at the local level must relate to the national level plans in order to achieve cohesion and integrity with overall development of the country to attain the national development objectives.

The present system of national level planning hardly links the local level plans. The present system of allocation of resources in national development budget is a top down approach, which is highly influenced by political objectives. As a result, urban sector is not yet considered a priority sector and due to resource constraint, many problems of the Paurashavas remain unresolved. Therefore, it is important to establish a linkage between the local plans and the national development plan so that aspirations of the people can be realized. National development plans are prepared considering the overall needs and aspirations of the country with respect to different sectors of development.

This necessitates for a bottom up approach of development planning and the budget allocation should be made according to the choice of the local governments who are accountable to the Paurashava people directly. Budget should be allocated according to the priority list of the projects prepared by the Paurashava that is supposed to reflect the needs of the Paurashava people as the list can be prepared by the counselors and the Mayor who are directly elected by the people.

The aim of the Structure Plan is to prepare a development plan for Shailkupa Paurashava with full participation of its stakeholders. In the process of planning, a large number of development projects have been identified in different sectors. Implementation of development projects will improve infrastructure and services and will create an environment for utilization of local resources. This will attract more investment in the locality to generate new employment. New employment will generate income for the poor people and shall improve the poverty situation, which is the main objective of PRSP. New jobs will also be created during implementation of various development projects of the Paurashava prepared under the master plan. New and improved road infrastructure will increase mobility *vis-a-vis* economic activities of the Paurashava that will help to address the problems of unemployment.

The current program of Paurashava Planning helps to address urban poverty through adequate steps taken up to accelerate urban infrastructure development based on the Shailkupa Paurashava plan. The new developments will induce new investments in trade and industry and lead to generation of more employment in the service, construction, transport and informal sectors. This will directly assist in reducing poverty. It will help absorb additional work force of rural areas as a result of natural growth of population. Agricultural sector has limitations in absorbing labor force. A map showing linkage of Shailkupa Paurashava in the regional and national set up is provided in **Map-3.1** below.

Map 3.1: Linkage of the Paurashava in the regional and national set up

3.12 Role of Agencies for Different Sectoral Activities

Local Government Engineering Department (*LGED*) is one of the largest public sector organizations in Bangladesh entrusted for planning and implementation of local level and small scale water resources infrastructure development programs. LGED works closely with the local stakeholders to ensure people's participation and bottom–up planning approach in all stages of project implementation cycle. LGED promotes labour-based technology to create employment opportunity at local level and uses local materials in construction and maintenance to optimize the project implementation cost with preserving the desired quality. LGED works in a wide range of diversified programs like construction of roads, bridges/ culverts and markets to social mobilization, empowerment and environmental protection.

Roads & Highways Department (*RHD*) is responsible for the construction, maintenance and management of the National, Regional and Zila road network and some bridges under the Bangladesh Government. Presently Zila road passing through the Paurashava area is executing by the RHD department.

Implementation of Flood Control and Drainage (*FCD*) programme and Flood Control, Drainage and Irrigation (*FCDI*) programme falls under the responsibility of Bangladesh Water Development Board (*BWDB*). BWDB is playing vital role in providing flood control, drainage and irrigation facilities through construction of embankment, irrigation canals, drainage channels, bridges, sluice, regulator and other water control structures in the Paurashava vicinity as well as other areas of the country.

In Paurashava areas the DPHE solely or jointly with the Paurashava is responsible for Water Supply & Sanitation services. In addition, DPHE is responsible for assisting the Paurashavas through infrastructure development and technical assistance. To strengthen water testing facilities through establishment of laboratories, carryout Hydro-geological investigations in search of safe source of water supply and promote social mobilization for awareness raising towards proper management of water supply & sanitation infrastructure and promotion of personal hygiene practices are also some of the major responsibilities of DPHE.

The Power Development Board (*PDB*) supplies electricity to Shailkupa from a substation located at Jhenaidah district. Both the PDB and Rural Electrification Board (*REB*) have the responsibility for distribution of electricity to Shailkupa Upazila. Out of total connections within the Paurashava the PDB has connected about 75% and rest by REB.

Ministry of education is responsible for construction of educational institutions at the Upazila level. The Paurashava Authority has the responsibility to provide piped water supply, construct hats/bazar, kitchen market, auditorium, community centre, street lighting and other civic amenities. Among other sectoral agencies, Department of

Agricultural Extension, Fisheries Department, Veterinary Department under Upazila Parishad and Zila Parishad, PWD, NGO's are also involved in the provision of concerned services and facilities.

The following Sectoral/Sub-Sectoral Agencies are involved in the development activities of Shailkupa Paurashava **(Table-3.7)**.

Table 3.7: Sectoral/Sub-Sectoral Agencies of Shailkupa Paurashava

Name of Agencies	Type of works done
Shailkupa Upazila Parishad (*through PIO*)	- Construction of Pucca, Semi-pucca and Katcha Roads - Pond Excavation - Construction of earthen Embankment
Roads & Highway Dept.	- Construction of Zila Road
LGED	- Construction of Tertiary Roads, drains
Dept. of Public Health Engineering (*DPHE*)	Provide low-cost water-sealed latrine Piped Water Supply Provide Tube Well (*Tara pump*) Simple Hand Tube Well
Zila Parishad	- Construction of Educational Building
Bangladesh Water Development Board	- Construction of Embankment with RCC blocks, construction of Bridges / Culvert and water control structures
PDB / REB	Supply of electricity
Ministry of Education	Construction of Educational Institutions
Ministry of Health and Family Planning	Providing health facilities
Public Works Department (*PWD*)	Contraction and maintenance of public buildings

CHAPTER-4

CRITICAL ISSUES FOR PLANNING

Deficiency in infrastructure and services is one of the major critical problems of the Paurashavas in Bangladesh, and Shailkupa is no exception. The reasons for such deficiency may vary, but are mostly linked with the institutional capacity and resource potential of the Paurashavas. The institutional capacity of each similar category Paurashava in terms of manpower and other logistics at present can be same across the country, but their efficiency and performance in practice may vary for a variety of reasons. **Chapter-4** describes the critical issues for planning based on the existing conditions in respect of Socio-economic and Demographic issues, Transport and Communication, Urban Utilities, Drainage and Environment, related other issues namely disaster, land use control, law and regulation etc. The weaknesses in the present development processes are also taken into consideration to identify the critical issues for planning at Shailkupa Paurashava.

4.1 Socio-Economic and Demographic Issues

Most of the Paurashavas in Bangladesh are basically urban centres with direct links to rural areas. There are significant differences in the standard of socio-economic well being and demographic characteristics of these small towns with large cities in the country. Most of these Paurashava towns have small population, not enough to sustain economic growth to render services and facilities for quality of life needed in an urban environment. As a result, qualities in socio-cultural and demographic matters suffer from inadequacies in their requirements of facilities and services of various kinds. Since Shailkupa Paurashava has all such problems and shortcomings, in the preparation of various components of the Master Plan, this aspect of reality in development has to be addressed for sustainable solutions.

4.2 Transportation and Communication

Transportation and communication network plays very important role in the growth pattern of both urban and rural settlements and their socio-economic and environmental development. Houses and other establishments always prefer road side lands to have easy access to different places and functions. The transportation and communication network at Shailkupa Paurashava is not yet planned and developed to serve a town. In Shailkupa the existing traffic and transportation infrastructures are confined mainly with the existing road network. The project area is served by 120.66 km of roads. Out of the total length of roads 29.49 km are pucca, 47.20 km are semi-pucca and 43.97 km are katcha. The Paurashava has a very low traffic volume to sustain high cost of development in this sector, particularly in areas of low population density and scattered settlements. However, without planning a transport network for the Paurashava area as a whole, a

standard transport network and an efficient traffic management system for the future can not be ensured. The nature of problems and deficiencies are identified below.

a. Unplanned and Narrow Road

Roads in the town are being developed without using any planning standard and network plan. As a result, narrow roads with tortuous pattern are common. Narrow roads and poor maintenance of roads are major problems for traffic movement in some parts of the Paurashava. New houses and other structures are cropping up along these sub-standard narrow roads. This is likely to poise traffic movement problems in the future, when development becomes more intense and density of population increases. The existing narrow roads require widening and improvements of pavement. Some road segments within the Paurashava are built in an unplanned manner. These segments will require improvement as per future traffic volume and required space for turning lane in the intersections.

b. Traffic Congestion

A very level of vehicular traffic in the streets of the town at present does not pose a threat for congestion in the near future. However, occasional congestions are found to arise from non-motorized traffic at selected locations, where public assembly is profound, especially in Kabirpur Mor. At present such congestions happen due to poor designing of the intersections. The slow moving rickshaws, on street parking and on street loading-unloading of goods are found to be the major sources of traffic congestion.

Manually operated rickshaw is a cozy and cheap traffic mode that can take passengers to their door steps. It is, therefore, a very popular mode that requires special planning attention in the design of transportation network and individual roads. Walking and cycling is encouraged in contemporary town planning practices to create healthy environment for all. Pedestrian safety should be an important element in the design of roads and other related infrastructure. These aspects require special attention in the Master Plan of Shailkupa Paurashava.

Reason for Congestion

- Lack of management is the prime reason for traffic congestion. There is a common tendency among the rickshaw pullers to disobey rules. They roam about the busy areas in search of passengers and park rickshaws at critical points leading to congestion.
- There is no proper and adequate space for parking auto-rickshaws and tempos. They are parked on the road. On road waiting for trips by these vehicles is also a source of congestion.
- Local buses often take passengers from wherever they find. In the same way, they disembark passengers according to their desires. These practices hamper smooth traffic movement.

c. Bus, Truck, and Tempo Terminal/Stand

Shailkupa Paurashava has no area for bus terminal and truck terminal. But it has no designated parking space for tempos and slow moving vehicles, such as rickshaws, van or cart. For the planned development of township in the future, these facilities are to be provided at suitable locations.

4.3 Urban Utilities

A key issue related to the sustainable development of planning area providing a minimum quality and standard of living, pertains to the availability of and accessibility to basic infrastructure facilities, *viz.* water, power, sewerage, drainage and solid waste management. The present state of infrastructure problems in the Paurashava may become a cause of crisis. At present, state of telecommunications and power scenario in Shailkupa Paurashava is not so good. There is no water and gas supply system in this Paurashava. Thus critical need of advance action and arrangement is required for adequate provision of physical infrastructure.

4.4 Drainage and Environment

Majority of the population at Shailkupa Paurashava is deprived of drainage facility. Uncollected waste is washed out into the roadside drains and natural canals. Blockage of drains by solid waste reduces the carrying capacity of drains and natural canals and become a source of pollution. Paurashava has very limited resources to clean the drains. It has been observed that in some areas, domestic sewage conveys directly to the water channels. Water logging is a problem at some parts of Shailkupa Paurashava, causing water logging for 5-7 days each time a heavy rainfall occurs between June and November every year.

The sources of surface water pollution are domestic waste, unhealthy sanitation and extensive use of fertilizer in the agriculture. Condition of solid waste management at Shailkupa Paurashava is very poor. There are 20 dustbins and one dumping site. Two trucks are used to collect solid waste. Hospital waste is dumped to their own dustbin. Garbage of kitchen markets is dumped to nearby dustbins. The present conditions demand substantial improvement to ensure desirable environment.

4.5 Disaster Issues

Bangladesh is a land of abundant and regular rainfall and the annual inundation of the rivers. Shailkupa is not susceptible to any kind of major disaster like flood, cyclone, earthquake, Nor'westers and tornado, landslide, erosion, drought etc. Some natural hazards and calamities like flood, tornado and drought cause loss of property, livestock and agricultural production in almost every year imposing an impact on human life. Shailkupa Paurashava is practically free from tornado. The whole district is practically free from drought. Water, however, subsides rapidly and the damage caused is not mostly very serious. Although it is located along the bank of Kumar River, Shailkupa

Paurashava is not an erosion prone area due to steady flow and low river stage. The Paurashava was not affected by recent flood.

4.6 Land Use Control

A Land Use Plan of the town was prepared in 1987 by Urban Development Directorate (*UDD*), but it was never brought into practice due to lack of regulatory measure for implementation. Instead, discretionary decisions are used in case of land use decisions. The Land Use Plan at that time was prepared for the Upazila Headquarters by Urban Development Directorate, but remained under the administrative control of the Ministry of Local Government, Rural Development and Cooperative. So conflict and lack of legal basis in implementation prevailed. In the present context of socio-economic demand and land use dynamics in the country, development of a Paurashava without a Master Plan can not be imagined. The preparation of Master Plan is mandatory as per Local Government (Paurashava) Act, 2009.

4.7 Laws and Regulations

There is no provision in the Industrial Policy, 2005 regarding setting up of industrial estate or special economic zones to reduce environment pollution and make service provision easier. Thus it is a critical planning issue pertinent to the regulations of industrial establishment. National Environmental Policy, 1992 does not provide guidelines for controlling of pollution in all kinds of water bodies by municipal, industrial waste and toxic materials and shifting of industries from residential areas. This point is a critical issue that should be considered in the planning process of environmental management.

Vast agricultural land was incorporated in the urban area during declaration of the Paurashava without considering fertility or agricultural productivity and requirement of land for providing urban services and land uses. According to Agricultural Policy 1999, acquisition of land in excess of requirement for non-agricultural purposes will be discouraged. Thus implementation of development proposals in the light of Local Government (Paurashava) Act, 2009 will conflict with the Agricultural Policy 1999.

The Government of Bangladesh formulated the first ever housing policy of the country in 1993. Despite formulation of National Housing Policy 1993, no effective programme and projects have been undertaken. National Housing Authority has been formed but it is yet to draw up any workable programme to realise national housing policy.

The policies, laws, by-laws, acts and regulations relevant to the implementation of the Structure plan of Shailkupa Paurashava are executed, exercised and implemented by different departments, ministries and authorities. There is no coordination among these departments, ministries and authorities regarding inter-related policies, laws and regulations. This is the most critical issue to be considered in formulation of the Structure Plan.

4.8 Existing Problems and Weaknesses in the Development

The two major problems that currently exist in Shailkupa Paurashava include the following:

- The Paurashava town has a weak economic and revenue base that does not support improvement in the socio-economic well being of the people. The Paurashava authority for lack of resources, fails to make required investments in the development of physical infrastructure to improve the quality of life of the people living in the town.
- The Paurashava has also no definite plan for the development of various physical infrastructures in a planned manner. With lack of resources, it also lacks in professionally skilled manpower to carry out development in a planned way.

Thus for making this Paurashava a viable urban centre, attention should be paid toward cost-effective development of all of its required infrastructure in phases, with the help of professionally skilled manpower and utilizing the newly prepared Master Plan as an important tool for all sorts of development.

CHAPTER-5

REVIEW OF POLICIES, LAWS AND REGULATIONS

5.1 Introduction

The urban planning and land use regulations *per se* are essential for municipal development. They impact on land market favorably or unfavorably and result in social benefits and costs depending on their nature and the specific contexts in which they are applied. Policies, regulations and processes that facilitate availability of land and its uses for planned development at affordable costs need to be continued and those lead to contrary results need to be eliminated or modified.

5.2 Review of Relevant National Policies

The various existing policies, regulations and laws of the country have direct and indirect effects on the preparation and implementation of Master Plans of the Paurashavas in the country. These are briefly reviewed in this chapter to examine their adherence with the Master Plans of the Paurashavas.

5.2.1 Directives of the Local Government (Paurashava) Act, 2009 for Preparing the Master Plan

The Paurashava Ordinances at different times since 1960's till the present time have iterated that a Paurashava as it gets established must prepare its Master Plan for planned development of the municipal town. So far, three ordinances have been made in the year 1967, 1977 and 2008, all suggesting for planned development. The Paurashava Ordinance 2008 was later modified and enacted as Local Government (Paurashava) Act, 2009 in the national Parliament on 6, October, 2009. The Local Government (Paurashava) Act, 2009 made provision for having the Master Plan prepared by a Paurashava within five years of its inception. The Master Plan of a Paurashava town is aimed for ensuring planned development, and should include the following:

- Survey of history, detailed statistical information, public service activities and other mentioned subjects of the Paurashava;
- Development, extension and up-gradation of any area within the Paurashava; and
- Control and regulation of development of any land, any building construction and renovation within the Paurashava.

Actions Suggested in the Act to Prepare Master Plan

The Local Government (Paurashava) Act, 2009 suggests for having qualified Town Planner in it's Organogram of Manpower to undertake the job of preparing the Master Plan of the Paurashava. Town Planner is not available in the Paurashava, the Paurashava may require a competent national government authority to prepare such plan for the Paurashava. The

Act also makes it contingent to form a Town Planning Committee within the capacity of it's manpower to execute the Master Plan of the Paurashava Town. Shailkupa Paurashava has no Town Planning Committee at the moment. This makes the Paurashava dependent on having the Master Plan currently being prepared by LGED.

5.2.2 National Land Use Policy 2001

To safeguard the use of its land resources, particularly the valuable agricultural land of the country, the government in 2001 declared the National Land Use Policy. The policy proposed for the preparation of national land use plan, which is very much relevant to the current plan of the Paurashava. The land use plan is to be based on the criteria of land productivity, land capability and land suitability, use and requirement of land by agriculture, forestry, industrialization, urbanization and housing. Following are the key issues of the national land use plan:

- Execution of coordinated land conservation programs aimed at prevention of desertification and weathering of land, conservation of land fertility, development and conservation of land.
- Prevention of destroying the landscape by earth cutting, excavation and removal of land.
- Formulation and effective execution of Land Use Plan in order to ensure planned use of land.
- Payment of compensation to those who will be affected by land weathering and land acquisition by the government.
- Monitoring, survey and research on desertification, land reclamation, prevention of weathering of land, conservation and development of land and watershed areas.

The policy emphasizes on the planned and the best use of land, and stressed on the most intensive use of this scarce resources of the country. The policy aims to introduce '*land use zoning*' based on particular characteristics of land, prevent unplanned expansion of residential areas and control of indiscriminate growth of industrial and commercial activities. In absence of execution, the situation in land use and land management is severely being deteriorated.

5.2.3 National Housing Policy, 1993

The Government of Bangladesh formulated the first ever housing policy of the country in 1993. The priority of the government is to create affordable housing, which might be possible through controlling unplanned and haphazard housing area development. The policy is committed to encourage private developers in land and infrastructure development, and house construction. The policy also made commitment to provide government assistance on participatory housing infrastructure development involving the community, NGOs, CBOs, private developers and social welfare organizations.

The policy declares that in housing activities, the government will continue to remain as a facilitator in housing sector. The government intends to provide housing only to the poor and the rootless classes of the society. The policy makes commitments to encourage private organizations, NGOs and CBOs in housing development, income generation and environmental improvement under local planning. The preparation of Master Plan of the Paurashavas is, therefore, a step forward to address the various development issues including housing for mass people at local level.

5.2.4 Population Policy 2004

Prepared in 2004, the Population Policy of Bangladesh responds to the critical need to deal with the complex national population problem in a holistic way. It aims to build national consensus and synergy among institutions: public, private, civil society and NGOs about the problem.

The objectives of the National Population Policy are to improve the living standard of the people through making a desirable balance between population and development. The Policy proposals can broadly be divided into four sectors, human resources development, decentralization of population activities, participation of NGOs and private sector in population planning. The population policy aims to create a large skilled workforce, emphasizing on education and training strategies.

The policy calls for decentralization of population activities and ensure people's participation through decentralization of services and devolution of power to the local levels. The policy aims to prepare Action Plan through participation of local elites, opinion makers, representatives of poorer section of the society along with the local level government officials. With a view to give a holistic approach, the population policy calls for making the NGOs and private sector as important partners in population activities at various levels.

5.2.5 Transportation Policy 2004

Prepared in 2004, following are the policy objectives of Transport Policy:

- To provide a safe and dependable transport service for all.
- Removal of unnecessary control and formulation of laws and regulations conducive to providing services.
- Fare control and reduction of transport cost of goods for export.
- Determining the roles of the Government sector and the private sector.
- To maintain an economic and environmental balance.
- To ensure maximum utilization of Government funds.
- Expansion of the role of transport in the ever increasing economic activities.

- Growth of traffic commensurate with economic development.
- Introduction of an integrated transport system and provision of alternate transport systems.

The aim is to encourage greater private sector participation with national ownership of road and rail infrastructure. Lease of infrastructure may be allowed on long term basis. The Government is interested to establish a user role within its transport planning process. The Government intends to make arrangements to realize the cost of transport operation and road maintenance from road users through new fiscal policies and protect public interests. The Government will regulate tariffs for passenger and goods both in road and rail transport.

5.2.6 National Environment Policy 1992

Government declared an environmental policy in 1992 with a view to safeguard the national environment. The main objectives of the policy are:

- To promote natural balance and overall development by means of conservation and development of environment.
- To save the country from natural disaster.
- To identify and control all sources of pollution and degradation.
- To ensure environment friendly development in all sectors.
- To ensure sustainable, long term and environment friendly use of all national resources.
- To get involved with all international initiatives on environmental issues.

The comprehensive environmental policy covers as many as 15 sectors of development namely, agriculture, industry, health and health promotion, energy, water resources, flood control and irrigation, land, forest, wild life and biodiversity, fish and animal resources, food, coastal and maritime environment, transport and communication, housing and urbanization, population, education and public awareness, science, technology and research, legal framework, institutional structure. The consultant highlights only those sectors that have relevance to urban development and planning.

Industrial Sector

The following environmental measures are important:

- Potential polluting industries must incorporate control measures in its set up.
- All industries must conduct EIA and take pollution control measures.
- All industries in residential areas to be gradually shifted and new locations to be identified for planned industrial development.

- The industries producing pollutants should have their own system of pollution monitoring.
- Recycling of waste in order to reduce the volume of waste.
- Safeguard health of industrial workers.

Health Sector

The following environmental issues are important:

- Supply of safe drinking water in the Paurashava area and introduction of low cost healthy sanitation system.
- Control of pollution in all kinds of water bodies by municipal, industrial and toxic materials.
- Ban on carrying waste during day time and in open garbage trucks.
- Steps to be taken to protect public health and environment from all activities harmful for human health.
- Inclusion of environment in the academic syllabi.

Energy Sector

The following are some relevant policies:

- Large scale for introduction of improved cooker and wide dissemination of the technology to conserve energy and save environment.
- Promotion of biogas, solar energy, mini hydro electric unit and wind mill as sources of energy.
- Take up measures to reduce the amount of harmful elements in fuel including, sulfur in diesel and lead in petrol.
- Care has to be taken so that use and transformation of primary and commercial energy does not create any adverse impact on the environmental balance.
- Appropriate measures have to be taken during extraction and distribution of different natural resources like, oil, gas coal, peat so that they do not create any adverse impact on air, water, land, hydrological balance and the eco-system.
- Care has to be taken during giving fitness certificate to vehicles that emit black smoke. Mobile courts will have to be arranged to enforce the relevant legal provisions.

Transport and Communication Sector

The important aspects are:

- Care to be taken to make the road infrastructure development congenial to environment and the development of roads does not impede drainage of water.
- Appropriate measure to be taken so that the passengers and the transport do not endanger public health by indiscriminate throwing of solid waste and defecation.
- The rail, road and water transport must adopt measures to control emission of excessive black smoke.
- Creation of public awareness about the effect of pollution of water.
- Control on water pollution to be ensured in inland river ports and dockyards.
- Encourage railway rolling stocks that generate less pollution.
- Forestation on both sides of railways and roads.

Population Sector

The important aspects are:

- Conduct study on the impact of population growth on environment and take appropriate measures to mitigate the problems of population growth.
- Prepare manpower utilization plan to make planned and effective use of human resources congenial to environment.
- Emphasize participation of women in environment conservation.
- Appropriate measures are needed to safeguard health of the poor and save them from the adverse effects of environmental degradation.

5.2.7 Industrial Policy 2005

The key aspects of the Industrial Policy 2005 are to:

- Set up planned industries considering the real domestic demand, prospect of exporting goods abroad, and discouraging unplanned industries in the light of the past experience.
- Accept private initiatives as the main driving force of economic development and uphold the government's facilitating role in creating a favourable atmosphere for private investments.
- Take necessary initiatives to establish industries on state initiative in those sectors that are considered very important and essential, where private entrepreneurs are not forthcoming.

- Care to the needs of consumer satisfaction of the local products; measures to be undertaken to: produce quality products, diversify goods, and provide support for enhancing productivity using appropriate and advanced technology.
- Provide inspiration for the speedy expansion of cottage industries and SMEs, and for further investment in these sectors so that new employment opportunities are generated, unemployment reduced and poverty alleviation programs made available.
- Prioritize the expansion and development of agro-based and agricultural processing industries, and assist in the expansion of poultry, dairy and goat-sheep industry as agricultural industries.
- Provide women entrepreneurs with all necessary assistance in establishing industries in various sectors.
- Provide all necessary assistance for producing environment-friendly product with the objective to creating a pollution-free environment in the industrial sector.
- Enrich the industrial sector with the proper utilization of various natural and mineral resources.

5.2.8 National Tourism Policy 1992 and 2010

Recognizing the contribution of tourism to the socio-economic development of the country, the government framed the National Tourism Policy in 1992. The government in a gazette notification in May 2010 declared that the government may declare any potential site as a tourist area and if declared so, any development within the area will require formal permission from the government. The attractions of tourism can be varied, and the major policy thrusts for the sector are:

- To create interest in tourism among the people
- To preserve, protect, develop and maintain tourism resources
- To take steps for poverty-alleviation through creating employment
- To build a positive image of the area concerned
- To identify sectors for private capital investment
- To arrange entertainment and recreation
- To strengthen solidarity and integrity among the peoples

5.2.9 Agriculture Policy 1999

Agriculture Policy of Bangladesh was framed in 1999. A new policy is currently under preparation. The following are the important considerations in the 1999 Agriculture Policy.

The major issues dealt within the policy are, seed, fertilizer, irrigation, pest management, agricultural research, extension services, marketing of agro-products, land use, education and training, environment and agriculture, women and agriculture, coordination of various agencies engaged in agricultural development. Most of these issues are not relevant to the current Master Plan. The only relevant issue is the land use. So, review has been carried out on the land use only. The Policy stresses on all possible steps to ensure optimum use of land. Its use has to be compatible with the overall goals of socio-economic services and utility provisions. The policy targeted to take the following steps to ensure planned utilization of land:

- Land zoning programme will be taken up by the Soil Resources Development Institute (*SRDI*) on a priority basis. Integrated approach of SRDI will be further strengthened for this purpose.
- To ensure maximum utilization of land, bottom up planning through people's participation will be started from the mouza or village level.
- Measures can be taken to stop fertile agricultural land being used for non-agricultural purposes, such as private construction, house building, brickfield, etc.
- Acquisition of land in excess of requirement for non-agricultural purposes will be discouraged.

About 2% of agricultural lands are being converted into non-agricultural use every year. In a country of constantly growing population, withdrawal of land from agriculture will affect food production. So it is necessary to safeguard farm land from conversion. But this vital issue has been partially addressed in the policy. It states only about fertile land and not agricultural in general. Government has not framed any effective mechanism to discourage acquisition of land in access of requirement for non-agricultural purpose. To protect agricultural land, immediate steps are necessary to delineate agricultural lands. This issue has not been covered in the policy. It has been found that some areas of agricultural lands are unnecessarily being included within Paurashava. Sometimes, it is about 39% of the total Paurashava area.

5.2.10 Urban Forest Policy 1994

Representing an amendment of the forest policy of 1979, current national forest policy was enacted in 1994 and officially announced on 31st May 1995. The policy was formulated to initiate a 20-year Forestry Master Plan (*FMP*). The plan provides a framework for optimizing the forestry sector's ability to stabilize environmental conditions and assist economic and social development. Three imperatives were identified: sustainability, efficiency and people's participation. Important objectives are:

- To afforest about 20% of the total area of the country by initiating various aforestation programmes in forest lands, fallow lands, lands not useful for

agriculture, hinter lands and other possible areas to meet the basic needs of the present and future generations and to ensure greater contribution of the forestry sector to economic development;

- To enrich biodiversity in the existing degraded forests by conserving the remaining natural habitats of birds and animals.
- To strengthen agriculture by extending assistance to those sectors related with forest development, especially by conserving land and water resources.
- To provide for and implement aforestation programmes on both public and private lands.

The policy statements which are most relevant to local participatory forestry are as follows:

- Tree growing by communities, local groups or individual families on roadsides, windbreaks, canal/ banks and other public or marginal lands will be promoted through NGOs and relevant state agencies;
- Buffer zones attached to protected areas may be allocated for tree farming and agro-forestry on a long term lease basis;
- The State will provide technical assistance and financial support to promote all forms of homestead forestry;
- Cottage and small scale labor intensive industries, which contribute to the local economy and process wood and other forest based raw materials, will be promoted;
- The traditional rights of people living within and adjacent to designated forest areas will be maintained and their forest-related cultural values and religious beliefs will be respected.

5.2.11 National Plan for Disaster Management, 2008-15

National Plan for Disaster Management 2008-2015 is an outcome of the national and international commitments of the Government of Bangladesh (*GoB*) for addressing the disaster risks comprehensively. The plan is developed to reduce the vulnerability of the poor to the effects of natural, environmental and human induced hazards to a manageable and acceptable humanitarian level. The objectives of this Plan are to:

- Align the strategic direction of disaster management programs with national priorities and international commitments.
- Articulate the vision and goals for disaster management
- Outline the strategic direction and priorities to guide the design and implementation of disaster management policies and programs.

- Create a cohesive and well-coordinated programming framework incorporating government, non-government and private sector.
- Ensure that disaster management has a comprehensive and all-hazards focus comprising disaster risk reduction and emergency response.
- Illustrate to other ministries, NGOs, civil society and the private sector how their work can contribute to the achievements of the strategic goals and government vision on disaster management.

A holistic approach for disaster management has been emphasized to work together with all the stakeholders and build strategic, scientific and implementation partnerships with all the relevant government departments and agencies, other key non-government players including NGOs, academic and technical institutions, the private sector and the donors. The role of Government is mainly to ensure risk reduction and comprehensive disaster management.

5.2.12 National Plan of Action for Person's with Disabilities (PWDs) as well as Autism, 1995

In line with the Government policy the Department of Social Services under the Ministry of Social Welfare has an enthusiastic vision & mission to address the social issues relating to Person's with Disabilities (*PWDs*) as well as Autism. The National policy for the persons with disability, 1995 calls for social protection and ensured the rights of the vulnerable groups. In the recent time, dynamic and sustainable steps have been taken for the PWDs. The steps are:

- To establish separate ticket counters in railway station, bus terminals, river ports, steamer terminal, airport and airways office to facilitate easy availability of tickets for the PWDs.
- To maintain reserve seats in the bus, train and water transports for PWDs.
- To fill up 10% reserved quota for employment in government jobs by orphans and PWDs.
- To construct a ramp in all the government offices to facilitate easy movement of the PWDs.
- To withdraw the existing restrictions regarding appointment of PWDs in the Govt. class I & class II jobs, and arrange micro-credit for PWDs by all the Nationalized Commercial Banks (*NCBs*).

5.2.13 Review of Relevant Laws and Regulations

5.2.13.1 The Act (36 of 2000) for Conservation of Play field, Open space, Park and Natural Water Reservoir in Mega City, Divisional Town, District Town and Paurashavas of Bangladesh

According to the section 5 of the Act, any land having such use as play field, park and natural reservoir can not be changed or can not be used for any other purpose(s).

However, in absence of Paurashava Master Plan, the Act can not be properly applied. This emphasizes upon having Master Plan for each Paurashava.

In the existing provision of the Act, any person violating the Act may be liable to punishment up to 5 years of imprisonment or Tk. 50,000 fine or both. The Act makes a provision for appeal, however, and any land owner having any land with above mentioned use may apply to the appropriate authority to have permission to change the use. The authority shall convey the results of appeal within 60 days of the appeal.

5.2.13.2 Bangladesh National Building Code (BNBC) 1993

The Bangladesh National Building Code (*BNBC*) 1993 was formulated in 1993, but given legal status in 2008. The purpose of Bangladesh National Building Code (*BNBC*) is to establish minimum standards for design, construction, quality of materials, use and occupancy, location and maintenance of all buildings in order to safeguard within achievable limits, life, limb, health, property and public welfare. It aims to insure public safety, health, and general welfare in so far as they are affected by the construction, alteration, repair, removal, demolition, use or occupancy or buildings, structures of premises, through structural strength, stability, means of egress, safety from fire and other hazards, sanitation, light and ventilation. The Bangladesh National Building Code suggests for conservation and restoration of historic buildings.

5.2.13.3 The Building Construction Act 1952

This Act was prepared in 1952 to prevent haphazard construction of buildings and excavation of tanks that are likely to interfere with the planning of certain areas in Bangladesh. The Act is usually exercised in areas under the urban local governments. The Act sets some conditions regarding construction of buildings in urban areas, where the Act will be in execution.

Preparation of Master Plan

The Act calls for preparation of a Master Plan of the urban area concerned before approval of building plan. The Master Plan shall show the future land use of the area through land use zoning. The buildings will be approved according to the land use provisions of the zoning plan. Having a Master Plan prepared, a Paurashava has the scope of exercising the following provisions/ actions:

Building Construction Rules

The Act in its Section 18 keeps provision for preparation of Building Construction Rules, 1996 to ensure healthy and environment friendly building development. The last Building Construction Rules were prepared in 1996. However, due to special characteristics of building development in Dhaka city a separate set of Building Construction Rules, 1996 was prepared for Dhaka City in 2008 under the same Act.

Power to Removal of Construction (Section 3B)

The Act gives special power to plan approval authority to remove any building that did not follow the specified rules of the Act or take action against any building owner who constructs building violating the rules after approval of the building plan.

Removal of Unauthorized Building (Section 7)

The Act empowers the authority to remove any building that has been built violating the Building Construction Rules, 1996. On failure to do so, the authority itself shall dismantle it and the entire cost shall be recovered from the owner as public demand.

Appeal

The Act, however, keeps provision for appeal, if the owner finds himself aggrieved due to any action by the authority.

Observation on the Building Construction Act

For appropriate execution of the Act, there is necessity of having Master Plan for a Paurashava. At the moment, there is serious lack of monitoring of disobedience of rules by the builders. Once the Master Plan is made for a Paurashava Town, the Paurashava Authority will be able to follow the rules properly.

5.3 Applicability of the Acts, Regulations and Policies in the Paurashava Master Plan

The key aspects of the policies presented in this Chapter have both direct and indirect relationships with the preparation of Master Plan of Paurashava Town in general, and Shailkupa Paurashava in particular. The Local Government (Paurashava) Act, 2009, the Building Construction Act 1952, the Bangladesh National Building Code, 1993, the Playfield, Open space, Park and Natural water reservoir Conservation Act, 2000, Agriculture Policy etc. have serious stakes in the execution of Paurashava Master Plan. The other policies also have relevance in the preparation of Master Plan for an Urban Centre. As a result, the relevant aspects of the Acts, rules, and policies are mentioned in this chapter and are taken into consideration in the preparation of the Master Plan for the Paurashava. The key aspects that are most relevant with the preparation of Paurashava Master Plan are shown in **Table-5.1**.

Table 5.1: Important provisions of different Acts, Policies and Rules having relevance with the preparation of Paurashava Master Plan

Act, Policies and Rules	Relevance with Paurashava Master Plan
Local Government (Paurashava) Act, 2009	Makes provision for having a Master Plan of the Paurashava Town. Provides legal basis for the preparation and implementation of Paurashava Master Plan. Suggests on the content and structure, and other relevant issues, such as provision for qualified Town Planner in the Paurashava staff.
National Land Use Policy, 2001	Formulation and effective execution of Land Use Plan in order to ensure planned use of land. Suggests for aforestation, conservation and development of land

Act, Policies and Rules	Relevance with Paurashava Master Plan
	maintaining landscape.
National Housing Policy, 1993	To create affordable housing through controlling unplanned and haphazard housing area development. To encourage private developers in land and infrastructure development, and house construction. Participatory housing infrastructure development involving the community, NGOs, CBOs, private developers and social welfare organizations.
Population Policy, 2004	To improve the living standard of the people through a desirable balance between population and development. The proposals are divided into four sectors - human resources development, decentralization of population activities, participation of NGOs and private sector. The policy aims to create a large skilled workforce providing education and training.
Transportation Policy, 2004	To provide a safe and dependable transport service for all. Removal of unnecessary control and formulation of laws and regulations conducive to providing services, determining the role of public and private sectors, maintaining an economic and environmental balance, maximum utilization of Government funds and introduction of an integrated transport system and provision of alternate transport systems.
National Environment Policy, 1992	To promote natural balance and overall development by means of conservation and development of environment, save an area from natural disaster, identify and control all sources of pollution and degradation, ensure environment friendly development in all sectors, ensure sustainable, long term and environment friendly use of all national resources, and get involved with international initiatives on environmental issues.
Industrial Policy 2005	To set up planned industries considering the real domestic and export demand discouraging unplanned industries, provide necessary assistance for producing environment-friendly products with the objective of creating a pollution-free environment, and enrich the industrial sector with the proper utilization of various natural and mineral resources. To prioritize the expansion and development of agro-based and agricultural processing industries, and assist in the expansion of poultry, dairy and goat-sheep industry as agricultural industries; and provide women entrepreneurs with all necessary assistance in establishing such industries.
National Tourism Policy 1992 and 2010	To create interest in tourism among the people, preserve, protect, develop and maintain tourism resources, take steps for poverty-alleviation through creating employment, build a positive image of the area concerned, arrange entertainment and recreation, identify sectors for private capital investment, and strengthen solidarity and integrity among the peoples.
Agriculture Policy, 1999	To strengthen land zoning program, ensure maximum utilization of land through bottom up planning and people's participation, stop fertile agricultural land being used for non-agricultural purposes, and discourage acquisition of land in excess of requirement for non-agricultural purposes.
Urban Forest Policy, 1994	To afforest about 20% of the total area of the country by initiating various aforestation programs in forest lands, fallow lands, lands not useful for agriculture, hinter lands and other possible areas to meet the basic needs of the present and future generations and to ensure greater contribution of the forestry sector to economic development; enrich biodiversity in the existing degraded forests by

Act, Policies and Rules	Relevance with Paurashava Master Plan
	conserving the remaining natural habitats of birds and animals; strengthen agriculture by extending assistance to those sectors related with forest development, especially by conserving land and water resources; and implement aforestation programs on both public and private lands.
National Plan for Disaster Management, 2008-15	To align the strategic direction of disaster management programs with national priorities and international commitments, articulate the vision and goals for disaster management, outline the strategic directions and priorities to guide the design and implementation of disaster management policies and programs, create a cohesive and well-coordinated programming framework incorporating government, non-government and private sector, and ensure that disaster management has a comprehensive and all-hazards focus comprising disaster risk reduction and emergency response.
National Plan of Action for Person's With Disabilities (PWDs) as well as Autism, 1995	To establish separate ticket counters in railway station, bus terminals, river ports, steamer terminal, airport and airways office to facilitate easy availability of tickets for the PWDs, fill up 10% reserved quota for employment in government jobs by orphans and PWDs, construct a ramp in all the government offices to facilitate easy movement of the PWDs, and withdraw the existing restrictions regarding appointment of PWDs in the Government Class I & class II jobs.
The Act (36 of 2000) for Conservation of Play field, Open space, Park and Natural Water Reservoir in Mega City, Divisional Town, District Town and Paurashavas of Bangladesh	To protect the existing use of land such use as play field, park and natural reservoir, and ensure punishment for conversion of such lands by any person/authority without proper permission from the appropriate authority.
Bangladesh National Building Code (BNBC) 1993	To establish minimum standards for design, construction, quality of materials, use and occupancy, location and maintenance of all buildings in order to safeguard within achievable limits, life, limb, health, property and public welfare. It aims to insure public safety, health, and general welfare in so far as they are affected by the construction, alteration, repair, removal, demolition, use or occupancy or buildings, structures of premises, through structural strength, stability, means of egress, safety from fire and other hazards, sanitation, light and ventilation. The Bangladesh National Building Code also suggests for conservation and restoration of historic buildings.
The Building Construction Act, 1952	The Act calls for preparation of a Master Plan of the urban area concerned before approval of building plan. The Master Plan shall show the future land use of the area through land use zoning. The buildings will be approved according to the land use provisions of the zoning plan. To ensure healthy and environment-friendly building development. To empower special power to remove any building that did not follow the specified rules of the Act. To take action against any building owner who constructs building violating the rules after approval of the building plan. To forbid cutting of any hill without prior permission of appropriate authority. To keep provision for appeal, if the owner finds himself aggrieved due to any action by the authority.

CHAPTER-6

PROJECTION OF FUTURE GROWTH BY 2031

Shailkupa Paurashava is a predominantly residential town that has experienced moderate growth over the last decade. It is likely that these circumstances will substantially change over the next 20 years. However, a clear defined set of growth policies, comprehensive Master Plan and related regulations are needed to guide the Paurashava town in future development. The proposed Master Plan provides guidelines for the development of remaining vacant areas within the proposed areas within and beyond current gazetted Paurashava boundaries.

6.1 Projection of Population

The assumptions are based on past trends and the projections only indicate what may happen should recent trends continue. The trend-based assumptions remain valid. The mechanics of projecting population growth from base year data and assumed future trends of growth rate are straightforward. Compound rate of growth method is adopted in projecting the future population of any target year assuming a growth rate from past trends.

Following the annual growth rate for the study area available from the 2011 Population Census, the projection up to the year 2031 with five years interval has been made. The growth rate scenario of Shailkupa Paurashava according to the BBS 2011 has been shown in the following **Table-6.1**.

Table 6.1: Comparative regional and local growth rates

Administrative Unit		Growth Rate
Jhenaidah District	District	1.13
Shailkupa Upazila	Upazila	0.85
	Shailkupa Paurashava	1.13

Source: BBS, 2011

The growth rate has been calculated from the population data of Census 2001 & Census 2011 of Shailkupa Paurashava and the population data is shown in **Table-6.2**.

Table 6.2: Trend of Population Growth

Census Year	1991	2001	2011
Total Population	25,909	31,515	35,271

Source: BBS, 1991, 2001, 2011

Before calculating future population, growth rate should be calculated first. To calculate the growth rate, the following formula is used.

$r = (P_{11}/P_{01})^{\wedge 1/t} - 1$

where,

P_{11} = Population of year 2011

P_{01} = Population of year 2001

t = time period

r = annual growth rate

According to the formula, considering population of year 2011 (35,271) and population of year 2001 (31,515) the annual growth rate for Shailkupa Paurashava is

r = (35,271/31,515)^$^{1/10}$ -1

= 0.0113.

For this reason, growth rate (1.13) has been considered for the population projection. This growth rate has been applied to estimate the projected population at 5 years interval up to 2031 and presented in **Table-6.3**.

For an example projection of Population of 2031 is shown according to the previously mentioned formula,

$$P_n = P_o (1+r/100)^n$$

Here,

P_n = Population in the year 2031?

P_o = 35,271 (*Population in the year 2011, which is considered as base year*)

n = 20 years (*number of intermediary years*)

So, population in the year 2031 = $35,271 (1+1.13/100)^{20}$

= 44,159

Table 6.3: Projected Population of Shailkupa Paurashava

Year	Population
2016	37,309
2021	39,466
2026	41,746
2031	44,159

The population of each ward at Shailkupa Paurashava is estimated assuming 1.13 as annual growth rate. Details are provided in following **Table-6.4**.

Table 6.4: Ward wise Projected Population of Shailkupa Paurashava

Ward No.	Population & Density										
	Area (Sq. km)	Pop^n in 2011	Density in 2011	Pop^n in 2016	Density in 2016	Pop^n in 2021	Density in 2021	Pop^n in 2026	Density in 2026	Pop^n in 2031	Density in 2031
1	2.51	3,124	1245	3,305	1317	3,496	1393	3,698	1473	3,911	1558
2	1.82	3,185	1750	3,369	1851	3,564	1958	3,770	2071	3,988	2191
3	1.73	2,894	1673	3,061	1770	3,238	1872	3,425	1980	3,623	2094
4	3.53	5,844	1656	6,182	1751	6,539	1852	6,917	1959	7,317	2073
5	2.25	5,016	2229	5,306	2358	5,613	2494	5,937	2639	6,280	2791
6	4.06	3,592	885	3,800	936	4,019	990	4,251	1047	4,497	1108
7	2.58	3,969	1538	4,198	1627	4,441	1721	4,698	1821	4,969	1926
8	0.79	2,892	3661	3,059	3872	3,236	4096	3,423	4333	3,621	4583
9	1.53	4,755	3108	5,030	3287	5,320	3477	5,628	3678	5,953	3891
Total	20.80	35,271	1696	37,309	1794	39,466	1897	41,746	2007	44,159	2123

Source: Annual growth rate 1.13%, BBS-2011

6.2 Identification of future economic opportunities

The contribution of the small towns to the economic development of their hinterlands depends largely on the urban development in these urban centres. Depending on transport, communication and storage facilities, this Paurashava can play a vital role in linking rural farmers to the urban market. For instance, development of road network between this town and its rural hinterlands may greatly benefit rural farmers as it enables them to transfer their agro produces to bigger markets. The industrial development in the Paurashava will have significant impact on the demand for raw materials that are required for the industrial production. All sorts of production materials, like brick, wood, bamboo etc. are produced in the countryside, serving as supply centres for urban demand. To support urban industries and related activities, it requires adequate infrastructure, such as urban rural transfer routes, communication and information structures. Investments in these projects, result in enhanced productivity in both urban and rural areas.

In Shailkupa the availability of manpower is sufficient. According to BBS (2011), there are 86% population of the Paurashava within age group 15-59 years, 11.12% are above SSC level educated and 28.30% people's monthly income are above Tk. 9,001-12,000/=.

However, it is extremely difficult to make any precise projection about future economy of this urban centre. Considering the present level of economic activities, no major change is anticipated in the local economy in the near future. The town has good prospects to local economic upliftment provided appropriate government policies and initiatives are taken. People have money, but they will have to convert it into capital. The following suggestions may be considered.

First, training on entrepreneurship may be arranged for prospective young and educated entrepreneurs to encourage them to invest in manufacturing, in particular.

Second, local entrepreneurs may go for consumer goods production targeting local market.

Third, prospective investors may also explore possibilities of investment in agriculture sector for local as well as export market, particularly, in fisheries, poultry and horticulture.

To raise the rate of employment and reduce poverty, employment opportunities in the town have to be increased. All these problems and others not revealed in the findings will have to be addressed in the proposed Master Plan of the Paurashava.

6.3 Projection of land use

The main basis of the projection of future land uses is the projected population and the planning standard (*approved by the LGED*). Since the land use categories of survey data (*i.e., 19 items*) and the land use categories as per approved planning standard (*i.e., 13 items*) are not similar, it was not possible to derive the projected land use from the extrapolation of land use categories provided in the survey data. The requirements of land was calculated based on the given standard and the projected population for the year 2031 which was presented in **Table-6.5**.

Table 6.5: Projected Landuse of Shailkupa Paurashava up to Year 2031

Facilities	Standard (LGED)	Existing Land of 2011 (acres)	Land Requirement for 2031 (acres)	Additional Requirement (Up to 2031)
Residential				
General Residential	100 pop./ acre	**1447.10**	**441.59**	**-**
Administration		**1.66**	**18**	**16.34**
Upazila Complex	15 acres/ Upazila HQ	1.33	15	13.67
Paurashava Office	3 acres/ Upazila HQ	0.33	3	2.67
Commerce		**33.72**	**54.07**	**20.36**
Wholesale Market	1.00 acre/ 10000 pop.	0	4.42	4.42
Retail sale Market	1.00 acre/ 1000 pop.	**33.72**	44.16	10.44
Neighborhood Market	1.00 acre/ Neighborhood market	0	4	4
Super Market	1.50 acres/ super market	0	1.50	1.50
Industry	1.50 acres/ 1000 pop.	**25.87**	**66.24**	**40.37**
Education		**12.17**	**66.82**	**54.65**
Primary School	2.00 acres/ 5000 pop.	4.23	17.66	13.43
Secondary School	5.00 acres/ 20000 pop.	2.52	11.04	8.52
College	10.00 acres/ 20000 pop.	4.20	22.08	17.87
Vocational Institute	5.00 acres/ Upazila	0	5	5
Others (Madrasa)	5.00 acres/ 20000 pop.	1.21	11.04	9.83
Health Facilities		**2.84**	**18.83**	**15.99**
Upazila Health Complex/ Hospital	10 acres/ Upazila HQ	2.43	10	7.57
Health Centre/ Maternity Clinic	1.00 acre/ 5000 pop.	0.41	8.83	8.42
Open Space/ Recreation		**1.20**	**103.05**	**101.85**
Playground	3.00 acres/ 20000 pop.	1.07	6.62	5.55
Park/ Open space	1.00 acre/ 1000 pop.	0	44.16	44.16
Neighborhood Park	1.00 acre/ 1000 pop.	0	44.16	44.16
Stadium	7 acres/ Upazila HQ	0	7	7
Cinema	0.5 acre/ 20000 pop.	0.13	1.10	0.98
Community Facilities		**12.11**	**12.94**	**6.40**
Mosque/ Temple/ Church	0.50 acre/ 20000 pop.	5.01	1.10	-
Eidgah	0.50 acre/ 20000 pop.	2.92	1.10	-
Graveyard	1.00 acre/ 20000 pop.	2.06	2.21	-
Community Centre	1.00 acre/ 20000 pop.	0	2.21	2.21
Police Station	3 acres/ Upazila HQ	0.68	3	2.32
Fire Service Station	1.00 acre/ 20000 pop.	1.18	2.21	1.03
Post Office	0.50 acre/ 20000 pop.	0.26	1.10	0.85
Utility Services		**1.17**	**14.06**	**12.96**
Telephone / Telegraph Exchange	0.50 acre/ 20000 pop.	1.17	1.10	-
Electric sub-station	1.00 acre/ 20000 pop.	0	2.21	2.21
Water Supply	1.00 acre/ 20000 pop.	0	2.21	2.21
Gas	1.00 acre/ 20000 pop.	0	2.21	2.21
Waste Dumping Ground	5-10 acre/ Site	0	10	10
Waste Transfer Station	0.25 acre/ Transfer Station	0	0.75	0.75
Transportation Services		**0**	**4.42**	**4.42**
Bus Terminal	1.00 acre/ 20000 pop.	0	2.21	2.21
Truck Terminal	0.50 acre/ 20000 pop.	0	1.10	1.10
Tempo Stand	0.25 acre/ 20000 pop.	0	0.55	0.55
Rickshaw Stand	0.25 acre/ 20000 pop.	0	0.55	0.55
Roads	15% of the built-up land	**110.58**	**253.05**	**142.47**

Facilities	Standard (LGED)	Existing Land of 2011 (acres)	Land Requirement for 2031 (acres)	Additional Requirement (Up to 2031)
Urban Deferred	10% of the total built-up area	**0**	**168.70**	**168.70**

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 Broad Planning View of Structure Plan

Shailkupa Paurashava is predominantly an Upazila headquarters town with emphasizing administrative functions facilitated with limited support services and manufacture-based small trade centre meeting the community needs from the inhabitants of the Upazila jurisdiction area. Thus the Paurashava should be developed with necessary infrastructures and ancillary facilities along with provisions for planned growth of the town. The Structure Plan sets forth certain strategies and policies for managing growth of the town, which is anticipated to encourage the planned growth and control any unplanned growth within the Paurashava area. Strategies for land use development is formulated in such way that conform the regulations associated with the optimum use of land, ensure a sound traffic movement system and promote a livable environment. The plan also indicates certain polices for promoting the economic growth, employment opportunities for the Paurashava dwellers and upgrading the living standards of the inhabitants as a whole.

7.2 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-7.1** 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. **Map-7.1** shows the structure plan of Shailkupa Paurashava.

Table 7.1: Policy Zoning Areas of Structure Plan

Policy Zones	Illustrates	Areas (acres)	Percentage
Agriculture	Agricultural land denotes the land suitable for agricultural production, both crops and livestock. It is one of the main resources in agriculture.	2578.86	50.19
Major Circulation	Major circulation contains major road network and railways linkage with regional and national settings.	406.56	7.91
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 Landuse Plan (2011-2021) period.	368.56	7.17
New Urban	This zone will be the required additional area for	1051.80	20.47

Policy Zones	Illustrates	Areas (acres)	Percentage
Area	future planned urban development as per population projection. Existing physical trend of growth and potential areas shall have to be considered in demarking for new urban land development.		
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.	507.48	9.88
Waterbody	Waterbody containing an area equals to or more than 0.15 acres excluding those of khal, irrigation canal and river will be treated as this category.	225.34	4.39
Total		5138.60	100

7.2.1 Core Area

Total 368.56 acres of land, which covers 7.17% of Structure Plan area, is declared as Core Area (**Map-7.1**). It is located with in Ward no. 2, 4, 5, 7, 8 and 9 some part. It includes the highest concentration of service area for an example Paurashava Office, Upazila complex, schools, post office, police station, Shailkupa Bazar area and other governmental offices and it has the highest potentiality of development. There are differences in levels of provision in this area, 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.

7.2.2 Peripheral Area

A total of 507.48 acres of area, which covers 9.88% of Structure Plan area, is declared as Urban Peripheral Area (**Map-7.1**). Peripheral area is in Ward no. 1, 2, 3, 4, 5, 6 and 9 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.

7.2.3 New Urban Area

Total 1051.80 acres of land covering 20.47% of Structure Plan area is declared as New Urban Area (**Map-7.1**). New urban area is mainly proposed on all the wards of the Paurashava; which are to be proposed as a residential area in future. It is assumed that town will be developed based on establishment as a trade centre which mostly depends on successful utilization of the road network with other urban areas and surrounding unions. So most of the new urban lands in Ward no. 3, 5 and 7 will be used to meet the

extra pressure of development in this Paurashava. A large portion of land in Ward no. 9 will be used to establish a new residential area for future planned urban development as per population projection.

7.2.4 Agriculture

Total 2578.86 acres of land covering 50.19% of Structure Plan area is declared as Agriculture Area (**Map-7.1**). North and Southern portion of the Paurashava is mostly declared as agriculture area.

7.2.5 Water body/ Retention Area

Total 225.34 acre area, which covers 4.39% of Structure Plan area, is declared as water body (**Map-7.1**). It includes 11 khals, 202 ponds, 2 ditches, 1 beel and 1 river. More detail information is provided in drainage and environmental plan in **Chapter-12**.

7.2.6 Major Circulation Network

It contains major road network with Jhenaidah and other neighbouring urban centres and also includes the major road way network required for maintaining existing internal communication. Total 406.56 acres of land which covers 7.91% of total structure plan area. **Map-7.1** shows major circulation network.

Map 7.1: Structure Plan Map of Shailkupa Paurashava

7.3 Strategies for optimum use of Urban Land Resources

7.3.1 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. Shailkupa 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 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
Policy UA/1: Optimization of Available Land Resources Growth within the established urban area is not compact in Shailkupa. 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.	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.	Control: 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. Promotion: The public sector should develop infrastructure facilities and services in deprived areas to enable the land owners for development.	-Shailkupa Paurashava; -Ministry of Land
Policy UA/2: Utilisation of Khas Land for Urban Development	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.	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	-Shailkupa Paurashava -Ministry of Land -DC, Jhenaidah

Policy	Justification	Means of Implementation	Implementing Agency
		particular development proposals.	

7.3.2 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
Policy UA/3: Initives For New Urban Area Development	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.	-Shailkupa Paurashava -DPHE -Private sector

7.3.3 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
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.	-Shailkupa Paurashava -DoE.
Low Land, Pond and Drainage Path: A total of 202 ponds with an area equal to or more than 0.15 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.	This area is declared as water body in the Master Plan. As per the guideline of Playfield, Open 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.	-Shailkupa Paurashava -Water Development Board

Type of Land	Means of Implementation	Implementing Agency
Green Belt: Some area beside khals are 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.	-Shailkupa Paurashava

7.4 Policies for Development

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

7.4.1 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-1: Raise the education level among mass people and emphasize more on grassroots level family planning workers services with effective delivery of birth control services.

Policy:

Item	Executing Agency
Pop/1: Declare population as one of the most critical sectors of national development	Ministry of Planning, Ministry of Health and Family Planning
Justification: Per capital 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 living standard of the people.	
Pop/2: Put more efforts and resources in raising the level of education.	Ministry of Planning, Ministry of Health and Family Planning Ministry 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 pay that would reduce poverty, which is a major source of large family.	
Pop/3: Create well-paid and well-trained grassroot level family planning workers for motivational work.	Ministry of Planning, Ministry of Health and Family Planning
Justification: Grassroots level workers can give door to door motivational services and distribute birth control materials in a	

Item	Executing Agency
better way. To get good services they must be well paid and efficient.	

Economic Development and Employment Generation

Economic development of any place is associated with generation of employment. And 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 Shailkupa as it is a large town with a very low level of population. Besides, it has to compete with other adjoining urban centres like, Hakimpur, Sarutia, Dignagar and larger town like Bagura. These urban centres are counter magnets of investment.

Strategy-2: Creating basic sector investment climate and lead the local economy forward through promotion of Small and medium Enterprise (*SME*).

Policy:

Item	Executing Agency
Econ/1: Provide bank loans on easy terms to attract prospective investors in the SME sector.	Ministry of Industries Ministry of Commerce
Justification: Easy loans would Encourage and attract prospective investors for investment in small scale industries.	
Pop/2: Take measures to channelize remittance to value adding productive sectors.	Ministry of Industries Ministry of Commerce
Justification: Larger amount of Remittance is being diverted to land purchase, which is considered as the safest investment. This huge capital may be channelized to productive sectors to help create more employment.	
Pop/3: Arrange entrepreneurship training programmes for prospective investors.	Ministry of Industries Ministry of Commerce
Justification: There are many potential investors who are ignorant of the ways and means of investment and. Operating an enterprise The training can help them get educated in these lines.	

Housing

As the town has low level of population, housing is yet to become a problem here. 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 is highly lacking. The projection of housing unit is shown in **Table-7.5**.

Table 7.5: Projection of Housing

Category	Base Year (2011)	Projected (2031)
No. of Population	35,271	44,159
No. of Families	8,507	10,651
Housing Demand	2,144	

Source: BBS, 2011

It is observed that 2,144 no's of housing unit is required for accommodation of the anticipated growth of population. No slums are observed in this town, the way they are exposed in large cities. Therefore, no slum and squatter related problems are there in the town.

Strategy-3: 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 landowners in housing area development on public-private partnership basis will be encouraged.

Policy:

Item	Executing Agency
Policy House/1: Provide all necessary services and facilities to promote housing at private sector.	Ministry of Local Government, Rural Development and Cooperative, Shailkupa Paurashava
Justification: It is more difficult to provide housing on public sector initiatives as it involves funding, land acquisition, takes long time. By providing infrastructure and services, general people can be enabled to build their own houses.	
Policy House/2: The land owners of housing area can be involved in a participatory development technique where Paurashava will provide infrastructure and the cost will be shared by land owners.	Ministry of Local Government, Rural Development and Cooperative, Shailkupa Paurashava

Social Amenities and Community Facilities

Social amenities and community facilities include, education facilities, health facilities, open space recreation facilities, like, park and play ground, amusement park, 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 goods. For education and health facilities national government has 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 national education and health policies and programmes execution. For providing amenities like, park and play ground, 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. For community centre intensive use of land should be made by making multiple use of same space. For example, providing community centre, ward commissioner's office, clinic or any other use in the same building.

Strategy-4: Exploring khas/ public land within Paurashava and catching the unused/ vacant land for providing amenities before density of population increases and land becomes scarce and dear.

Policy:

Item	Executing Agency
Policy-Amenity/1: Procurement of khas and other public land for park, playfield, community centre.	Ministry of Local Government, Rural Development and Cooperative, Shailkupa Paurashava
Justification: Since above facilities are non-revenue earning, they should be procured at least cost.	
Policy-Amenity/2: Procure land for open space facilities as quick as possible, because when land value will be higher cost of providing the facilities will also be very high. 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.	Ministry of Local Government, Rural Development and Cooperative, Shailkupa Paurashava

7.4.2 Physical Infrastructure Sector

Transport

By far, transport is the most important means to revitalize an urban centre. lntra and inter 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 centre. To create transportation facilities, quality inter-district road network will have to be created that makes movement faster and easy. With good infrastructure transport on the road will be forthcoming. Besides, quality of tertiary 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-5: Creation of efficient inter-city and intra-city communication for easy transportation of goods and passengers.

Policy:

Item	Executing Authority
Policy-Transport/1: Development of efficient inter-city road network with standard road.	Roads and Highways Department (*RHD*)
Justification: Increased inter-city mobility will increase business transactions and generate investment and employment.	
Policy-Transport/2: Promotion of efficient road transport facilities between urban centres.	Bangladesh Road Transport Authority (*BRTA*) Deputy Commissioner, Jhenaidah
Justification: Not only that communication is needed between urban centres, but to attract transport movement emphasis must be laid on quality of roads built.	
Policy-Transport/3: Development of tertiary road network through participatory approach	Shailkupa Paurashava Local Government Engineering Department (*LGED*)
Justification: Development of roads will involve huge cost.	

Participatory development will enable cost sharing, which will reduce cost of road construction substantially.	

Utility Services

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

Strategy-6: Attainment of self reliance in revenue collection and adoption of participatory approach to service provision to ensure better services and facilities to the people.

Policy:

Item	Executing Agency
Policy-Utility/1: Exploration of alternative sources of water to ensure sustainable supply.	LGED Shailkupa Paurashava
Justification: Amid constant rise of urban population, it is time to explore alternative sources of water, like, rain water harvesting and surface water supply.	
Policy-Utility/2: Involve beneficiary participation in solid waste management.	Shailkupa Paurashava NGO and CBO
Justification: Involvement of beneficiaries in solid waste management will make the operation more effective and reduce financial responsibility of the Paurashava.	
Policy-Utility/3: Exploring re-use and recycling of waste materials to extract resources.	Shailkupa Paurashava NGO and CBO
Justification: Re-use and recycling of waste materials will produce resources and reduce cost of waste management.	
Policy-Utility/4: Publicity on the benefits of hygienic sanitation to motivate people and enable people to have easy access to sanitary materials.	LGED Shailkupa Paurashava NGO and CBO
Justification: Motivation will encourage people to adopt healthy sanitation and reduce health risks.	
Policy-Utility/5: Protection of natural drainage system and preparation of hierarchical drainage network.	LGED Shailkupa Paurashava
Justification: Natural drainage systems are being grabbed and filled up, which increases the risk of water logging. Well planned hierarchical drainage network help smooth drainage of storm and waste water.	

7.4.3 Environmental Issues

From environmental point of view Shailkupa 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 meager natural resources that are available, 524 number of ponds and 34.24 km of natural drainage canals can be mentioned. Out of the total ponds 202 with an area

equal to or more than 0.15 acres and the natural khals need to be protected and conserved to ensure sustainability in drainage and water supply of the Paurashava.

Strategy-7: All khas land and canals should be vested with Paurashava for use in community interest.

Policy:

Item	Executing Agency
Policy-Nature/1: The river-bank and all khas land within Paurashava must be assessed and Handed over to the Paurashava for use in community interest.	Ministry of Land Shailkupa Paurashava
Justification: This will prevent misuse of river-bank and khas land.	
Policy-Nature/2: The river-bank and all khals within Paurashava must be vested with the Paurashava for maintenance and proper use as drainage channel.	Ministry of Land NGO and CBO
Justification: This will help prevent unaithorised occupation and filling of natural drainage.	

CHAPTER-8

IMPLEMENTATION ISSUES

This chapter deals with the issues of implementation of the Master Plan. 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.
- A double entry cash accounting system has to be introduced to modernize the accounting system. For this purpose, massive training programme has to be arranged for the relevant municipal staff.
- To improve revenue collection, the urban local governments should be given more power and responsibilities. Measures should be taken for strengthening the Paurashava administration for municipal development.
- Section-50 of the Local Government (Paurashava) Act, 2009 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 Shailkupa 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, Rural Development and Cooperative and other staffs are appointed locally through the approval of the Ministry after the advertisement on the newspapers. In Shailkupa Paurashava, the revenue income is too low. That is why it is not capable to pay the salary of all the officials and staffs. This is the main reason for under staffing of the Paurashava. There is no proper arrangement for staff training. As a result, the staffs are mostly unskilled. They can not deliver proper service to the citizens. Besides, most of them are not qualified enough to render proper services.

8.1.2 Lack of Automation

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

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 it's 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:

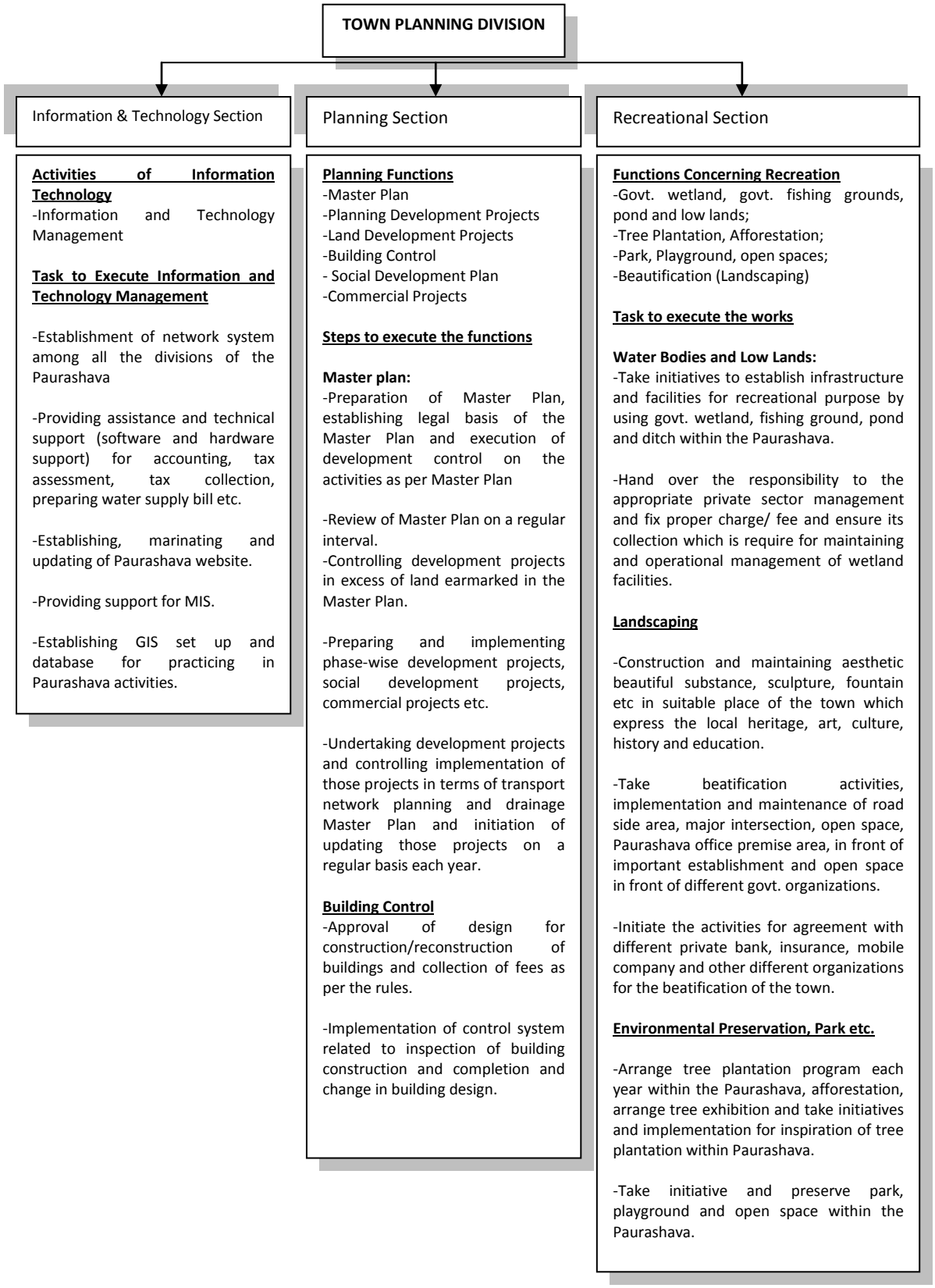
Planning unit/Division: a) IT Section

b) Planning Section

c) Beautification and recreation Section

According to the division and it's 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 bellow.

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 division or any appropriate manpower to prepare and implement the Master Plan. For proper implementation of the Master Plan in each Paurashava establishment of a separate planning division is indispensable. The Paurashava must strengthen its capacity to implement its Master Plan when it will be completed. It will otherwise be in trouble for implementation, monitoring and updating the Master Plan.

Shailkupa is an 'A' class Paurashava. For the 'A' 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 constrains 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 Progamme (UGIAP) and Capacity Building of Institutes at Municipality-level in particular.

Citizen Awareness and Participation

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

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

Urban Planning and Environmental Improvement

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

Urban Poverty Reduction

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

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

Income Generating Activities

The income generating activities include:

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

Transparency and Accountability

Functions and activities perform by the Paurashava authority should be transparent and the persons responsible for performing activities for betterment of the society should

maintain accountability to the Paurashava people as well as central government. Following guidelines may be followed for such performances:

- Administrative Reformation of Paurashava.
- Set Vision, Mission and functions for each department/ section of the Paurashava.
- Functions to be decentralized, transfer and coordination with other authorities.
- Establishment of Capacity Development Committee in Paurashava-level.
- Establishment of Urban Information Services Centre at Paurashava premises.
- Meet the Mass people of Poura-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 Local Government (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 Local Government (Paurashava) Act, 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 Shailkupa 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 Local Government, Rural Development 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 Shailkupa 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 asses 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, Shailkupa 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 Shailkupa 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. 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 Shailkupa Paurashava. As there is no town planner in the Paurashava, review and updating of the Master Plan will require service of senior level planners that Paurashava might be able to provide. But more planner is needed for this Paurashava. 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 piece-meal. It is unfortunate that town planning has not yet become a part of our urban development culture. Individuals develop lands and construct buildings with a little respect for planned development, and the concerned authority is also unable to exercise full control on development. Some strict measures are necessary to make stakeholders follow up plans and development rules. Awareness is to be built among the people to follow the Master Plan provisions and plan. Government agencies must be compelled to follow plans. Existing laws in this regard must be updated incorporating provisions of plan execution.

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 Shailkupa 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 20 years that includes 1st phase (*1st-5th year*), 2nd phase (*6th-10th year*), 3rd phase (*11th-15th year*) and 4th phase (*16th-20th year*) of development programs. 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 Shailkupa 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 uses and 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 Shailkupa 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.

9.2.1 Delineation of Planning Areas

For delineation of Master Plan area, it is necessary to identify the possible future urban growth locations. The objective of project area demarcation is to determine the boundary of the area and mark it on the map as well as in the field. Logic behind the delineation of the Planning area of Shailkupa Paurashava for the year 2031 has been done on the basis of the gazette notification of the Paurashava and after the reconnaissance survey within the area, the discussions with all groups of stakeholders, analyzing the present trend of developmental growth of the town. Cooperation of the Paurashava was more important in delineating the Paurashava area in the cadastral map and the future planning area boundary. As conversant with local conditions and the future trend of development, valuable advices were received from the Paura Mayor and its engineers and other staffs. **Table-9.1** presents the detail about the mouzas, within the nine wards of the Paurashava along with their areas in acre.

Table 9.1: Ward wise RS Mouza sheet

Ward No.	Mouza Name	J.L. No.	Sheet No.	Area (Acre)
Ward No. 01	Shyampur	50	00	187.684
	Shailkupa	51	01	214.474
			05	217.534
Ward No. 02	Shailkupa	51	02	265.725
			04	180.776
			05	4.509
Ward No. 03	Shailkupa	51	05	354.888
	Horidebpur	48	00	71.968
Ward No. 04	Satgachhi	52	00	307.195
	Shailkupa	51	02	237.454
			03	103.002
			04	224.424
Ward No. 05	Fazilpur	66	00	171.589

Ward No.	Mouza Name	J.L. No.	Sheet No.	Area (Acre)
	Pathanpara	65	00	91.312
	Shailkupa	51	02	4.138
			03	288.164
Ward No. 06	Aushia	62	01	455.164
			02	298.990
	Khalkula	63	00	249.849
Ward No. 07	Habibpur	125	00	576.397
	Horidebpur	48	00	16.770
	Shailkupa	51	05	43.681
Ward No. 08	Shailkupa	51	03	22.310
			04	65.079
	Kabirpur	124	00	108.512
Ward No. 09	Fazilpur	66	00	33.373
	Kabirpur	124	00	85.527
	Jhaudia	123	00	258.102
Total	11 Mouzas		16 Sheets	5138.60

Source: DLRS

9.2.2 Content and Form of Urban Planning

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. At present, the Urban Area Plan covers existing Paurashava area within the Structure Plan area of 20.80 sq. km. or 5138.60 acres with a present population of 35,271 of Shailkupa Paurashava. The Urban Area Plan of the Master Plan of Shailkupa Paurashava contains several components. These are:

i) Land Use Plan;

ii) Transportation and Traffic Management Plan;

iii) Drainage and Environmental Management Plan and

iv) Plan for Urban Services.

CHAPTER-10

LAND USE PLAN

The Land Use Plan is the main part of the Urban Area Plan and is planned for the period of 20 years. The proposals in the Land Use Plan will be implemented through the 1st, 2nd, 3rd and 4th phase development programs of the Master Plan. In each phase development projects are identified as priority projects and are listed in the Ward Action Plan for implementation within 5 years of the Master Plan.

10.1 Existing and Projected land uses

This section describes the analysis of existing and proposed land uses and at the same time mentions estimation on the requirement of land for different land uses. It lays down the land use zoning plan and infrastructure development proposals at the town level.

10.1.1 Existing Land Use

Map-10.1 illustrates how the land uses are distributed at present in the Paurashava area. The information helps the preparation of Master Plan providing background information for selection of areas of different land uses. The existing land uses of the project area are shown in **Table-10.1**. In the land use pattern of the Paurashava, 16 types of land uses are found. It is clearly evident from the table that agricultural land use (52.81%) dominates the Paurashava area, followed by residential (20.96%), industrial (13.51%), waterbodies (6.48%), circulation network (2.71%), vacant land (1.04%) and commercial (0.66%).

Table 10.1: Existing Land use Classification of Shailkupa Paurashava

SL. No.	Land Use	Area in Acres	% of Area
1	Residential	1469.93	28.61
2	Commercial	33.72	0.66
3	Industrial/Manufacturing/Processing	25.88	0.50
4	Education & Research Facility	12.17	0.24
5	Community Service	7.94	0.15
6	Service Activity	4.89	0.10
7	Recreational Facilities	1.20	0.02
8	Governmental Services	16.24	0.32
9	Non Government Services	1	0.02
10	Urban Green Space	2.06	0.04
11	Forest Area	-	0
12	Restricted Area	-	0
13	Transport & Communication	2.57	0.05
14	Agricultural	3183.62	61.95
15	Circulation Network	110.58	2.15
16	Waterbody	233.51	4.54
17	Vacant Land	32.39	0.63
18	Mixed Use	0.91	0.02
19	Miscellaneous	-	0
Total		5138.60	100

Source: Land Use Survey, 2009

10.1.2 Land Requirement Estimation

The requirement of land for different uses were estimated based on Planning Standards for UTIDP provided by the PMO Office of LGED and the projected population for up to the year 2031. The forecasted areas for each specific use were calculated through spreadsheet analysis (*Microsoft Excel 2007*) Software and further summarized into category wise land requirement for 2031, which was presented in **Table-10.2**.

Table 10.2: Projected Landuse of Shailkupa Paurashava

Facilities	Standard (LGED)	Existing Land of 2011 (acres)	Land Requirement for 2031 (acres)	Additional Requirement (Up to 2031)
Residential				
General Residential	100 pop./ acre	**1447.10**	**441.59**	**-**
Administration		**1.66**	**18**	**16.34**
Upazila Complex	15 acres/ Upazila HQ	1.33	15	13.67
Paurashava Office	3 acres/ Upazila HQ	0.33	3	2.67
Commerce		**33.72**	**54.07**	**20.36**
Wholesale Market	1.00 acre/ 10000 pop.	0	4.42	4.42
Retail sale Market	1.00 acre/ 1000 pop.	**33.72**	44.16	10.44
Neighborhood Market	1.00 acre/ Neighborhood market	0	4	4
Super Market	1.50 acres/ super market	0	1.50	1.50
Industry	1.50 acres/ 1000 pop.	**25.87**	**66.24**	**40.37**
Education		**12.17**	**66.82**	**54.65**
Primary School	2.00 acres/ 5000 pop.	4.23	17.66	13.43
Secondary School	5.00 acres/ 20000 pop.	2.52	11.04	8.52
College	10.00 acres/ 20000 pop.	4.20	22.08	17.87
Vocational Institute	5.00 acres/ Upazila	0	5	5
Others (Madrasa)	5.00 acres/ 20000 pop.	1.21	11.04	9.83
Health Facilities		**2.84**	**18.83**	**15.99**
Upazila Health Complex/ Hospital	10 acres/ Upazila HQ	2.43	10	7.57
Health Centre/ Maternity Clinic	1.00 acre/ 5000 pop.	0.41	8.83	8.42
Open Space/ Recreation		**1.20**	**103.05**	**101.85**
Playground	3.00 acres/ 20000 pop.	1.07	6.62	5.55
Park/ Open space	1.00 acre/ 1000 pop.	0	44.16	44.16
Neighborhood Park	1.00 acre/ 1000 pop.	0	44.16	44.16
Stadium	7 acres/ Upazila HQ	0	7	7
Cinema	0.5 acre/ 20000 pop.	0.13	1.10	0.98
Community Facilities		**12.11**	**12.94**	**6.40**
Mosque/ Temple/ Church	0.50 acre/ 20000 pop.	5.01	1.10	-
Eidgah	0.50 acre/ 20000 pop.	2.92	1.10	-
Graveyard	1.00 acre/ 20000 pop.	2.06	2.21	-
Community Centre	1.00 acre/ 20000 pop.	0	2.21	2.21
Police Station	3 acres/ Upazila HQ	0.68	3	2.32
Fire Service Station	1.00 acre/ 20000 pop.	1.18	2.21	1.03
Post Office	0.50 acre/ 20000 pop.	0.26	1.10	0.85
Utility Services		**1.17**	**14.06**	**12.96**
Telephone/ Telegraph	0.50 acre/ 20000 pop.	1.17	1.10	-

Facilities	Standard (LGED)	Existing Land of 2011 (acres)	Land Requirement for 2031 (acres)	Additional Requirement (Up to 2031)
Exchange				
Electric sub-station	1.00 acre/ 20000 pop.	0	2.21	2.21
Water Supply	1.00 acre/ 20000 pop.	0	2.21	2.21
Gas	1.00 acre/ 20000 pop.	0	2.21	2.21
Waste Dumping Ground	5-10 acre/ Site	0	10	10
Waste Transfer Station	0.25 acre/ Transfer Station	0	0.75	0.75
Transportation Services		**0**	**4.42**	**4.42**
Bus Terminal	1.00 acre/ 20000 pop.	0	2.21	2.21
Truck Terminal	0.50 acre/ 20000 pop.	0	1.10	1.10
Tempo Stand	0.25 acre/ 20000 pop.	0	0.55	0.55
Rickshaw Stand	0.25 acre/ 20000 pop.	0	0.55	0.55
Roads	15% of the built-up land	**110.58**	**253.05**	**142.47**
Urban Deferred	10% of the total built-up area	**0**	**168.70**	**168.70**

10.2 Land Use Proposals

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 and other service facilities. 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. Shailkupa 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. A conservative and rational standard of space use and their proper application in planning, designing and development is, therefore, followed in the land use proposals.

10.2.1 Designation of Future Land Use

Future Land Use is proposed for the next 20 years up to 2031 i.e. within the time frame of Urban Area Plan. It was done based on public consultation meeting with the stakeholders and land suitability analysis. The future land uses of the planning area were designated as a combination of two approaches, e.g. i) allocating development proposals of various services and facilities necessary to ensure habitable urban living ii) redefining uses of the remaining land as per structure plan policies, strategies and guidelines. The list of development proposals have been shown in **Table-10.3** to **Table-10.12** with detailed plot schedule and shown in **Map-10.2**. After that proposed general land use map was prepared according to the Landuse Classification of PMO, LGED (*The detailed list is provided in **Annexure-A***). The details are shown in **Table-10.13** (*Proposed General Land Use*) and **Map-10.2** (*Land Use Plan Map*) below.

Residential Land Use

The existing total acreage under residential use has been found to be 1469.93 acres. Residential uses are mostly concentrated on southern part of Paurashava area. The projected population of the Paurashava is expected to be 44,159 in the year 2031. The net density of population is at present 24 persons/ acre. If the current trend of population continues, the target net density is anticipated as 33 persons/ acre in 2031 which is sufficient enough to meet the future housing requirements based on planning standard. So it is found that no additional land is required for residential development. The increasing demand of land for residential development is recommended to be met by the densification of existing areas through vertical development and compact township concept to ensure the optimum use of land.

According to the planning standards of UTIDP provided by LGED, the standard is recommended to be 100 persons/ acre for general residential use. The projected residential land is 441.59 acre for 2031. The existing residential area is proposed to be splited into two distinct types of residential uses e.g. Urban Residential Zone (836.55 acre) and Rural Settlement (482.23 acre). A considerable amount of residential land (57.85 acres) has been designated as mixed use where some other compatible activities (*e.g. light commercial, light industrial*) are observed and expected to continue. Details of permitted and conditional permits have been presented in **Annexure-B**.

Table 10.3: New Land Proposal for Residential Land Use

ID	Proposal	Location	Ward	Existing Area (Acre)	Proposed Area (Acre)	Mouza Name
LIHP	Low Income Housing Project	Southern part of W-9 beside PR-02 road	W-9	-	9.16	Jhaudia
OH	Old Home	Western part of W-6 between TR-29 & TR-30 road	W-6	-	0.54	Aushia
RZ	Resettlement Zone	Southern part of W-8 between SR-05 & SR-06 road	W-4	-	16.73	Shailkupa
Total				1469.93	26.43	-

Commercial Land Use

The commercial activities have been occupied 33.72 acres of land in the project area, which is insufficient covering only about 0.66% of the total land. Considering planning standards and projected population it is notified that 53.03 acres of land is proposed for commercial development which is 1.03% of the total project area. It includes wholesale market, retail sale market, cattle market, super market, corner shops, neighborhood market that will accelerate trade and commerce of the Paurashava.

Due to scarcity of land in the built-up part it was not possible to follow the standard and only 14.10 acres of land has been newly proposed in addition to the existing commercial land. 4 (four) neighbourhood markets comprising 5.29 acres of land, 1 (one) wholesale

market of 4.30 acres land, 1 (one) cattle market of 0.57 acres land and 1 (one) Super Market of 3.94 acres land is proposed as commercial land use. Neighbourhood markets, wholesale markets and super markets may have vertical expand for the future need. Details of permitted and conditional permits have been presented in **Annexure-B**.

Table 10.4: New Land Proposal for Commercial Land Use

ID	Proposal	Location	Ward	Existing Area (Acre)	Proposed Area (Acre)	Mouza Name
CM	Cattle Market	Eastern part of W-8 between TR-32 & TR-33 road	W-8	-	0.57	Shailkupa
NM-01	Neighbourhood Market	Central part of W-1 beside SR-01 road	W-1	-	0.90	Shampur
NM-02	Neighbourhood Market	Southern part of W-5 beside SR-13 road	W-5	-	1.15	Fazilpur
NM-03	Neighbourhood Market	Western part of W-6 beside TR-29 road	W-6	-	2.34	Aushia
NM-04	Neighbourhood Market	Southern part of W-9 beside PR-02 road	W-9	-	0.90	Jhaudia
SM	Super Market	Central part of W-4 beside SR-03 road	W-4	-	3.94	Shailkupa
WM	Wholesale Market	Eastern part of W-7 & Western part of W-8 between SR-18, TR-40 & TR-56 road	W-7,8	-	4.30	Hobibpur Kobirpur
Total				33.72	14.10	-

Water body

The third highest land use category is water body. In all 233.51 acres of land are covered by water bodies which represents about 4.54% of the project area. Water bodies include ponds, ditches, beel, canals and river. Major water bodies of the area are the ponds and beels which are distributed scatteredly all over the project area. The existing water bodies, which have an area more than 0.15 acres is proposed to be retained for functioning of water body as detention pond of storm runoff and thereby mitigation of rainfall induced flood vulnerability. And these water bodies should be preserved under "*Playfield, Open space, Park and Natural water reservoir Conservation Act, 2000*". Details of permitted and conditional permits have been presented in **Annexure-B**.

Agricultural Land Use

The major portion of land of the project area is under agricultural use. Total land under agricultural use is 3183.62 acres which is 61.95% of the land. Agricultural land of 2578.86 acres, which is 50.19% of the total land, is proposed to continue the current agricultural trend and the remaining land is proposed to be shifted in industrial/ manufacturing, commercial, service or some other non-agricultural uses. Details of permitted and conditional permits have been presented in **Annexure-B**.

Urban Deferred

There is no land in the Paurashava which can be termed as urban deferred. Agricultural land having potentiality for development comprising 168.70 acres of land which is nearly 10% of built-up area as per standard has been proposed. As it is a growing area, therefore, 180.30 acres of land is proposed for this purpose. Urban deferred land is proposed for the provision of urban development in future. Details of permitted and conditional permits have been presented in **Annexure-B**.

Circulation Network

Existing circulation network occupies 2.15% land of the project area. Total area under this use amounts to 110.58 acres. The main circulation network is road. The projected area for circulation network use is estimated as 253.05 acre, which is 15% of the total built-up area. The projected area of circulation network was not followed properly in the provision of land allocation for circulation network. The proposed use of circulation network is 406.56 acres (7.91%) of total land. The reason behind this anomaly is that in practice more roads have been proposed to ensure connectivity and accessibility among the localities. Details of permitted and conditional permits have been presented in **Annexure-B**.

Education and Research Land Use

Educational facility occupied 0.24% of the project area that covered 12.17 acres of land. Educational Institutions were generally Kindergarten, Government and Non-Government Primary School, High Schools, College, Madrasha, Computer Training Institute, Tutorial Coaching Centre etc. The proposed area for education and research land use is 63.12 acres comprising of about 1.23% land of the total project area. Details of permitted and conditional permits have been presented in **Annexure-B**.

Table 10.5: New Land Proposal for Education and Research Land Use

ID	Proposal	Location	Ward	Existing Area (Acre)	Proposed Area (Acre)	Mouza Name
PS-01	Primary School	Central part of W-3 beside PR-01 road	W-3	-	2.67	Shailkupa
PS-02	Primary School	Southern part of W-8 beside TR-65 road	W-8	-	1.97	Kobirpur
HS-01	Secondary School	Central part of W-1 beside SR-01 road	W-1	-	6.30	Shampur
HS-02	Secondary School	Central part of W-3 beside PR-01 road	W-3	-	4.15	Shailkupa
HS-03	Secondary School	Southern part of W-9 beside PR-02 road	W-9	-	3.63	Jhaudia
C-01	College	Northern part of W-5 beside PR-01 road	W-5	-	6.57	Shailkupa
C-02	College	South-east part of W-7 & Western part of W-9 beside TR-44 road	W-7,9	-	10.59	Jhaudia
VI	Vocational Institute	Eastern part of W-2 & Western part of W-4	W-2,4	-	8.28	Shailkupa

ID	Proposal	Location	Ward	Existing Area (Acre)	Proposed Area (Acre)	Mouza Name
		beside PR-01 road				
Total				12.17	44.16	-

Industrial Land Use

Manufacturing and Processing land use occupies 25.88 acres of land and which is only 0.50% of the total land of the project area. Rice mils are the main industry of Shailkupa Paurashava which cover almost full part of this category. As per standard (*1.50 acres/ 1000 population*), 66.24 acres of land is required for industrial activity. A general industrial zone of additional 23.12 acres of land has been proposed for advancement of industrial activity and generation of employment opportunity for the Paurashava inhabitants. Details of permitted and conditional permits have been presented in **Annexure-B**.

Table 10.6: New Land Proposal for Industrial Land Use

ID	Proposal	Location	Ward	Existing Area (Acre)	Proposed Area (Acre)	Mouza Name
IZ	General Industrial Zone	Northern part of W-7	W-7	-	23.12	Hobibpur
						Kobirpur
						Shailkupa
Total				25.88	23.12	-

Transportation Facilities

A total of 2.57 acres of land are occupied by Transportation facilities. For provision of transportation facilities including bus terminal, bus stand and rickshaw/ van/ tempo stand, passengers' shed, ghat, helipad, filling station, CNG station, mobile tower/ transmission centre, railway station a total of 5.52 acres of land is proposed for such type of facilities. Details of permitted and conditional permits have been presented in **Annexure-B**.

Table 10.7: New Land Proposal for Transportation Facilities

ID	Proposal	Location	Ward	Existing Area (Acre)	Proposed Area (Acre)	Mouza Name
BT	Bus Terminal	Northern part of W-7 between SR-18 & TR-48 road	W-7	-	1.44	Hobibpur
PA	Parking Area	Central part of W-4 beside PR-01 road	W-4	-	0.35	Shailkupa
TS-01	Tempo Stand	Southern part of W-2 beside SR-01 road	W-2	-	0.19	Shailkupa
TS-02	Tempo Stand	Western part of W-4 between PR-01 & SR-08 road	W-4	-	0.27	Shailkupa
TS-03	Tempo Stand	Southern part of W-5 beside SR-13 road	W-5	-	0.25	Fazilpur
TS-04	Tempo Stand	Northern part of W-7 between SR-18 & TR-48 road	W-7	-	0.29	Hobibpur

ID	Proposal	Location	Ward	Existing Area (Acre)	Proposed Area (Acre)	Mouza Name
TT	Truck Terminal	Northern part of W-7 beside SR-18 road	W-7	-	1.02	Hobibpur
Total				2.57	3.81	-

Open Space (Outdoor Recreation)

The existing land under open space, designated as urban green space at the survey stage, is 2.76 acres covering 0.04% of the total area. 116.30 acres of land is proposed for outdoor recreation to serve the projected population up to year 2031 reserving open land with a view to sustain hydrological processes as well as. It includes central park, stadium, playground and other outdoor recreational facilities. Details of permitted and conditional permits have been presented in **Annexure-B**.

Table 10.8: New Land Proposal for Open Space

ID	Proposal	Location	Ward	Existing Area (Acre)	Proposed Area (Acre)	Mouza Name
CP	Central Park	Eastern part of W-8 & Northern part of W-9 between SR-13 & TR-68 road	W-8,9	-	7.59	Fazilpur Shailkupa
NP-01	Neighbourhood Park	Southern part of W-3 between PR-01 & TR-12 road	W-3	-	3.19	Horidebpur Shailkupa
NP-02	Neighbourhood Park	Western part of W-6 beside TR-29 road	W-6	-	7.03	Aushia
NP-03	Neighbourhood Park	South-east part of W-7 beside PR-02 road	W-7	-	9.60	Hobibpur Jhaudia
P-01	Park	Central part of W-1 between SR-01 & TR-02 road	W-1	-	5.39	Shampur
P-02	Park	Eastern part of W-5 between SR-12 & SR-13 road	W-5	-	9.15	Pathanpara
PG-01	Playground	Central part of W-1 beside SR-01 road	W-1	-	3.93	Shampur
PG-02	Playground	Eastern part of W-2 between SR-02 & TR-02 road	W-2	-	3.25	Shailkupa
PG-03	Playground	Central part of W-3 beside PR-01 road	W-3	-	6.85	Shailkupa
PG-04	Playground	Southern part of W-5 beside TR-31 road	W-5	-	3.30	Fazilpur
PG-05	Playground	Western part of W-6 beside TR-29 road	W-6	-	2.78	Aushia
PG-06	Playground	South-east part of W-7 between PR-02 & TR-44 road	W-7	-	2.99	Hobibpur
ST	Stadium	Southern part of W-4 near PR-01, SR-03 & SR-05 road	W-4	-	10.69	Shailkupa
Total				2.76	75.75	-

Recreational Use (Indoor Recreation)

Presently there is one cinema hall in the Paurashava area which may be considered as sufficient enough to meet the requirement of such purpose. However, no additional land is proposed to designate for this purpose up to year 2031. Details of permitted and conditional permits have been presented in **Annexure-B**.

Health Services

Presently 2.84 acres of land is used for Health services in the Paurashava. According to planning standard, total 21.06 acres of land is projected for future use up to year 2031. However, the Doctor's residential areas are not counted in health services landuse according to landuse category provided the PMO. So, Upazila HQ have sufficient land to support the Paurashava. Furthermore, 3 (three) of hospitals are proposed within the Paurashava with 16.93 acres of land. Details of permitted and conditional permits have been presented in **Annexure-B**.

Table 10.9: New Land Proposal for Health Services

ID	Proposal	Location	Ward	Existing Area (Acre)	Proposed Area (Acre)	Mouza Name
HOS-01	Hospital	Central part of W-1 between SR-01 & TR-01 road	W-1	-	5.90	Shampur Shailkupa
HOS-02	Hospital	Northern part of W-5 between PR-01 & SR-11 road	W-5	-	4.84	Shailkupa
HOS-03	Hospital	Southern part of W-9 beside PR-02 road	W-9	-	6.19	Jhaudia
Total				2.84	16.93	-

Utility Services

Presently there are some land under utility services. According to planning standard, total 14.06 acres of land is projected for future use up to year 2031. Total 16.10 acres of land is proposed for Utility services to serve the projected population up to year 2031. It includes public toilets, fire station, slaughter house, waste disposal ground and waste transfer stations. Details of permitted and conditional permits have been presented in **Annexure-B**.

Table 10.10: New Land Proposal for Utility Services

ID	Proposal	Location	Ward	Existing Area (Acre)	Proposed Area (Acre)	Mouza Name
FS	Fire Station	Northern part of W-5 between PR-01 & SR-11 road	W-5	-	1.94	Shailkupa
PT-01	Public Toilet	Central part of W-1 beside TR-01 road	W-1	-	0.12	Shailkupa
PT-02	Public Toilet	Central part of W-4 beside SR-03 road	W-4	-	0.14	Shailkupa

ID	Proposal	Location	Ward	Existing Area (Acre)	Proposed Area (Acre)	Mouza Name
PT-03	Public Toilet	Southern part of W-5 beside SR-13 road	W-5	-	0.11	Fazilpur
PT-04	Public Toilet	Western part of W-6 beside TR-29 road	W-6	-	0.24	Aushia
PT-05	Public Toilet	Northern part of W-7 beside TR-48 road	W-7	-	0.11	Hobibpur
PT-06	Public Toilet	Southern part of W-9 beside PR-02 road	W-9	-	0.10	Jhaudia
SH	Slaughter House	Eastern part of W-8 between TR-32 & TR-33 road	W-8	-	0.19	Shailkupa
WDG	Waste Disposal Ground	Eastern part of W-6 beside PR-01 road	W-6	-	10.96	Khalkula
WTS-01	Waste Transfer Station	Northern part of W-1 near TR-05 road	W-1	-	0.26	Shailkupa
WTS-02	Waste Transfer Station	Eastern part of W-3 between TR-13 & TR-15 road	W-3	-	0.25	Shailkupa
WTS-03	Waste Transfer Station	Central part of W-5 near TR-30 road	W-5	-	0.26	Shailkupa
WTS-04	Waste Transfer Station	Central part of W-9 beside TR-75 road	W-9	-	0.26	Kobirpur
Total				1.17	14.94	-

Community Facilities

Currently 12.11 acres of land is used as community facilities. According to planning standard, total 12.94 acres of land is projected for future use up to year 2031. Total 11.88 acres of land is proposed for community facilities to serve the projected population up to year 2031. It includes Community Centre, Youth Development Centre, Eidgah and graveyard. Details of permitted and conditional permits have been presented in **Annexure-B**.

Table 10.11: New Land Proposal for Community Facilities

ID	Proposal	Location	Ward	Existing Area (Acre)	Proposed Area (Acre)	Mouza Name
CC	Community Centre	South-east part of W-4 beside TR-17 road	W-4	-	1.25	Shailkupa
ED	Eidgah	Western part of W-5 between TR-21 & TR-22 road	W-5	-	0.65	Shailkupa
GY	Graveyard	Central part of W-4 beside SR-08 road	W-4	-	0.98	Shailkupa
YDC	Youth Development Centre	Southern part of W-8 beside SR-06 road	W-4	-	0.56	Shailkupa
Total				12.11	3.44	-

Map 10.1: Existing Land Use Map of Shailkupa Paurashava

Mixed Use

Some mixed use zone has been proposed in the adjoining areas of proposed public places, e.g. stadium, central park, neighborhood park and other functionally important areas where co-existence of more than one compatible land uses is anticipated by the planning team. This co-existence of land uses is requisite to ensure a livable urban environment as well as a means of income generating activities for the Paurashava dwellers. A total of 57.85 acres of land has been proposed as mixed use zone at different locations of the planning area. Mixed use zone will accommodate mainly residential use along with light commercial or some other activities compatible with living environment of the locality.

Besides, some mixed use zone under the name Ward Centre has been proposed in each Ward at strategic location which may also be considered as hub of the respective Ward. Ward Centre will contents councilor office, community centre, super market and in some cases primary school provided with adequate open space for playground. Other compatible uses may also be provided in the Ward Centre which is justified to be an vigorous agent in turning it into a livable growth centre. Details of permitted and conditional permits have been presented in **Annexure-B**.

Table 10.12: New proposal of Ward Centre in Shailkupa Paurashava

ID	Proposal	Location	Ward	Existing Area (Acre)	Proposed Area (Acre)	Mouza Name
WC-01	Ward Centre	Central part of W-1 beside TR-01 road	W-1	-	0.51	Shailkupa
WC-02	Ward Centre	Southern part of W-2 between TR-07 & TR-08 road	W-2	-	0.52	Shailkupa
WC-03	Ward Centre	Eastern part of W-3 between TR-13 & TR-15 road	W-3	-	0.49	Shailkupa
WC-04	Ward Centre	Southern part of W-8 beside SR-06 road	W-4	-	0.51	Shailkupa
WC-05	Ward Centre	Southern part of W-5 beside SR-13 road	W-5	-	0.55	Fazilpur
WC-06	Ward Centre	Western part of W-6 beside TR-29 road	W-6	-	0.57	Aushia
WC-07	Ward Centre	Northern part of W-7 between SR-18 & TR-43 road	W-7	-	0.49	Hobibpur
WC-08	Ward Centre	Eastern part of W-8 beside TR-68 road	W-8	-	0.50	Kobirpur
WC-09	Ward Centre	Southern part of W-9 beside TR-67 road	W-9	-	0.54	Jhaudia
Total				-	4.68	-

Government Office

Being an Upazila Headquarters, Shailkupa Paurashava accommodates almost all the government offices necessary for proper functioning of the Upazila as an administrative centre as well as providing government services to the inhabitants of the entire Upazila. However, the Paurashava has its own office building for functioning of the Paurashava. The Paurashava authority has been continuing its administrative functions from this Paurashava Building and the area is sufficient to continue its functions. Thus no additional land has been proposed for Paurashava Office Complex. Details of permitted and conditional permits have been presented in **Annexure-B**.

Miscellaneous

Other categories of uses which do not fall under the classified 23 types of land uses have been designated as miscellaneous use. NGO office, vacant land etc. falls under this category. An area of 7.11 acres that is 0.14% of the total area has been designated as miscellaneous use. Details of permitted and conditional permits have been presented in **Annexure-B**.

10.2.2 Land Use Zoning

Development control is an essential part of urban planning. For development control certain procedures have to be followed for approval of designs of various categories of structures, establishments and land uses. The first condition is to secure land use permit according to approved zoning plan followed by approval of the design of proposed building/structure.

10.2.2.1 Types of Land Use Zoning

In land use zoning, the entire area of a town is divided into suitable land use zones to create congenial and livable environment and thereby enhance land value. In Bangladesh such land use zoning is incorporated as a part of the master plan / land use plan/urban area plan. Before submitting building plans for approval an applicant must secure land use permit from the Paurashava. For land use permit, an applicant's prospective use of structure must be compatible with the approved land use zone of the site. Land use zoning limits activities that can or cannot function on a land parcel by establishing a range of development options. Land use zoning is a legal instrument by application of which a Paurashava can control,

- The height of building/structure,
- The area of a land parcel that must be left vacant, and
- The use of a buildings and land.

Zoning can be of three types, area zoning, density zoning and height zoning.

Area Zoning

By area zoning an area is divided into zones suitable for that particular area. The main objectives of such zoning are done mainly from environmental point of view that accrues other social benefits.

Density Zoning

The aim of the density zoning is to limit the size of population in any particular area by means of density control. The size of population has bearing on the capacity of designed utility facilities and amenities and traffic volume and crowding, especially in the residential areas. Such zoning is done to ensure a healthy and enjoyable community living.

Height Zoning

Height zoning restrict the height of buildings structures in any particular area. This zoning is aimed to promote the proper and sound development of areas. Height zoning is of particular importance in airport areas to ensue take off and landing of aircrafts.

Considering the existing level of development and development prospects, the consultant recommends to follow the area zoning only. Zoning is only a part of development control regulations. A prospective developer in a Paurashava has to comply with other rules and regulations, like, Building Construction Rules, 1996 under East Bengal Building Construction Act 1952, Bangladesh National Building Code 1993 and other conditions of construction method, building safety and associated issues.

10.2.2.2 Classification of Land Use Zoning

The following land use zone classification is recommended under the current Paurashava Master Plan.

Table 10.13: Proposed Land Use Categories for Urban Area Plan of Shailkupa Paurashava

Sl No.	Landuse Type	Illustrates	Area (acre)	%
1	Agricultural Zone	Agricultural land denotes the land suitable for agricultural production, both crops and livestock.	2578.86	50.19
2	Circulation Network	Road and Rail Transport network falls under this category. New construction of Primary, Secondary and Tertiary Roads along with widening of existing roads form the road transport network.	406.56	7.91
3	Commercial Zone	Existing markets, shops and proposed neighborhood market, super market and wholesale market.	53.03	1.03
4	Community Facilities	All community facilities including funeral places and other religious uses, e.g. mosque/ church/ temple, graveyard/ cemetery/ crematorium, eidgah, shasan ghat, community centre falls under this category.	11.88	0.23
5	Education & Research Zone	Existing and proposed primary school, high school, college, Madrasa, youth development centre	63.12	1.23
6	General Industrial Zone	Green and Orange A categories as per The Environment Conservation Rules, 1997	41.70	0.81

Sl No.	Landuse Type	Illustrates	Area (acre)	%
7	Government Office	All Government Offices including Upazila complex, Paurashava building, police station, land office, post office, LGED office, DPHE office, education office etc.	19.28	0.38
8	Health Services	All Hospitals, clinics and diagnostic centre	21.06	0.41
9	Heavy Industrial Zone	Other toxic and pollutions Industries (*Orange B and Red categories as per the Environment Conservation Rules, 1997*)	15.69	0.31
10	Miscellaneous	Any other categories, which are not related to other 23 categories. It includes vacant land, NGO office, international office etc.	7.11	0.14
11	Mixed Use Zone	Mixed land use refers to the area without a dominant land use or, multiuse	57.85	1.13
12	Open Space	Playground, Central park, neighborhood park, Stadium etc.	116.30	2.26
13	Recreational Facilities (*Indoor Recreation*)	Indoor based facilities with designated building structure i.e. Cinema Hall, Theater Hall etc.	0.13	0
14	Rural Settlement	Rural settlement includes the low dense residential area, which is scattered and rural in nature.	482.23	9.38
15	Transportation Facilities	This category includes airport, bus terminal/ stand, truck terminal, tempo stand, ferry ghat, filling station, garage, launch terminal, passenger shed, ticket counter, parking area, transport office etc.	5.52	0.11
16	Urban Deferred	Urban reserved area for future development	180.30	3.51
17	Urban Residential Zone	It includes existing high dense residential area and proposed resettlement zone, land for poor people, old home	836.55	16.28
18	Utility Services	Utility services include Overhead Tank, Power Office/ Control Room, Public Toilet, Sewerage Office, Waste Dumping Ground, waste transfer station, Fire Service, Water Pump House, Water Reservoir, Water Treatment Plant etc.	16.10	0.31
19	Beach	Sea Beach	Not Applicaple	0
20	Forest	Designated Forest Area	Not Applicaple	0
21	Restricted Area	Where no one but certain people can enter, i.e. Electric Sub-Station, Fuel Reserve Depot, Gas Transmission, Cantonment etc.	Not Applicaple	0
22	Overlay Zone	Undefined Zone	Not Applicaple	0
23	Historical & Heritage Site	The entire mentionable historical and heritage site	Not Applicaple	0
24	Water Body	Equal or More than 0.15 acre and justification by the consultant and wet land will merge with water body	225.34	4.39
Total			5138.60	100

Map 10.2: Land Use Plan of Shailkupa Paurashava

10.2.3 Land Use Permission

One of the major purposes of land use zoning is to restrict an area for a particular use meant for the zone. This is intended to maintain a disciplined land use distribution and development. But there are many uses other than the use meant for the zone that are considered for permit in the zone. Sometimes such applications are accommodated to support or assist the area, with conditions imposed in giving land use permit, sometimes strict restrictions are maintained by refusal of applications. Detailed lists of permissible and conditionally permissible uses have been provided in **Annexure-B** according to land use categories. The list has been developed with ideas borrowed from the recommendations made by the consultants under the recently completed DAP Project of RAJUK. It is required that permit procedures mentioned in **Annexure-B** are officially adopted through incorporation in the Building Construction Rules, 1996 under Section 18 of the East Bengal Building Construction Act 1952.

10.3 Plan Implementation Strategy

This section deals with the issues of implementation of land use plan. Discussion is made on development regulation and recommendation on implementation, monitoring and evaluation of urban land use plan.

10.3.1 Land Development Regulations to implement the Land use Plan

Urban planning regulations are necessary for the smooth functioning of land use plan. The land use regulations impact on planned development and result in social benefits and costs depending on their nature and the specific contexts in which they are applied. Careful reforms of these regulations can result in a lower cost for urban development and for housing. An additional benefit could be in terms of a more functional spatial organization of the town. Regulations and processes that facilitate land availability and uses for planned development at affordable costs need to be continued. Regulatory and process reforms can lead to

- more compact towns, containment of urban sprawl, more efficient urban forms,
- less costly urban infrastructure,
- more market-friendly development of urban land;
- more intensely used central areas, better efficiency of public transportation systems and decrease in trip length and transportation costs;
- less violations in zoning, sub-division and building regulations, and reduction in nonconforming and non-compatible uses and slums;

- reduction in difference between what is allowed under regulations and what is financially feasible due to land use reforms leading to reduced opportunities for corruption;
- generally lower land prices in city/town but higher prices in some prime commercial and business districts driven by market forces;
- average urban population densities likely to stay constant as more efficient land use consumption.

The following measures of Land Development Regulations should strictly be followed for the proper implementation of the Land use Plan.

a. Restriction on Use of Land Contrary to the Master Plan

No person shall use any land for any purpose other than that laid down in the land use zoning of the Master Plan approved by the Government. All future developments and constructions, both public and private within the area of Structure Plan shall be in conformity with the Master Plan approved by the Government. No compensation shall be payable to any person owing to demolition of any construction developed in violation of the Master Plan provisions.

b. Building Permission and Construction Approval

Development control mechanism will be one of the major plan implementation instruments to be carried out through the Building Construction Rules, 1996 under Section 17 of the East Bengal Building Construction Act 1952 and the land use provisions of the Master Plan.

c. Building Permission in Proposed Development Areas

The Master Plan proposes a number of development projects. Many of the lands under these development projects are under private ownership. No development in these lands by their owners will be allowed. They will remain in the present form till they are taken over by the respective authority for development or the development project is abandoned.

d. Parking in Commercial and Mixed Use Areas

For parking, Building Construction Rules, 1996 has specific provisions for housing and commercial areas. But no provision has been suggested for mixed use areas. According to the rules for commercial area, 23 sq.m areas, has to be reserved for every 200 sq.m of commercial space. The consultant suggests that for mixed areas, Building Construction Rules, 1996 meant for commercial area should also be applied to the mixed areas under the current plan.

e. Rules for Realization of Betterment Fee

The Local Government (Paurashava) Act, 2009 enables Paurashava to charge betterment fees on land owners or any other person having interest in it for an increase in land value due to execution of any development scheme by the Authority. The Authority should develop appropriate procedures in this regard and get them approved to start charging betterment fee. Due to failure of execution of the powers of charging betterment fee, all benefits of land value enhancement due to Paurashava development projects goes to the land owner at the cost of the community. So it is not irrational for the road developer to demand a share of the benefit accruing to the land owner following road development.

f. Planning Rules for Real Estate Companies

With the increase in population, there will be further rise of land based real estate activities. But there is no provision in the Local Government (Paurashava) Act, 2009 to control the activities of real estate companies. It is needed that infrastructure and services provided in the housing plans of the real estate projects be standardized to secure interest of the buyers. Strict vigilance is needed against any fraudulent practices that might affect public interest.

However, any control imposed on the housing companies must be imbued with a positive approach, so that it does not affect the housing promotion activities of the private sector. The intention would be to allow them function under certain control that would secure public interest and at the same time will not discourage private investment in housing. The infrastructure, services and facilities provided in a housing project must be standardized. Road width and the land allocated for community facilities must be adequate to meet requirements of the future inhabitants. The infrastructure provided therein must follow minimum standard as some day these housing estates would become parts of the future town and the infrastructure provided therein would be used by a wide range of population of the town.

To control apartment development, the national rules under East Bengal Building Construction Act 1952 will be applied. The rules for land based real estate projects exist for Dhaka only. In anticipation of expansion of real estate projects, there is an urgent need to prepare a set of rules for small towns. The real estate companies seeking approval for their housing project layout plan must fulfill certain conditions as set in the rules. The set of rules is clearly described in the Private Residential Land Development Rule-2004.

g. Minimum Road Width

Building Construction Rules, 1996, should be amended in the following way by incorporating the minimum road width standard.

To ease future traffic movement, it is necessary to keep provision for wider roads in the present plan. It is an uphill task to widen roads after development has taken place along the road. So it is wiser to reserve wider right of way for new roads now. Building Construction Rules, 1996 has determined the minimum road width as 12 ft. or 3.65 meter for roads in general and approximately 10 ft. for private roads. The consultants feel that this standard is not enough in view of future increase in population density and traffic. For safeguarding and easing future traffic movement the consultants have set the minimum width for any road for common use as 20 ft. or 6 meter and 16 ft. or 4.77 meter for private roads. However, in the built up areas, where development has already blocked the scope for developing such wide roads, the consultant recommends the minimum road width provisions of Building Construction Rules, 1996. The new road width provision will be applicable in new areas. In the areas, where there already exist roads of less than 20 ft., the land owners on either side of the road will equally share the space needed to increase the road width to 20 ft. The land owners must leave the space vacant for taking it over by the Paurashava for widening of the road at some later date. No proposal for construction should be permitted on the vacant space reserved for road widening though the land will remain under its current ownership till it is taken over by the authority. In the light of the above recommendations, necessary amendment will have to be brought in the Building Construction Rules, 1996 applicable to the secondary and small towns only.

h. Low Land, Pond and Drainage Path

No low land that retains water for certain period of the year can be filled up and no obstruction to natural or man made drainage system shall be allowed. Prior permission of Shailkupa Paurashava will be required for filling up of any low lands. The Paurashava shall accord such permission based on prevailing laws. All ponds should not be allowed to be filled up as they are a good source of urban water supply as well as serve as open space. As per the Playfield, Open space, Park and Natural water reservoir Conservation Act, 2000, the use of these water bodies can not be changed without prior permission of the authority.

i. Security Areas - Cantonment, BDR, Police Stations

BDR, Police, etc. areas have to be safe guarded from any possible incompatible development.

j. Radio, Television, Water Treatment and Pump Station and Power Station Sites

The key point installations including radio, television, water treatment and pump station and power station sites will have to be safeguarded from any possible undesirable development around these areas that can endanger their security. No

building except vegetation should be allowed within 183 meters around the transmission towers.

10.3.2 Implementation, Monitoring and Evaluation of the Land Use Plan

The implementation, monitoring and evaluation strategies of Structure Plan have been illustrated in **Chapter-9** of **Part-A**. The Land Use Plan should also be implemented, monitored and evaluated under the same strategy by strengthening capacity of the Paurashava and forming a Monitoring and Evaluation Committee (*MEC*).

As the Land Use Plan is a plan with a period of 20 years (2011-2031), it will be implemented on phase wise according to priority. The proposals have been prioritized based on the most urgent community needs, since the Government of Bangladesh (*GoB*) is a least developed country and it has a very limited budget on infrastructure development. Besides, the Paurashava Authority itself is not capable of financing this huge cost.

The ***Land Use Plan*** will be implemented gradually following prioritized landuse proposals. Phasing of land use proposals was done based on the priority needs for development of the town. The ***Phase-I*** of the land use proposals, to be also incorporated in the Ward Action Plan, will be implemented within first 5 year (2011-2016) of the land use plan period. The consultants have proposed ***Phase-II, Phase-III*** and ***Phase-IV*** of the proposals to be implemented within next consecutive 5 years for Ward Action Plan. The details of phasing are shown in **Table-10.14, Table-10.15, Table-10.16** and **Table-10.17**. After each 5 years the ***Land Use Plan*** will be evaluated, updated and new Ward Action Plan will be formulated under the changing circumstances.

Table 10.14: Phasing of Development Proposals (Phase-I)

Phase-I (2011-2016)				
ID	Name of Proposal	Location	Ward No.	Area (Acre)
FS	Fire Station	Northern part of W-5 between PR-01 & SR-11 road	W-5	1.94
PA	Parking Area	Central part of W-4 beside PR-01 road	W-4	0.35
PT-01	Public Toilet	Central part of W-1 beside TR-01 road	W-1	0.12
PT-02	Public Toilet	Central part of W-4 beside SR-03 road	W-4	0.14
PT-03	Public Toilet	Southern part of W-5 beside SR-13 road	W-5	0.11
PT-04	Public Toilet	Western part of W-6 beside TR-29 road	W-6	0.24
PT-05	Public Toilet	Northern part of W-7 beside TR-48 road	W-7	0.11
PT-06	Public Toilet	Southern part of W-9 beside PR-02 road	W-9	0.10
SH	Slaughter House	Eastern part of W-8 between TR-32 & TR-33 road	W-8	0.19
TS-01	Tempo Stand	Southern part of W-2 beside SR-01 road	W-2	0.19
TS-02	Tempo Stand	Western part of W-4 between PR-01 & SR-08 road	W-4	0.27
WC-01	Ward Centre	Central part of W-1 beside TR-01 road	W-1	0.51
WC-02	Ward Centre	Southern part of W-2 between TR-07 & TR-08 road	W-2	0.52
WC-03	Ward Centre	Eastern part of W-3 between TR-13 & TR-15 road	W-3	0.49

Phase-I (2011-2016)				
ID	Name of Proposal	Location	Ward No.	Area (Acre)
WC-04	Ward Centre	Southern part of W-8 beside SR-06 road	W-4	0.51
WC-05	Ward Centre	Southern part of W-5 beside SR-13 road	W-5	0.55
WC-06	Ward Centre	Western part of W-6 beside TR-29 road	W-6	0.57
WC-07	Ward Centre	Northern part of W-7 between SR-18 & TR-43 road	W-7	0.49
WC-08	Ward Centre	Eastern part of W-8 beside TR-68 road	W-8	0.50
WC-09	Ward Centre	Southern part of W-9 beside TR-67 road	W-9	0.54
WDG	Waste Disposal Ground	Eastern part of W-6 beside PR-01 road	W-6	10.96
WTS-01	Waste Transfer Station	Northern part of W-1 near TR-05 road	W-1	0.26
WTS-02	Waste Transfer Station	Eastern part of W-3 between TR-13 & TR-15 road	W-3	0.25
WTS-03	Waste Transfer Station	Central part of W-5 near TR-30 road	W-5	0.26
WTS-04	Waste Transfer Station	Central part of W-9 beside TR-75 road	W-9	0.26

Table 10.15: Phasing of Development Proposals (Phase-II)

Phase-II (2016-2021)				
ID	Name of Proposal	Location	Ward No.	Area (Acre)
BT	Bus Terminal	Northern part of W-7 between SR-18 & TR-48 road	W-7	1.44
CM	Cattle Market	Eastern part of W-8 between TR-32 & TR-33 road	W-8	0.57
NM-01	Neighbourhood Market	Central part of W-1 beside SR-01 road	W-1	0.90
NM-02	Neighbourhood Market	Southern part of W-5 beside SR-13 road	W-5	1.15
NP-01	Neighbourhood Park	Southern part of W-3 between PR-01 & TR-12 road	W-3	3.19
NP-02	Neighbourhood Park	Western part of W-6 beside TR-29 road	W-6	7.03
P-01	Park	Central part of W-1 between SR-01 & TR-02 road	W-1	5.39
PG-01	Playground	Central part of W-1 beside SR-01 road	W-1	3.93
PG-02	Playground	Eastern part of W-2 between SR-02 & TR-02 road	W-2	3.25
PG-03	Playground	Central part of W-3 beside PR-01 road	W-3	6.85
PS-01	Primary School	Central part of W-3 beside PR-01 road	W-3	2.67
TS-03	Tempo Stand	Southern part of W-5 beside SR-13 road	W-5	0.25
TS-04	Tempo Stand	Northern part of W-7 between SR-18 & TR-48 road	W-7	0.29
TT	Truck Terminal	Northern part of W-7 beside SR-18 road	W-7	1.02
WM	Wholesale Market	Eastern part of W-7 & Western part of W-8 between SR-18, TR-40 & TR-56 road	W-7	4.30

Table 10.16: Phasing of Development Proposals (Phase-III)

Phase-III (2021-2026)				
ID	Name of Proposal	Location	Ward No.	Area (Acre)
C-02	College	South-east part of W-7 & Western part of W-9 beside TR-44 road	W-7	10.59
CC	Community Centre	South-east part of W-4 beside TR-17 road	W-4	1.25
ED	Eidgah	Western part of W-5 between TR-21 & TR-22 road	W-5	0.65
GY	Graveyard	Central part of W-4 beside SR-08 road	W-4	0.98
HOS-01	Hospital	Central part of W-1 between SR-01 & TR-01 road	W-1	5.90
HOS-02	Hospital	Northern part of W-5 between PR-01 & SR-11 road	W-5	4.84
HS-01	Secondary School	Central part of W-1 beside SR-01 road	W-1	6.30
HS-02	Secondary School	Central part of W-3 beside PR-01 road	W-3	4.15
NM-03	Neighbourhood Market	Western part of W-6 beside TR-29 road	W-6	2.34
PG-04	Playground	Southern part of W-5 beside TR-31 road	W-5	3.30
PG-05	Playground	Western part of W-6 beside TR-29 road	W-6	2.78
PS-02	Primary School	Southern part of W-8 beside TR-65 road	W-8	1.97
SM	Super Market	Central part of W-4 beside SR-03 road	W-4	3.94
VI	Vocational Institute	Eastern part of W-2 & Western part of W-4 beside PR-01 road	W-2	8.28

Table 10.17: Phasing of Development Proposals (Phase-IV)

Phase-IV (2026-2031)				
ID	Name of Proposal	Location	Ward No.	Area (Acre)
C-01	College	Northern part of W-5 beside PR-01 road	W-5	6.57
CP	Central Park	Eastern part of W-8 & Northern part of W-9 between SR-13 & TR-68 road	W-8	7.59
HOS-03	Hospital	Southern part of W-9 beside PR-02 road	W-9	6.19
HS-03	Secondary School	Southern part of W-9 beside PR-02 road	W-9	3.63
IZ	General Industrial Zone	Northern part of W-7	W-7	23.12
LLP	Land for Poor People	Southern part of W-9 beside PR-02 road	W-9	9.16
NM-04	Neighbourhood Market	Southern part of W-9 beside PR-02 road	W-9	0.90
NP-03	Neighbourhood Park	South-east part of W-7 beside PR-02 road	W-7	9.60
OH	Old Home	Western part of W-6 between TR-29 & TR-30 road	W-6	0.54
P-02	Park	Eastern part of W-5 between SR-12 & SR-13 road	W-5	9.15
PG-06	Playground	South-east part of W-7 between PR-02 & TR-44 road	W-7	2.99
RZ	Resettlement Zone	Southern part of W-8 between SR-05 & SR-06 road	W-4	16.73
ST	Stadium	Southern part of W-4 near PR-01, SR-03 & SR-05 road	W-4	10.69
YDC	Youth Development Centre	Southern part of W-8 beside SR-06 road	W-4	0.56

Monitoring 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. Thus the Plan should be monitored by the MEC for proper implementation of the Plan. The MEC should call for a meeting at least two times a year on regular basis. In addition, it should sit for a meeting in any situation if any dispute arises regarding implementation of the Plan. After expiry of any Plan evaluation will be made about the errors and omissions. Such evaluation will help to take corrective measures in the next plan.

CHAPTER-11

TRANSPORTATION AND TRAFFIC MANAGEMENT PLAN

11.1 Introduction

Transportation and Traffic Management Plan is an advanced document that sets out the long-term direction for transport in a particular area. The plan guides development of a town's transportation system. It covers the movement of people by mode, for example, public transport, car, walking and cycling, and freight by road, railway and waterway as appropriate to an area.

It is useful for defining the direction of transport-related issues in a particular area. It can recognize the links between transport and land use and urban form and set objectives and policies to address these linkages.

Shailkupa Paurashava connects with the Shailkupa-Garaganj road through Jhenaidah Sadar road. A road named Sreepur connecting the Bagura district and Jhenaidah district passes over the Paurashava. Most of the offices are located in the southern part of the Paurashava, whereas the educational institutions are scatteredly distributed all over the Paurashava. All markets and shopping centres are placed along the Kabi Golam Mostofa road sides.

The project area is served by 120.66 kilometers of roads. Total area covered by road network is about 113.09 acres. Out of them 29.35% are pucca, 37.12% are semi-pucca and 33.53% are katcha.

There is a major intersection known as Kabirpur Mor. Other three intersections are laid adjacent to the main Road (*Kabi Golam Mostofa road*) and four less important Road links within the jurisdiction of the Paurashava. Not a single rail network is established yet in this Paurashava.

Rickshaw and Rickshaw Van are the main mode of transport within the jurisdiction of the Paurashava. Bhodvodi is a locally made motorized vehicle are another mode of transport, those are being using passenger into the heart from long distance.

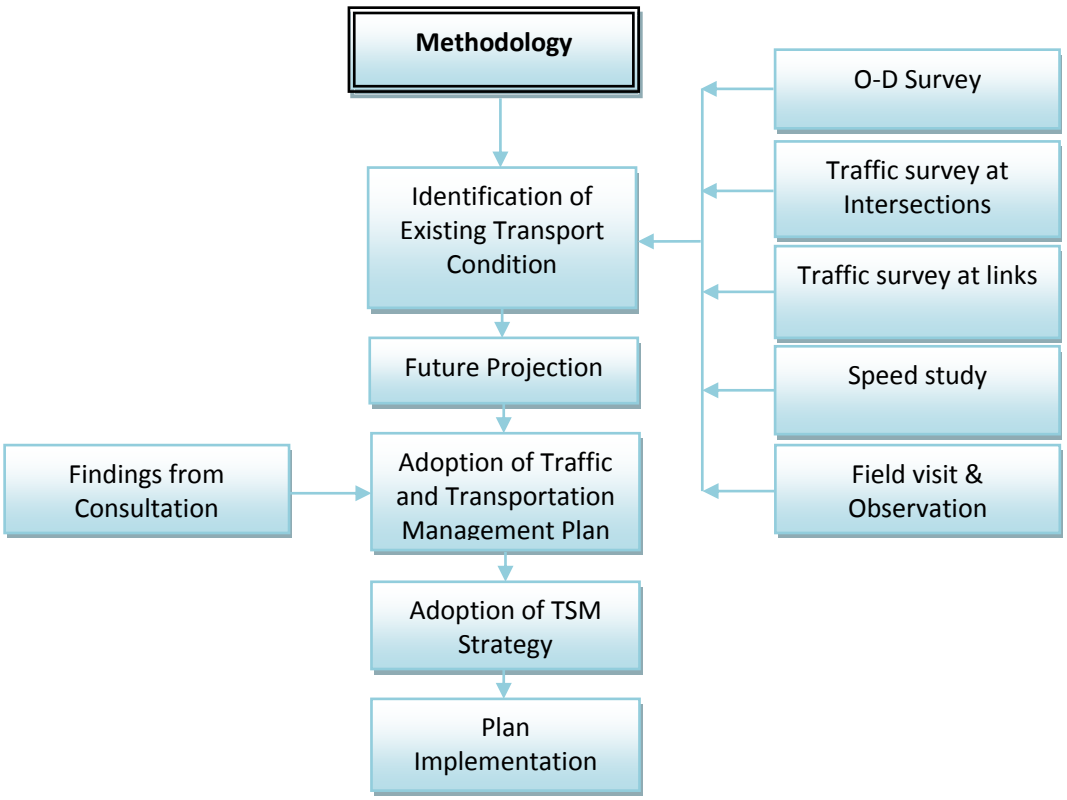
11.1.1 Approach and Methodology

The methodology of the study could be illustrated through five-step process for the assessment of Transportation and Traffic Management Plan. These five steps are:

The first step of the methodology of transportation and traffic management plan is to identify the existing transport condition, which is the result of O-D survey, traffic survey at intersection, traffic survey at links and speed study; have already described in the survey report. In the next step, the future projection of transportation network and traffic demand is identified, which is described in the interim report. The 3rd phase of the

study is to adopt new traffic and transportation management plan, which is prepared based on future projection. After that, some strategies on Transportation System Management (*TSM*) are undertaken. Finally, plan implementation strategies are espoused based on both transportation management plan and transportation system management.

Figure 11.1: Flow Chart of the Methodology



11.2 Existing Conditions of Transportation Facilities

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

11.2.1 Roadway Characteristics and Functional Classification

11.2.1.1 Major Road Network

There are as many as three types of roads are existed in Shailkupa Paurashava which is Pucca, Semi-Pucca and Katcha. The Pucca roads are usually the paved bituminous roads, Semi-Pucca roads are mostly the Herring Bone Bond (*HBB*) type, and the Katcha roads are usually earthen roads.

11.2.1.2 Roads in Shailkupa Paurashava

According to the Paurashava source, the total length of roads in the Paurashava area is 120.66 km. There are katcha, semi-pucca and pucca roads within the Paurashava area. Out of 120.66 km of roads, Pucca road is 29.49 km, Semi-pucca road is 47.20 km and Katcha Road is 47.20 km.

Roads of Roads and Highways Department

The Paurashava has some roads within the town owned and maintained by the Roads and Highways Department (*RHD*). This road passes through the heart of the town to connect other urban centres and Dhaka via Jhenaidah. The width of this road is 25 ft, while the right of way is 30 ft.

Roads of Local Government Engineering Department (LGED)

LGED maintains about some roads within the Shailkupa Paurashava. These are, Chatura Road, Char Aoushia Road, Paurashava Road, Pathanpara Road and Habibpur Road.

Important Tertiary Roads

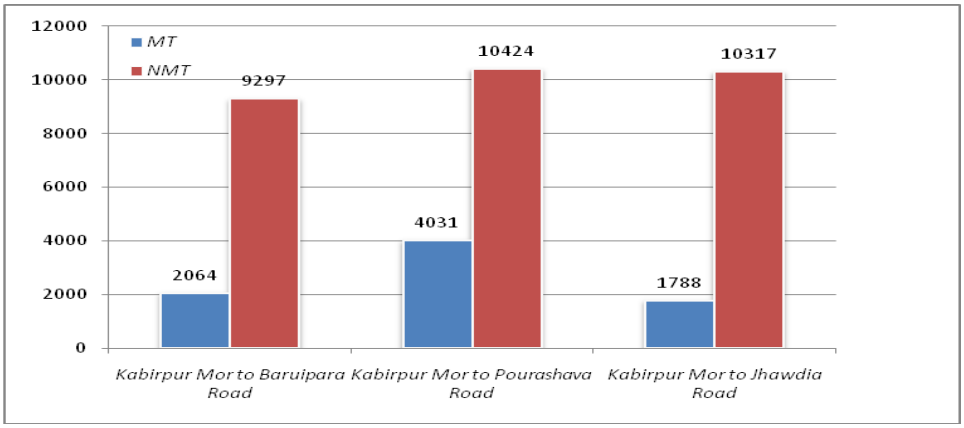
The Paurashava has so far developed many roads within its area with different widths. The Paurashava is also responsible for maintaining these roads. The authority has named many of these roads after renowned local personalities.

Map 11.1: Existing Road Network Map of Shailkupa Paurashava

11.2.2 Modal Share of vehicular traffic

Shailkupa Paurashava is a big town. Non-Motorized Transport (*MT*) is dominating in the town's internal traffic. The traffic volume survey at Kabirpur Mor presents that almost 79.21% traffic is NMT. The highest number of MT moves through Kabirpur Mor, the number of MT is 10424 which shares 27.49% of total traffic movements through this direction. **Figure-11.2** shows the directional vehicular composition of Kabirpur Mor.

Figure 11.2: Directional Composition of MT and NMT Composition at Kabirpur Mor



Source: Traffic Survey, 2009

It is clearly evident from the survey that majority of the people choose non-motorized vehicle to go their desired destinations and hence NMT is the most widely used transport mode for Shailkupa like most of the other Paurashavas.

11.2.3 Intensity of Traffic Volume

In order to investigate the nature of traffic movement and assess the volume of traffic the consultant has identified a point of Kabirpur Mor as the only major road intersection with in the Project Area for conducting the traffic volume survey. The consultant has designed a standard format for traffic volume survey (*approved by LGED*). Traffic volume survey shows more than 37921 traffic move through the intersection. Among these 30038 NMT and 7883 are MT vehicles.

11.2.4 Level of Service: Degree of Traffic Congestion and Delay

11.2.4.1 Traffic Congestion

Traffic conflict is common and frequent in towns, where there is combination of transport vehicles slow and fast-on the streets. Major conflict and congestions occur in the places, where intensity of traffic movement is high, on street parking is made and on street loading or unloading of goods are taken place. The consultant studied the traffic movement all over the town and has identified three main points, where the traffic congestion is the highest. These are located at Kabirpur Mor, Chowrasta Mor and Hall Mor. At these points, the slow moving vehicles like, rickshaws and vans come in conflict

with motor vehicles, creating traffic congestion. As the number of slow moving vehicles is higher, the conflicts are usually frequent.

11.2.4.2 Delay

The traffic delays in Shailkupa town is caused by the interaction of various factors, such as congestion, inadequacy of carriageway widths, mixed traffic conditions, parked vehicles and heavy pedestrian flow and such delays are called congestion delays or operational delays and are difficult to measure precisely. It is observed that peak period takes on an average 10-15% excess time than off-peak period due to congestion, narrow road and improper design of Hospital road intersection.

11.2.5 Facilities for Pedestrians

The town does not have any footpath anywhere. In towns like Shailkupa, footpaths are usually absent, as it is given least priority in development program.

11.2.6 Analysis of Existing Deficiencies

11.2.6.1 Roadway capacity Deficiencies

As in any other towns in Bangladesh, Shailkupa has also its own road and transportation deficiencies. A physical feature and traffic survey of major inter-sections revealed that none of these are properly designed. Traffic level is far behind the actual capacity of the junctions. Congestion is created by large number of slow moving rickshaws waiting for passengers at the inter-sections.

Narrow Road Width

Narrow width of roads and poor maintenance of these roads have been mentioned by most respondents (*of the household survey conducted by the consultant*) as the major road problems in the town. 44% of the respondents have pointed out the misery of road movement during monsoon when unpaved roads get muddy. Narrow width of roads is likely to become a major problem of traffic movement when the town will grow and density of population will increase in future with consequent increase of road traffic. As field survey shows, 82% of the households of the town reported that the road widths in front of their houses are 8 ft. or less. A list of ssome major roads of functional importance in the regional transport network has been given in **Table-11.1** below:

Table 11.1: Inventory of Some Major Roads at Shailkupa Paurashava

Sl. No.	Name of Major Roads	Road Hierarchy	Width (m)	Total Length (km)	Road Type
1.	Kabi Golam Mostofa Road (*Part-1*)	Feeder Road Type-A	4.88	1.79	Pucca
2.	Kushtia University Road	Feeder Road Type-A	3.04	3.25	Pucca
3.	Kabirpur Road	Feeder Road Type-A	5.52	3.32	Pucca
4.	Shatgachhi Road	Feeder Road Type-B	4.89	2.67	Pucca
5.	Kabi Golam Mostofa Road (*Part-2*)	Feeder Road Type-B	4.88	1.81	Pucca
6.	Char Aoushia Road	Rural Road Class 1 (R1)	4.55	1.83	Pucca

Source: Physical Feature Survey, 2009

Tortuous Road and Missing Link

A major characteristic of spontaneously developed roads is that they are tortuous in their shapes. This is because land owners allow roads to follow the alignment of the edges of the tortuous plot boundaries. Another problem of community initiated roads is that they are not in a well linked network. Sometimes links to nearby roads are missing. This causes people to travel comparatively longer distances to reach a nearby destination.

11.2.6.2 Operational Safety, Signal and other Deficiencies

Like any other Upazila town, which is beyond the regional and national movement directly, Shailkupa Paurashava has no traffic management system. There is no traffic point and traffic islands including road dividers, no signal posts. That is why operational and road safety is not existed.

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

11.2.7.1 Railway Network

There is no railway network in the project area.

11.2.7.2 Waterway Network

Kumar river passes through the middle part of the Paurashava. There is no waterway network in the Paurashava.

11.2.7.3 Air Communication

There is no air transport facility in Shailkupa, for air travelling the people of Shailkupa depending upon the Capital City Dhaka.

11.3 Future Projections

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

11.3.1 Travel Demand Forecasting for Next 20 Years

Travel demand occurs as a result of thousands of individual travelers making individual decisions on how, where and when to travel. These decisions are affected by many factors such as family situations, characteristics of the person making the trip, and the choices (*destination, route and mode*) available for the trip.

Before forecasts are made of travel, it is necessary to determine how the community will look in the future. Transportation is directly linked to land use. Trips are assumed to follow future land use patterns. If land use is changed, there should be a change in travel.

The travel forecasting process is at the heart of urban transportation planning. This process is used to estimate the number of trips that will be made on a transportation systems alternative at some future date. Many assumptions need to be made about how people make decisions, the factors they consider and how they react a particular transportation alternative. Travel demand is expressed as the number of persons or

vehicles per unit of time that can be expected to travel on a given segment of a transportation system under a set of given land-use, socio-economic, and environmental conditions. Three factors affect the demand for urban travel:

- Location and intensity of land use
- Socio-economic characteristics of people living in the area; and
- Extent, cost, and quality of available transportation services

Land use characteristics are a primary determinant of travel demand. The amount of traffic generated by a parcel of land depends on how the land is used, for example, shopping centres, residential complexes, and office buildings produce different traffic generation patterns. Socio-economic characteristics of the people also influence the demand for transportation. Lifestyles and values affect how people use their resources for transportation, for example, a residential area consisting of high-income workers will generate more trips by automobile per person than a residential area populated primarily by low-income workers. The availability of transportation facilities and services, referred to as the supply, also affects the demand for travel. Travelers are sensitive to the level of service provided by alternative transportation modes, when deciding whether to travel at all or which mode to use they consider attributes such as travel time, cost, convenience, comfort, and safety. To extrapolate the transport demand, it was necessary to accumulate data on employment, vehicle ownership, trip distribution, etc. Though some categories of data mentioned above have been collected by Socio-economic Survey, yet these data sets are scanty to enable forecast of future travel demand.

Furthermore, the traffic survey for the UTIDP was conducted to get the overall picture of traffic pattern in the study area and this survey is not detail enough to allow extrapolation of traffic. The consultants have some limitations to adopt any traffic model to forecast future traffic demand. The complexities of traffic in the study area, as per common observation are assumed to be insignificant. However, prior to maintaining proper planning standard, the Paurashava is yet capable of regulating the traffic. Nevertheless, the recommended planning standards of road are given in **Table-11.2**.

Table 11.2: Recommended Planning Standard

Types of Road	Recommended width
Paurashava Primary Roads	30.50-45.72 meter (*100'-150'*)
Paurashava Secondary Roads	18.30-24.40 meter (*60'-80'*)
Tertiary Roads	6.10-12.20 meter (*20'-40'*)

Source: UTIDP Planning Standard, LGED

However, a little bit of jamming concentration has been observed in some major roads of the Paurashava. Generally, the concentration of traffic reaches to its peak during 9:00 am-10:30 and 4:30 pm-5:30 pm. Moreover, it is also observed that most of the major roads of Shailkupa Paurashava are below 6.10 meter in width, which is assumed to be a

potential threat to accommodate the future traffic. Therefore, the road capacity needs to be improved as per the UTIDP planning standard of LGED.

11.3.2 Transportation Network Considered

The growth of transport networks obviously affects the social and economic activities that an area can support; yet the dynamics of how such growth occurs is one of the least understood areas in transport, geography, and planning. Transport network changes are treated exclusively as the result of top-down decision-making. Changes to the transport network are rather the result of numerous small decisions (*and some large ones*) by property owners, firms, developers, towns, cities, counters, and MPOs in response to market conditions and policy initiatives. Understanding how markets and policies translate into facilities on the ground is essential for scientific understanding and improving forecasting, planning, policymaking and evaluation.

11.4 Transportation Development Plan

The current chapter of the report is about Transport Development Plan covering its development plan proposals and management of the proposed project area up to the year 2031. The report describes existing transportation facilities and consultant's proposal on the important facilities such as, bus terminal, truck terminal, rickshaw/ van stands, baby taxi/ tempo stands and passenger sheds for local bus users. Many of the proposals may now seem to be premature, but will be necessary in future. If their executions are delayed, land may not be available in future for providing such facilities.

11.4.1 Plans for Road Network Development

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

Table 11.3: Proposal for Road Standard in the Project area

Types of Road	Standards Recommended (RoW)
Paurashava Primary Roads	30.50-36.60 meter (*100'-120'*)
Paurashava Secondary Roads	18.30-24.40 meter (*60'-80'*)
Tertiary Roads	6.10-12.20 meter (*20'-40'*)

Source: Upazila Towns Infrastructure Development Project and Proposed by Consulting Firm

11.4.1.1 Road Network Plan

Several number of Primary, Secondary and Tertiary roads has been proposed in this Paurashava by considering the hierarchy of the road. In total, 96.81 km of roads have been proposed for efficient accessibility of the Paurashava.

Paurashava Primary Road

Total Primary road is 9.37 km with 100 ft RoW. Two primary roads notified as PR-01 and PR-02 are proposed over Ward nos. 2, 3, 4, 5, 6, 7, 9.

Paurashava Secondary Road

Total Secondary road is 31.94 km with 60-80 ft RoW. Within it 24.81 km secondary road will be widening and rest 7.13 km new secondary road will be constructed.

Tertiary Road

Total 55.50 km Tertiary Road is proposed with 20-40 ft RoW within in the Paurashava of which 22.13 km road will widening and rest 33.37 km road will be newly constructed in on different phases to fulfill the future needs of the Paurashava.

Table 11.4: Summary of Primary, Secondary and Tertiary Roads

Type	No. of Roads	Length (km)
Primary Road	2	9.37
Secondary Road	19	31.94
Tertiary Road	76	55.50
Total	97	96.81

Table 11.5: List of Proposed Roads

Road ID	Ward No.	Proposed Status	Road Type	Length (km)	Proposed RoW
PR-01	W-2,3,4,5,6,7	New Construction	Primary Road	6.125	100 ft
PR-02	W-7,9	New Construction	Primary Road	3.246	100 ft
SR-01	W-1,2,3,4	Widening	Secondary Road	3.385	60 ft
SR-02	W-2	New Construction	Secondary Road	2.551	60 ft
SR-03	W-4	New Construction	Secondary Road	0.550	60 ft
SR-04	W-4	Widening	Secondary Road	0.857	60 ft
SR-05	W-4	New Construction	Secondary Road	0.530	60 ft
SR-06	W-4,5	New Construction	Secondary Road	0.745	60 ft
SR-07	W-4,5	Widening	Secondary Road	1.288	80 ft
SR-08	W-4,5,6	Widening	Secondary Road	6.186	80 ft
SR-09	W-4,6	Widening	Secondary Road	3.202	60 ft
SR-10	W-4,8	Widening	Secondary Road	0.451	80 ft
SR-11	W-5	Widening	Secondary Road	1.295	60 ft
SR-12	W-5,6	Widening	Secondary Road	1.860	60 ft
SR-13	W-5,6,9	New Construction	Secondary Road	1.895	80 ft
SR-14	W-7	New Construction	Secondary Road	0.507	60 ft
SR-15	W-7	Widening	Secondary Road	0.428	60 ft
SR-16	W-7	Widening	Secondary Road	1.293	60 ft
SR-17	W-7,8	New Construction	Secondary Road	0.354	60 ft
SR-18	W-7,8,9	Widening	Secondary Road	4.362	80 ft
SR-19	W-9	Widening	Secondary Road	0.203	60 ft
TR-01	W-1	Widening	Tertiary Road	0.970	30 ft
TR-02	W-1,2,4	New Construction	Tertiary Road	1.877	40 ft
TR-03	W-1,2,4	New Construction	Tertiary Road	2.099	30 ft
TR-04	W-1,2,4,6	New Construction	Tertiary Road	3.573	40 ft
TR-05	W-1,3	Widening	Tertiary Road	1.453	30 ft
TR-06	W-1,3	Widening	Tertiary Road	1.182	30 ft
TR-07	W-2	New Construction	Tertiary Road	0.595	30 ft

Road ID	Ward No.	Proposed Status	Road Type	Length (km)	Proposed RoW
TR-08	W-2	New Construction	Tertiary Road	0.175	30 ft
TR-09	W-2	New Construction	Tertiary Road	0.477	30 ft
TR-10	W-2,3,4	Widening	Tertiary Road	2.053	40 ft
TR-11	W-2,3,4,7	New Construction	Tertiary Road	1.996	40 ft
TR-12	W-3	Widening	Tertiary Road	0.419	30 ft
TR-13	W-3	Widening	Tertiary Road	0.515	30 ft
TR-14	W-3	Widening	Tertiary Road	0.611	30 ft
TR-15	W-3	Widening	Tertiary Road	0.324	30 ft
TR-16	W-3	Widening	Tertiary Road	0.443	30 ft
TR-17	W-4	Widening	Tertiary Road	0.165	30 ft
TR-18	W-4,5	Widening	Tertiary Road	0.646	40 ft
TR-19	W-4,5,8	New Construction	Tertiary Road	0.812	40 ft
TR-20	W-5	New Construction	Tertiary Road	0.578	40 ft
TR-21	W-5	New Construction	Tertiary Road	0.782	40 ft
TR-22	W-5	Widening	Tertiary Road	0.309	40 ft
TR-23	W-5	Widening	Tertiary Road	0.275	30 ft
TR-24	W-5	New Construction	Tertiary Road	0.644	30 ft
TR-25	W-5	New Construction	Tertiary Road	0.285	40 ft
TR-26	W-5	New Construction	Tertiary Road	0.550	40 ft
TR-27	W-5	Widening	Tertiary Road	0.404	30 ft
TR-28	W-5	Widening	Tertiary Road	0.064	30 ft
TR-29	W-5,6	New Construction	Tertiary Road	1.990	40 ft
TR-30	W-5,6	New Construction	Tertiary Road	0.844	40 ft
TR-31	W-5,6	Widening	Tertiary Road	1.640	30 ft
TR-32	W-5,8	New Construction	Tertiary Road	0.067	40 ft
TR-33	W-5,8,9	New Construction	Tertiary Road	0.779	40 ft
TR-34	W-6	New Construction	Tertiary Road	1.481	30 ft
TR-35	W-6	New Construction	Tertiary Road	1.419	30 ft
TR-36	W-6	Widening	Tertiary Road	0.853	40 ft
TR-37	W-6	New Construction	Tertiary Road	0.575	30 ft
TR-38	W-6	Widening	Tertiary Road	0.096	30 ft
TR-39	W-7	Widening	Tertiary Road	0.884	40 ft
TR-40	W-7	Widening	Tertiary Road	0.769	40 ft
TR-41	W-7	Widening	Tertiary Road	0.572	30 ft
TR-42	W-7	Widening	Tertiary Road	0.281	30 ft
TR-43	W-7	New Construction	Tertiary Road	1.148	40 ft
TR-44	W-7	Widening	Tertiary Road	0.942	40 ft
TR-45	W-7	Widening	Tertiary Road	0.227	20 ft
TR-46	W-7	New Construction	Tertiary Road	0.974	40 ft
TR-47	W-7	New Construction	Tertiary Road	0.358	30 ft
TR-48	W-7	New Construction	Tertiary Road	0.230	20 ft
TR-49	W-7	New Construction	Tertiary Road	0.322	30 ft
TR-50	W-7	Widening	Tertiary Road	0.230	30 ft
TR-51	W-7	Widening	Tertiary Road	0.336	40 ft
TR-52	W-7	Widening	Tertiary Road	0.446	40 ft
TR-53	W-7,8	Widening	Tertiary Road	0.864	40 ft
TR-54	W-7,8	Widening	Tertiary Road	0.211	20 ft
TR-55	W-7,8	New Construction	Tertiary Road	0.710	40 ft
TR-56	W-7,8,9	New Construction	Tertiary Road	0.944	40 ft
TR-57	W-7,9	New Construction	Tertiary Road	0.873	40 ft
TR-58	W-8	New Construction	Tertiary Road	0.268	20 ft
TR-59	W-8	Widening	Tertiary Road	0.250	30 ft
TR-60	W-8	New Construction	Tertiary Road	0.638	40 ft

Road ID	Ward No.	Proposed Status	Road Type	Length (km)	Proposed RoW
TR-61	W-8	Widening	Tertiary Road	0.156	20 ft
TR-62	W-8	Widening	Tertiary Road	0.147	30 ft
TR-63	W-8	New Construction	Tertiary Road	0.118	30 ft
TR-64	W-8	New Construction	Tertiary Road	0.121	20 ft
TR-65	W-8,9	New Construction	Tertiary Road	1.876	30 ft
TR-66	W-8,9	Widening	Tertiary Road	0.589	30 ft
TR-67	W-8,9	Widening	Tertiary Road	1.640	40 ft
TR-68	W-8,9	New Construction	Tertiary Road	1.955	40 ft
TR-69	W-8,9	Widening	Tertiary Road	0.229	40 ft
TR-70	W-9	New Construction	Tertiary Road	0.287	20 ft
TR-71	W-9	Widening	Tertiary Road	0.339	20 ft
TR-72	W-9	New Construction	Tertiary Road	0.253	20 ft
TR-73	W-9	New Construction	Tertiary Road	0.240	30 ft
TR-74	W-9	New Construction	Tertiary Road	0.145	30 ft
TR-75	W-9	New Construction	Tertiary Road	0.313	20 ft
TR-76	W-9	Widening	Tertiary Road	0.597	40 ft

11.4.1.2 Proposal for improvement of the existing road networks

Traffic management measures may be adopted to increase traffic capacity and safety. The improvement could be done by removing the deficiencies in the existing core road network by widening and/or strengthening of selected stretches/ corridors in a phased manner and improvement of road geometrics and safety provisions. The proposals for widening of roads existing roads are listed in tabular form (**Table-11.6**) below:

Table 11.6: Road Improvement Proposal

Road ID	Ward No.	Proposed Status	Road Type	Length (km)	Proposed RoW
SR-01	W-1,2,3,4	Widening	Secondary Road	3.385	60 ft
SR-04	W-4	Widening	Secondary Road	0.857	60 ft
SR-07	W-4,5	Widening	Secondary Road	1.288	80 ft
SR-08	W-4,5,6	Widening	Secondary Road	6.186	80 ft
SR-09	W-4,6	Widening	Secondary Road	3.202	60 ft
SR-10	W-4,8	Widening	Secondary Road	0.451	80 ft
SR-11	W-5	Widening	Secondary Road	1.295	60 ft
SR-12	W-5,6	Widening	Secondary Road	1.860	60 ft
SR-15	W-7	Widening	Secondary Road	0.428	60 ft
SR-16	W-7	Widening	Secondary Road	1.293	60 ft
SR-18	W-7,8,9	Widening	Secondary Road	4.362	80 ft
SR-19	W-9	Widening	Secondary Road	0.203	60 ft
TR-01	W-1	Widening	Tertiary Road	0.970	30 ft
TR-05	W-1,3	Widening	Tertiary Road	1.453	30 ft
TR-06	W-1,3	Widening	Tertiary Road	1.182	30 ft
TR-10	W-2,3,4	Widening	Tertiary Road	2.053	40 ft
TR-12	W-3	Widening	Tertiary Road	0.419	30 ft
TR-13	W-3	Widening	Tertiary Road	0.515	30 ft
TR-14	W-3	Widening	Tertiary Road	0.611	30 ft
TR-15	W-3	Widening	Tertiary Road	0.324	30 ft
TR-16	W-3	Widening	Tertiary Road	0.443	30 ft
TR-17	W-4	Widening	Tertiary Road	0.165	30 ft
TR-18	W-4,5	Widening	Tertiary Road	0.646	40 ft
TR-22	W-5	Widening	Tertiary Road	0.309	40 ft

Road ID	Ward No.	Proposed Status	Road Type	Length (km)	Proposed RoW
TR-23	W-5	Widening	Tertiary Road	0.275	30 ft
TR-27	W-5	Widening	Tertiary Road	0.404	30 ft
TR-28	W-5	Widening	Tertiary Road	0.064	30 ft
TR-31	W-5,6	Widening	Tertiary Road	1.640	30 ft
TR-36	W-6	Widening	Tertiary Road	0.853	40 ft
TR-38	W-6	Widening	Tertiary Road	0.096	30 ft
TR-39	W-7	Widening	Tertiary Road	0.884	40 ft
TR-40	W-7	Widening	Tertiary Road	0.769	40 ft
TR-41	W-7	Widening	Tertiary Road	0.572	30 ft
TR-42	W-7	Widening	Tertiary Road	0.281	30 ft
TR-44	W-7	Widening	Tertiary Road	0.942	40 ft
TR-45	W-7	Widening	Tertiary Road	0.227	20 ft
TR-50	W-7	Widening	Tertiary Road	0.230	30 ft
TR-51	W-7	Widening	Tertiary Road	0.336	40 ft
TR-52	W-7	Widening	Tertiary Road	0.446	40 ft
TR-53	W-7,8	Widening	Tertiary Road	0.864	40 ft
TR-54	W-7,8	Widening	Tertiary Road	0.211	20 ft
TR-59	W-8	Widening	Tertiary Road	0.250	30 ft
TR-61	W-8	Widening	Tertiary Road	0.156	20 ft
TR-62	W-8	Widening	Tertiary Road	0.147	30 ft
TR-66	W-8,9	Widening	Tertiary Road	0.589	30 ft
TR-67	W-8,9	Widening	Tertiary Road	1.640	40 ft
TR-69	W-8,9	Widening	Tertiary Road	0.229	40 ft
TR-71	W-9	Widening	Tertiary Road	0.339	20 ft
TR-76	W-9	Widening	Tertiary Road	0.597	40 ft

11.4.1.3 List of Proposed new roads

The Urban Area Plan provides brief description of any proposed transport improvements. The transport content of this plan has been developed around the framework of the Structure Plan. The specific transport proposals set out in the Urban Area Plan for public consideration include new road schemes and improvements, traffic management measures, the co-ordination of public transport services, the control of car and lorry parking and the improvement of cyclist and pedestrian safety. The proposals put forward for discussion to the mass people of the Paurashava. The Paurashava authority also advises about road development should not be duplicated in the public examination of Urban Area Plan and Ward Action Plans. Local Authority roads, which are not strategic, are not included in the Ward Action Plan and both the need for the road and the line of the route are matters for the Urban Area Plan to consider. A list proposed of new roads have been made after studying the existing road network, travel demand pattern, potential for future urban growth and conducting public consultation meeting with Paurashava officilals, councilors, local people and other stakeholders which is presented in **Table-11.8**.

Table 11.7: Summary of New and Widening Road Proposal

Type	No. of Roads	Length (km)
New Construction	48	49.87
Widening	49	46.94
Total	97	96.81

Table 11.8: List of Proposed New Roads in the Project Area

Road ID	Ward No.	Proposed Status	Road Type	Length (km)	Proposed RoW
PR-01	W-2,3,4,5,6,7	New Construction	Primary Road	6.125	100 ft
PR-02	W-7,9	New Construction	Primary Road	3.246	100 ft
SR-02	W-2	New Construction	Secondary Road	2.551	60 ft
SR-03	W-4	New Construction	Secondary Road	0.550	60 ft
SR-05	W-4	New Construction	Secondary Road	0.530	60 ft
SR-06	W-4,5	New Construction	Secondary Road	0.745	60 ft
SR-13	W-5,6,9	New Construction	Secondary Road	1.895	80 ft
SR-14	W-7	New Construction	Secondary Road	0.507	60 ft
SR-17	W-7,8	New Construction	Secondary Road	0.354	60 ft
TR-02	W-1,2,4	New Construction	Tertiary Road	1.877	40 ft
TR-03	W-1,2,4	New Construction	Tertiary Road	2.099	30 ft
TR-04	W-1,2,4,6	New Construction	Tertiary Road	3.573	40 ft
TR-07	W-2	New Construction	Tertiary Road	0.595	30 ft
TR-08	W-2	New Construction	Tertiary Road	0.175	30 ft
TR-09	W-2	New Construction	Tertiary Road	0.477	30 ft
TR-11	W-2,3,4,7	New Construction	Tertiary Road	1.996	40 ft
TR-19	W-4,5,8	New Construction	Tertiary Road	0.812	40 ft
TR-20	W-5	New Construction	Tertiary Road	0.578	40 ft
TR-21	W-5	New Construction	Tertiary Road	0.782	40 ft
TR-24	W-5	New Construction	Tertiary Road	0.644	30 ft
TR-25	W-5	New Construction	Tertiary Road	0.285	40 ft
TR-26	W-5	New Construction	Tertiary Road	0.550	40 ft
TR-29	W-5,6	New Construction	Tertiary Road	1.990	40 ft
TR-30	W-5,6	New Construction	Tertiary Road	0.844	40 ft
TR-32	W-5,8	New Construction	Tertiary Road	0.067	40 ft
TR-33	W-5,8,9	New Construction	Tertiary Road	0.779	40 ft
TR-34	W-6	New Construction	Tertiary Road	1.481	30 ft
TR-35	W-6	New Construction	Tertiary Road	1.419	30 ft
TR-37	W-6	New Construction	Tertiary Road	0.575	30 ft
TR-43	W-7	New Construction	Tertiary Road	1.148	40 ft
TR-46	W-7	New Construction	Tertiary Road	0.974	40 ft
TR-47	W-7	New Construction	Tertiary Road	0.358	30 ft
TR-48	W-7	New Construction	Tertiary Road	0.230	20 ft
TR-49	W-7	New Construction	Tertiary Road	0.322	30 ft
TR-55	W-7,8	New Construction	Tertiary Road	0.710	40 ft
TR-56	W-7,8,9	New Construction	Tertiary Road	0.944	40 ft
TR-57	W-7,9	New Construction	Tertiary Road	0.873	40 ft
TR-58	W-8	New Construction	Tertiary Road	0.268	20 ft
TR-60	W-8	New Construction	Tertiary Road	0.638	40 ft
TR-63	W-8	New Construction	Tertiary Road	0.118	30 ft
TR-64	W-8	New Construction	Tertiary Road	0.121	20 ft
TR-65	W-8,9	New Construction	Tertiary Road	1.876	30 ft
TR-68	W-8,9	New Construction	Tertiary Road	1.955	40 ft
TR-70	W-9	New Construction	Tertiary Road	0.287	20 ft
TR-72	W-9	New Construction	Tertiary Road	0.253	20 ft
TR-73	W-9	New Construction	Tertiary Road	0.240	30 ft

Road ID	Ward No.	Proposed Status	Road Type	Length (km)	Proposed RoW
TR-74	W-9	New Construction	Tertiary Road	0.145	30 ft
TR-75	W-9	New Construction	Tertiary Road	0.313	20 ft

11.4.2 Plans for Transportation Facilities

In the field of transportation facilities, the consultant has proposed such facilities as, bus terminal, truck terminal, rickshaw stands, baby taxi/tempo stands and passenger shed for local bus users.

11.4.2.1 Transportation Facilities Plan

Bus Terminal

There is no designated bus terminal in this Paurashava. Considering inter-town movement of high-speed vehicular traffic without interrupting safe urban living of the Paurashava inhabitants, one inter-upazila bus terminals are proposed at Northern part of W-7 between SR-16 & TR-49 road (*BT*). As per standard of UTIDP the required area of Bus Terminal for the projected population of 44,159 up to year 2031 is about 2.21 acre. According to the consultants' justification, this huge amount of land will not be required for bus terminal in case of a town like Shailkupa. Thus, an area of 1.44 acre is proposed for the bus terminal. It comprises Plot No. 146-147, 150-154 of Hobibpur Mouza. The location and outline of the proposed bus terminal is shown in **Map-11.2**. The details are given in **Table-11.9.**

Truck Terminal

There is no truck terminal in this Paurashava. A truck terminal is also proposed one truck terminal to the Northern part of W-7 beside SR-16 road (*TT*). As per standard of UTIDP the required area of Truck Terminal for the Projected population of 44,159 up to year 2031 is about 1.10 acre. An area of 1.02 acre is proposed for the truck terminal. It comprises Plot No. 132, 136-139, 2348 of Hobibpur Mouza. The location and outline of the proposed truck terminal is shown in **Map-11.2**. The details are given in **Table-11.9**.

Table 11.9: List of Proposed Transport Facilities

ID	Proposal	Location	Ward	Area (Acre)	Mouza Name
BT	Bus Terminal	Northern part of W-7 between SR-18 & TR-48 road	W-7	1.44	Hobibpur
PA	Parking Area	Central part of W-4 beside PR-01 road	W-4	0.35	Shailkupa
TS-01	Tempo Stand	Southern part of W-2 beside SR-01 road	W-2	0.19	Shailkupa
TS-02	Tempo Stand	Western part of W-4 between PR-01 & SR-08 road	W-4	0.27	Shailkupa
TS-03	Tempo Stand	Southern part of W-5 beside SR-13 road	W-5	0.25	Fazilpur
TS-04	Tempo Stand	Northern part of W-7 between SR-18 & TR-48 road	W-7	0.29	Hobibpur
TT	Truck Terminal	Northern part of W-7 beside SR-18 road	W-7	1.02	Hobibpur

Tempo Stand

Tempo is now a major and cheap commuter in small towns that play important role in commuter transportation. There is no formal tempo stand in the Paurashava. Thus, four tempo stands (*with unique ID TS-01, TS-02, TS-03, TS-04*) are proposed in Ward-2 (*Southern part of W-2 beside SR-01 road*), Ward-4 (*Central part of W-4 between PR-01 and SR-06 road*), Ward-5 (*Southern part of W-5 beside SR-11 road*) and Ward-7 (*Northern part of W-7 between SR-16 & TR-49 road*) respectively. The location and outline of the proposed tempo stand is shown in **Map-11.2**. As per standard of UTIDP the required area of this facility is about 0.55 acre/one tempo stand. Proposed area of TS-01, TS-02, TS-03, TS-04 are 0.19 acre, 0.27 acre, 0.25 acre and 0.29 acre respectively. The details are shown in **Table-11.9**.

Bus Stop

A bus stop is a designated place where buses stop for passengers to board or leave them. These are normally positioned on the highway. The construction of bus stops tends to reflect the level of usage. In Shailkupa Paurashava, there are one bus stops–one near Shailkupa Paurashava. Only Inter-Upazila bus movement pattern is observed to ply over the Paurashava and no town service is existed in this area. Through traffic is highly discouraged to pass over the central part of the Paurashava. For the movement of Inter-Upazila bus and other through traffic, an alternative option is proposed; where two secondary roads will act as by-pass road and channelize the traffic movement without interrupting the bazar area. Every bus will stand at the proposed bus terminal to pick the passengers.

Map 11.2: Transport &Traffic Management Plan of Shailkupa Paurashava

11.4.2.2 Parking and Terminal Facilities

There is no parking facilities provided in Shailkupa Paurashava. People are habituated for parking beside the roads. This parking practice occupied considerable spaces and reduces the effective road width. Particularly in bazar area where a number of markets exist the parking problem become acute during weekly hat days. If it is possible to integrate parking area for tempo, rickshaw, van, etc. near to bazar area the congestion problem will be solved.

In order to mitigate the traffic congestion and traffic conflict at the bazar area one parking area is proposed (**Map-11.2**). An area of about 0.35 acre land comprising Plot No. 4654-4655, 5806-5807 of Shailkupa Mouza has been proposed at the Central part of W-4 beside PR-01 road. On-street parking shall be prohibited on all roads within the bazar area except at places where it is specifically permitted for parking.

Adequate terminal facilities will be provided at the bus and truck terminal for the convenience and comfort of the commuters. The bus terminal should have to accommodate the following services:

- Ticket Counter
- Passenger-shed
- Workshop
- Cleaning and washing facility
- Loading and unloading place
- Bus parking space
- Toilet facility
- Waiting room

The following facilities are proposed to accommodate in the truck terminal complex:

- Workshop
- Cleaning and washing
- Loading and unloading yard
- Truck parking space
- Toilet facility

11.4.2.3 Development of Facilities for Pedestrians, Bicycles and Rickshaws

Footpath may refer to sidewalk, which runs along vehicular roads. It is a separate lane exclusively designed for the purpose of pedestrian movement. The footpath is quite safe

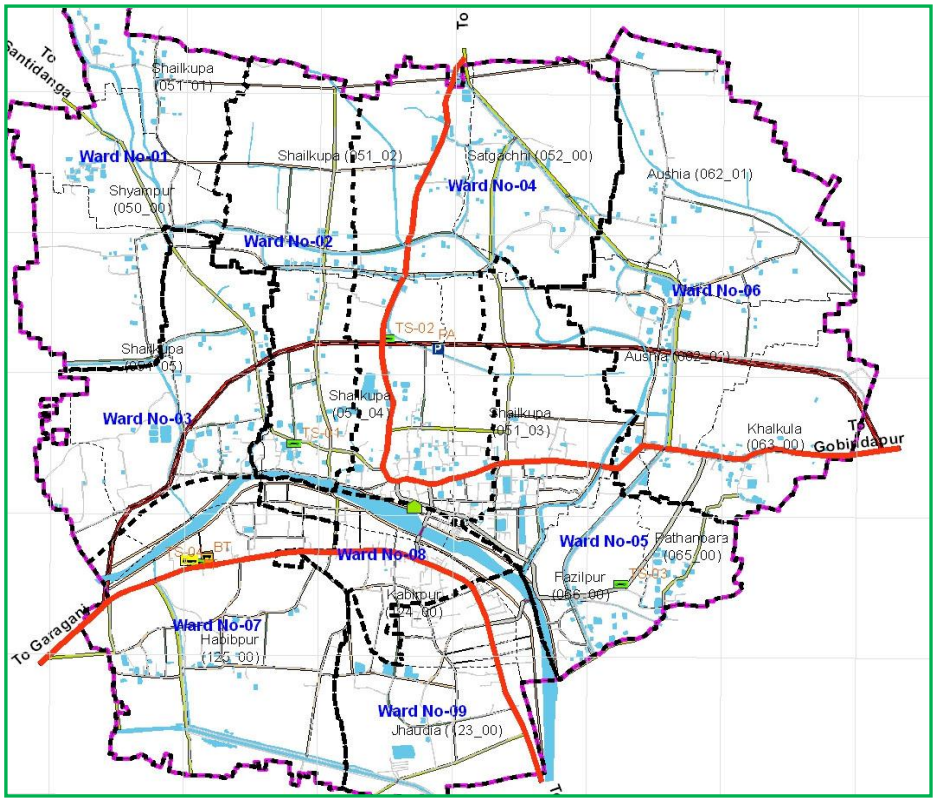
and free from any accident. Unfortunately, there is no footpath besides any road of Shailkupa Paurashava.

The transportation system within residential neighborhoods should favor pedestrian movement and discourage vehicular through traffic in both new and existing neighborhoods. A pedestrian system that utilizes neighborhood streets and paths to link the residents with the commercial and school functions serving the area will be encouraged. A pedestrian ways (*Footpath*) of total 10.55 km is proposed for the smooth movement of pedestrian traffic. The details are illustrated in **Table-11.10** and the alignment is shown in **Figure-11.3 below**.

Table 11.10: List of Proposed Footpath/ Pedestrian Way

Sl. No.	Alignment	Length (km)
1.	From Northern part of W-4 to eastern part of W-4 (*SR-08 road*)	6.19
2.	From Western part of W-7 to southern part of W-9 (*SR-18 road*)	4.36
Total		10.55

Figure 11.3: Alignment of Footpath/ Pedestrian Way



The provision of separate bicycle or rickshaw lane is not a requisite for a low level of traffic movement pattern, which is prevalent in any Upazila level town like Shailkupa Paurashava.

Other Transportation Facilities

Roundabout

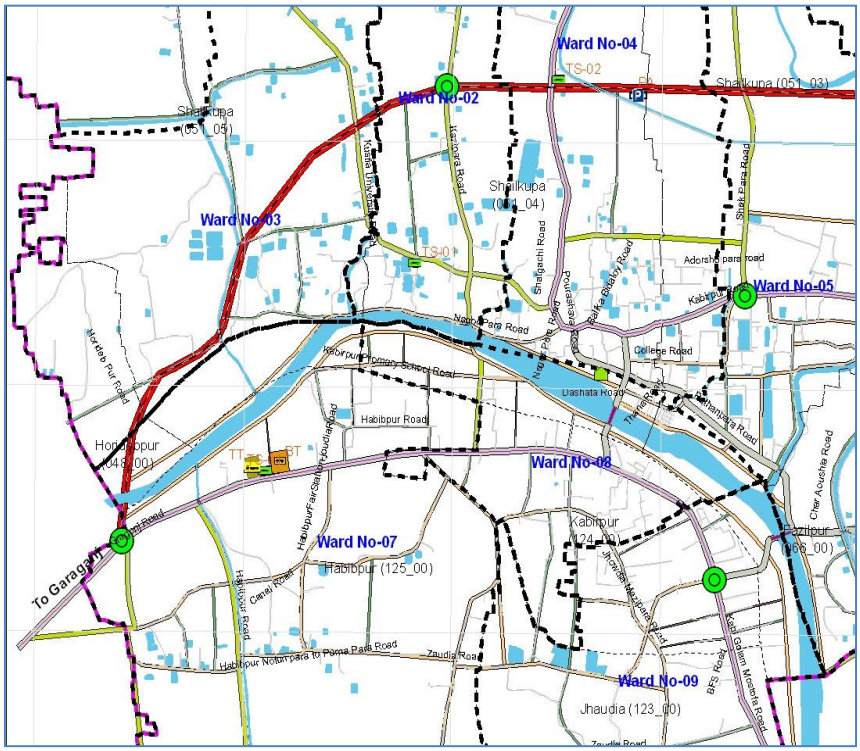
A roundabout is a type of circular intersection. Well-designed roundabouts is a safe, effective form of junction. They can handle much higher volumes of turning traffic. Their safety benefits result primarily from the control they exercise on approach speeds, and this makes them ideal for junctions at the entrance to towns and villages. They are also one of the safest ways of handling the transition between dual carriageways and single carriageways.

The presence of mixed traffic, including NMVs and pedestrians, means that roundabouts must be designed primarily for speed control. The proposed list of roundabout in Shailkupa Paurashava is given in **Table-11.11** and the locations are shown in **Figure-11.4**.

Table 11.11: List of Proposed Roundabout in Shailkupa Paurashava

Ward No.	Location
Ward No. 2	In the junction of Proposed PR-01 and SR-02 road
Ward No. 5	In the junction of Proposed SR-08 and SR-11 road
Ward No. 7	In the junction of Proposed PR-01 and SR-18 road
Ward No.9	In the junction of Proposed SR-13 and SR-18 road

Figure 11.4: Proposed Roundabout in Shailkupa Paurashava



Central Divider

Central divider on one road is proposed with a view to avoid conflict between both-way movements of vehicular traffic on same road. Details are shown in **Table-11.12** below.

Table 11.12: Proposal for Central Divider

Sl. No.	Alignment	Length (km)
1.	From western part of W-7 to eastern part of W-6 (*Proposed PR-01*)	6.13
Total		6.13

Traffic Signs and Signals

Traffic signs and signals are required in order to provide for the safe and orderly movement of motorized and non-motorized traffic and pedestrians. These provide information about routes, directions, destinations and points of interest. They also provide information on regulations, which apply to specific locations or at specific times, and warn of hazards, which may not be evident. When a traffic sign is correctly used, the majority of motorists will comply with the posted regulation or warning, and drive in a safe and orderly manner. In order to minimize the rate of traffic conflict the following signs and signals should be provided at the key location considering the prevailing traffic situation and traffic management option.

- Warning signs
- Regulatory signs
- Speed limit signs
- Bus and cycle signs and road markings
- On-street parking control signs
- Road markings
- Motorway signs and signals
- Direction signs on all-purpose roads
- Information signs
- Traffic signals
- Zebra crossings
- Signs for road works and temporary situations

11.4.3 Waterway Development/Improvement Options

Kumar river passes through the middle part of the Paurashava. No waterway development or improvement has been proposed for Shailkupa Paurashava.

11.4.4 Railway Development Option

There is no existing railway line in the vicinity of the Shailkupa Paurashava and there is no proposal for its establishment from higher authority. Thus, railway development option is not applicable at Shailkupa Paurashava.

11.5 Transportation System Management Strategy (TSM)

The strategy for street layouts must start with considering pedestrian movement rather than vehicular movement. This approach ensures greater consideration of pedestrians, cyclists and public transport users. In many instances, all users can comfortably share the same street network.

11.5.1 Strategies for Facility Operations

- Direct walking and cycling routes to local facilities such as shops, schools, public transport, and open spaces, together with lighting and landscaping of such routes
- The planting of appropriate street plantation
- Protect environment and improve health by building and investing in public transport and other types of efficient and sustainable transport which minimize emissions and consumption of resources and energy
- Strict vigilance should be in force in order that no one can cut the earth from the embankment and shoulders of the road and nothing is done to cause harm to the embankment and shoulders
- The people should be motivated to give up the use of the iron rim for the tractor, and wooden frame for the cartwheel drawn by cows or buffaloes-instead they should be encouraged to use rubber wheels
- People should be encouraged not to overload the bus and additionally, they should also be informed about the hazards of trucks loaded beyond their carrying capacity to dissuade them from such practices
- Care should be taken to dissuade people from digging irrigation canals on the shoulder or slope

11.5.2 Strategies for Traffic Flow and Safety

- Links to the overall road network in the town, including bus services, based on an analysis of the need for such linkages
- Maximum accessibility for pedestrians and cyclists
- Circulation routes for public transport within the area
- Consideration of provision for low design speeds (*such as 30 kph*) and facilities for pedestrians and cyclists
- Automated traffic signals to improve traffic flow and road safety
- Introduction of temporary signs to provide information to road users to enable safe and convenient travel
- Restricting movement of heavy vehicle though the residential zone during specific periods

- Provision for prescribed shoulder on either side of the road
- The roads should be kept free from all unauthorized obstructions. In this regard, all markets, shops, Billboards, utility lines such as telephone lines, street lights, electricity poles, gas connection lines etc. must be relocated
- Undesirable hump on the road, if exists, should be removed. In case of speed needs to be regulated, then the hump should be replaced by rumble strips
- Measures should be taken to prevent water stagnation of on the road surface
- Kilometer posts are put up on each road in accordance with the approved design, drawing and specification

11.5.3 Strategies for Traffic Management

- Enhancements to enable more effective use and management of existing physical infrastructure. These enhancements typically include better road markings, signs, traffic signals, channelization at intersections, turn restrictions and separation barriers, space for bus stops, and parking or waiting areas for public transport vehicles
- Initiatives to improve the ability of road users (*motorists and pedestrians alike*) to adopt behavioral patterns which lead to more efficient and safer transport services. Typically, this will involve programs to alter community attitudes and invoke a greater willingness to accept better discipline by all users and providers of the transport services
- Improved testing and licensing procedures for all drivers and re-training for offending drivers. Since most drivers work for someone else, the influence that owners exert by either condoning or reinforcing poor driving habits or insisting and demanding good driving habits is substantial and should not be under estimated
- Increased level of enforcement of traffic rules to ensure a greater compliance with community desired road user behavior. Enforcement actions can involve formal policing as well as informal pressure on individuals to adopt community norms of behavior and should include the involvement of community leaders

11.6 Plan Implementation Strategies

The section describes the plan implementation strategies of transportation plan of Shailkupa Paurashava. This also describes the regulation to implement transport pan, evaluation and coordination to implement the transport plan in the Paurashava.

11.6.1 Implementation, Monitoring, Evaluation and Coordination of the Plan

The implementation, monitoring and evaluation strategies of Structure Plan have been illustrated in **Chapter-9** of **Part-A**. ***The Transportation and Traffic Management Plan***

should also be implemented, monitored and evaluated under the same strategy by strengthening capacity of the Paurashava and forming a Monitoring and Evaluation Committee (*MEC*).

As ***The Transportation and Traffic Management Plan*** is a plan with a period of 20 years (2011-2031), it will be implemented on phase wise according to priority. The proposals have been prioritized based on the most urgent transport needs, since Bangladesh is a least developed country and it has a very limited budget for infrastructure development. Besides, the Paurashava Authority itself is not capable of financing this huge cost.

The Transportation and Traffic Management Plan will be implemented gradually following prioritized transport proposals including roads, central divider, roundabout etc. Phasing of proposals was done based on the priority. The **Phase-I** of the proposals, to be also incorporated in the Ward Action Plan, will be implemented within first 5 year (2011-2016) of the plan period. The consultants have proposed **Phase-II, Phase-III** and **Phase-IV** of the proposals to be implemented within consecutive 5 years for Ward Action Plan. The details of phasing are shown in **Table-11.13, Table-11.14, Table-11.15** and **Table-11.16**. After each 5 years the Plan will be evaluated, updated and new Ward Action Plan will be formulated under the changing circumstances.

Table 11.13: Phasing of Proposed Roads (Phase-I)

Phase-I (2011-2016)				
ID	Road Type	Ward No.	Length (km)	Proposed RoW
PR-01	Primary Road	W-2	6.125	100 ft
PR-02	Primary Road	W-7	3.246	100 ft
SR-01	Secondary Road	W-1	3.385	60 ft
SR-02	Secondary Road	W-2	2.551	60 ft
SR-03	Secondary Road	W-4	0.550	60 ft
SR-04	Secondary Road	W-4	0.857	60 ft
SR-08	Secondary Road	W-4	6.186	80 ft
SR-09	Secondary Road	W-4	3.202	60 ft
SR-13	Secondary Road	W-5	1.895	80 ft
SR-16	Secondary Road	W-7	1.293	60 ft
SR-18	Secondary Road	W-7	4.362	80 ft
TR-02	Tertiary Road	W-1	1.877	40 ft
TR-29	Tertiary Road	W-5	1.990	40 ft
TR-30	Tertiary Road	W-5	0.844	40 ft
TR-31	Tertiary Road	W-5	1.640	30 ft
TR-34	Tertiary Road	W-6	1.481	30 ft
TR-35	Tertiary Road	W-6	1.419	30 ft
TR-36	Tertiary Road	W-6	0.853	40 ft
TR-40	Tertiary Road	W-7	0.769	40 ft
TR-43	Tertiary Road	W-7	1.148	40 ft
TR-46	Tertiary Road	W-7	0.974	40 ft
TR-65	Tertiary Road	W-8	1.876	30 ft
TR-67	Tertiary Road	W-8	1.640	40 ft
TR-68	Tertiary Road	W-8	1.955	40 ft

Table 11.14: Phasing of Proposed Roads (Phase-II)

Phase-II (2016-2021)				
ID	Road Type	Ward No.	Length (km)	Proposed RoW
SR-06	Secondary Road	W-4	0.745	60 ft
SR-07	Secondary Road	W-4	1.288	80 ft
SR-10	Secondary Road	W-4	0.451	80 ft
SR-11	Secondary Road	W-5	1.295	60 ft
SR-12	Secondary Road	W-5	1.860	60 ft
SR-17	Secondary Road	W-7	0.354	60 ft
TR-03	Tertiary Road	W-1	2.099	30 ft
TR-04	Tertiary Road	W-1	3.573	40 ft
TR-18	Tertiary Road	W-4	0.646	40 ft
TR-19	Tertiary Road	W-4	0.812	40 ft
TR-37	Tertiary Road	W-6	0.575	30 ft
TR-39	Tertiary Road	W-7	0.884	40 ft
TR-41	Tertiary Road	W-7	0.572	30 ft
TR-44	Tertiary Road	W-7	0.942	40 ft
TR-54	Tertiary Road	W-7	0.211	20 ft
TR-55	Tertiary Road	W-7	0.710	40 ft
TR-56	Tertiary Road	W-7	0.944	40 ft
TR-57	Tertiary Road	W-7	0.873	40 ft
TR-58	Tertiary Road	W-8	0.268	20 ft
TR-59	Tertiary Road	W-8	0.250	30 ft
TR-60	Tertiary Road	W-8	0.638	40 ft
TR-66	Tertiary Road	W-8	0.589	30 ft
TR-75	Tertiary Road	W-9	0.313	20 ft
TR-76	Tertiary Road	W-9	0.597	40 ft

Table 11.15: Phasing of Proposed Roads (Phase-III)

Phase-III (2021-2026)				
ID	Road Type	Ward No.	Length (km)	Proposed RoW
SR-05	Secondary Road	W-4	0.530	60 ft
SR-14	Secondary Road	W-7	0.507	60 ft
SR-15	Secondary Road	W-7	0.428	60 ft
SR-19	Secondary Road	W-9	0.203	60 ft
TR-01	Tertiary Road	W-1	0.970	30 ft
TR-10	Tertiary Road	W-2	2.053	40 ft
TR-11	Tertiary Road	W-2	1.996	40 ft
TR-13	Tertiary Road	W-3	0.515	30 ft
TR-14	Tertiary Road	W-3	0.611	30 ft
TR-15	Tertiary Road	W-3	0.324	30 ft
TR-16	Tertiary Road	W-3	0.443	30 ft
TR-20	Tertiary Road	W-5	0.578	40 ft
TR-21	Tertiary Road	W-5	0.782	40 ft
TR-22	Tertiary Road	W-5	0.309	40 ft
TR-23	Tertiary Road	W-5	0.275	30 ft
TR-24	Tertiary Road	W-5	0.644	30 ft
TR-26	Tertiary Road	W-5	0.550	40 ft
TR-27	Tertiary Road	W-5	0.404	30 ft
TR-32	Tertiary Road	W-5	0.067	40 ft
TR-33	Tertiary Road	W-5	0.779	40 ft
TR-52	Tertiary Road	W-7	0.446	40 ft

Phase-III (2021-2026)				
ID	Road Type	Ward No.	Length (km)	Proposed RoW
TR-53	Tertiary Road	W-7	0.864	40 ft
TR-61	Tertiary Road	W-8	0.156	20 ft
TR-62	Tertiary Road	W-8	0.147	30 ft
TR-69	Tertiary Road	W-8	0.229	40 ft

Table 11.16: Phasing of Proposed Roads (Phase-IV)

Phase-IV (2026-2031)				
ID	Road Type	Ward No.	Length (km)	Proposed RoW
TR-05	Tertiary Road	W-1	1.453	30 ft
TR-06	Tertiary Road	W-1	1.182	30 ft
TR-07	Tertiary Road	W-2	0.595	30 ft
TR-08	Tertiary Road	W-2	0.175	30 ft
TR-09	Tertiary Road	W-2	0.477	30 ft
TR-12	Tertiary Road	W-3	0.419	30 ft
TR-17	Tertiary Road	W-4	0.165	30 ft
TR-25	Tertiary Road	W-5	0.285	40 ft
TR-28	Tertiary Road	W-5	0.064	30 ft
TR-38	Tertiary Road	W-6	0.096	30 ft
TR-42	Tertiary Road	W-7	0.281	30 ft
TR-45	Tertiary Road	W-7	0.227	20 ft
TR-47	Tertiary Road	W-7	0.358	30 ft
TR-48	Tertiary Road	W-7	0.230	20 ft
TR-49	Tertiary Road	W-7	0.322	30 ft
TR-50	Tertiary Road	W-7	0.230	30 ft
TR-51	Tertiary Road	W-7	0.336	40 ft
TR-63	Tertiary Road	W-8	0.118	30 ft
TR-64	Tertiary Road	W-8	0.121	20 ft
TR-70	Tertiary Road	W-9	0.287	20 ft
TR-71	Tertiary Road	W-9	0.339	20 ft
TR-72	Tertiary Road	W-9	0.253	20 ft
TR-73	Tertiary Road	W-9	0.240	30 ft
TR-74	Tertiary Road	W-9	0.145	30 ft

Plan implementation strategy depends on Monitoring, evaluation and coordination of a plan. Monitoring checks the plan is being implemented properly or not. 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 Shailkupa 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 town planner in Shailkupa Paurashava, the implementation, monitoring, evaluation and coordination phase of Transport Management Plan will be less affected. The Paurashava should have built its own capacity to ensure the '*Transportation Management Plan*' properly.

CHAPTER-12

DRAINAGE AND ENVIRONMENTAL MANAGEMENT PLAN

12.1 Drainage Management Plan

This chapter states about goals and objectives, and methodology of Drainage Development Plan. An inventory of the existing drainage system of Shailkupa has been made as a part of the comprehensive topographical survey to be taken-up under this project. While assessing the drainage conditions, the serviceability, structural conditions, obstruction, siltation, blockages are taken into consideration. And finally describe the drainage and environmental management plan, and its implementation strategies.

12.1.1 Goals and Objectives

Following are the overall objectives of the drainage plan of Shailkupa Paurashava:

- To allow smooth drainage of storm water and the waste water of the town.
- To develop a comprehensive drainage network with area coverage and capacity.
- To prevent encroachment to natural drainage system.
- To create awareness about disposing of solid waste in the drainage system.

12.1.2 Methodology and Approach to Planning

Preparation of the Drainage Plan involves (I) analyzing the existing conditions related to drainage facilities and the flood management (II) identifying major drainage outfalls and on the basis of the outfalls splitting the total drainage area into a number of drainage zones (III) defining all pertinent design criteria and (IV) defining drainage facility requirements and sizing.

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 runoff of a particular catchment area. The US Soil Conservation Service (*SCS*) method shall be used as an alternative of the Modified Rational Method for larger catchment areas.

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.

12.2 Existing Drainage System/Network

12.2.1 Man-made drains

Paurashava has 36.87 km drainage network at Shailkupa Paurashava. The project area has 2.63 km man-made drainage network. In Shailkupa Paurashava the core part of the Paurashava possesses some tertiary drains which mainly drain out water from the Bazar area, Upazila area and the Thana (*Police station*) area. The other areas of the Paurashava have to depend upon the natural canals for storm or waste water to be drained out. The drains are poorly managed. Uncovered drains are common feature and the result of uncovering is ultimately filling and losing the drain. Necessity of covering the drains are not only from environmental and safety perspective but also it is a local need. Water logging is the main problem of Shailkupa Paurashava. **Table-12.1** shows Coverage of Different Types of Drains in Shailkupa Paurashava.

Table 12.1: Coverage of Different Types of Drain in Shailkupa Paurashava

Ward No.	Average Width (Feet)	Length (Meter)	Area (Sq. Meter)	Type	Quality	Status
2	3	275	163.006	Pucca	Poor	Covered
3	2	95	57.933	Pucca	Poor	Uncovered
4	2	15	8.889	Pucca	Poor	Covered
	2	126	38.580	Pucca	Poor	Uncovered
	3	148	69.757	Pucca	Poor	Covered
5	2	318	197.948	Pucca	Poor	Covered
	2	65	29.585	Pucca	Poor	Uncovered
	3	40	30.714	Pucca	Poor	Uncovered
	2	70	161.507	Pucca	Poor	Uncovered
	2	18	10.878	Pucca	Poor	Uncovered
8	2	31	34.017	Pucca	Poor	Uncovered
	6	240	175.676	Pucca	Poor	Covered
	6	149	52.925	Pucca	Good	Covered
	3	180	136.828	Pucca	Poor	Covered
	6	210	249.263	Pucca	Good	Covered
	4	292	313.876	Pucca	Good	Piped drain
	2	155	93.556	Pucca	Poor	Covered
	3	209	218.096	Pucca	Poor	Uncovered
Total	-	2636	2043.03	-	-	-

Source: Physical Feature Survey, 2009

12.2.2 Natural Canal and River

General Description of Natural Canals

The existing 11 canals at present are trying to serve the drainage requirements which are acting as the Primary drains for the Paurashava. All of these canals are not well linked with one another in the Paurashava area. Lack of drainage network is causing water logging for 4 months in the Paurashava area during rains. The entire drainage network is required to be developed with primary, secondary and tertiary drains to mitigate the current water logging problem. In some portion of the area the condition of the khals are being encroached by the local people and the situation is deteriorating day by day. So, it

should be given much concern to sustain the natural canal. Drainage system of Shailkupa Paurashava is being managed by a natural drainage system (*composed mainly by khals*) and a few man-made drains. There are 11 khals in the Paurashava. Total length of that natural drainage network of the Paurashava is 34.24 km. **Table-12.2** shows list of Primary Drains of Shailkupa Paurashava. **Table-12.3** shows Drainage Coverage of Existing Khals in Shailkupa Paurashava.

Table 12.2: List of Primary Drains of Shailkupa Paurashava

Sl. No.	Canal Name	Flow Direction	Length (km)	Area (acres)	Alignment
1	Shatgasi Khal	South	1.17	5.815	Ward-4, 6
2	Muritola Khal	Kumar River	0.56	2.133	Ward-7
3	Unnamed	South	0.21	0.619	Ward-1
4	Unnamed	Kumar River	0.57	1.42	Ward-4, 5
5	Ekkhu Centre Khal	Kumar River	21.52	15.495	Ward-4, 5, 6, 9
6	Link Khal	Kumar River	4.80	25.466	Ward-1, 2, 4, 5, 6
7	Unnamed	Kumar River	0.91	6.347	Ward-1, 3, 7
8	Unnamed	Towards South-west	1.78	11.244	Ward-1, 2, 3
9	GK Main Khal	Kumar River	1.06	10.709	Ward-7, 9
10	Unnamed	Link Khal	0.64	1.039	Ward-2
11	GK Khal	Kumar River	3.66	16.877	Ward-4, 6, 5
Total			36.87	96.19	-

Source: Physical Feature Survey, 2009

Table 12.3: Drainage Coverage of Existing Man-made Drainage in Shailkupa Paurashava

Ward No.	Area (Acre)	%
Ward No. 01	13.50	14.03
Ward No. 02	7.94	8.25
Ward No. 03	4.88	5.07
Ward No. 04	20.62	21.44
Ward No. 05	16.81	17.47
Ward No. 06	18.93	19.68
Ward No. 07	10.72	11.15
Ward No. 08	0.02	0.02
Ward No. 09	2.78	2.89
Total	96.19	100

Source: Physical Feature Survey, 2009

River

Kumar River passes through the Paurashava in the Ward no. 2, 3, 4, 5, 7, 8 and 9. Total area of this river within the Paurashava is about 59.46 acres. **Table 12.4** shows the detail.

Beel/ Marsh land, Pond-Dighi, Ditch and Dyke

Apart from the natural drainage system, large number of ponds and ditches (555) observed in the area covering an area of 100.58 acres. These also play an important role to retain the storm water during monsoon and contribute to make the area partially flood free. **Table-12.4** shows ward wise distribution of pond and ditch in Shailkupa Paurashava. Waterbodies having an area equal to or more than 0.15 acres within the

Paurashava are declared as retention area. And these water bodies should be preserved under "*Playfield, Open space, Park and Natural water reservoir Conservation Act, 2000*".

Table 12.4: Ward-wise Water Bodies in Shailkupa Paurashava

Ward No.	Beel		Ditch		Khal		Pond		River	
	Area (Acre)	%	Area (Acre)	%	Area (Acre)	%	Area (Acre)	%	Area (Acre)	%
Ward-01	-	0	0.25	7.79	13.50	14.03	8.70	8.93	-	0
Ward-02	-	0	0.10	3.24	7.94	8.25	10.31	10.58	5.18	8.71
Ward-03	-	0	0.11	3.58	4.88	5.07	11.35	11.66	0.48	0.81
Ward-04	-	0	0.25	7.73	20.62	21.44	19.36	19.88	1.67	2.81
Ward-05	-	0	0.56	17.54	16.81	17.47	14.76	15.16	5.50	9.25
Ward-06	-	0	0.50	15.68	18.93	19.68	21.80	22.38	-	0
Ward-07	2.91	87.19	1.37	43.18	10.72	11.15	4.77	4.90	15.18	25.53
Ward-08	-	0	0.04	1.26	0.02	0.02	0.02	0.02	23.93	40.25
Ward-09	0.43	12.81	-	0	2.78	2.89	6.32	6.49	7.52	12.64
Total	3.342	100	3.18	100	96.19	100	97.40	100	59.46	100

Source: Physical Feature Survey, 2009

12.2.3 Analysis on land level Topographic contour

The Total Station (*TS*) based surveys were conducted for measuring the spot levels/land levels of the project area (*Northing, Easting, Elevation or RL*). Later on these spot levels were used for generating the contour of the project area. In general the spot levels on the land were taken approx. at 10 meter intervals.

Total 1571 nos. spot values were collected for the study area. The lowest spot height is 6.058m PWD and the highest spot height is 12.826m PWD. Around 63.15% of the spot heights are between 8mPWD to 10mPWD and average height of land of the project area is 9.09m PWD. Details statistical summary of land levels survey are shown in **Table-12.5** below.

Table 12.5: Contour derived from the spot elevation

Sl. No.	Spot Unit	Value
1.	Total Spot Number	1571
2.	Mean (*Meter*)	9.09
3.	Maximum Height (*Meter*)	12.826
4.	Minimum Height (*Meter*)	6.058
5.	Standard Deviation	1.39

Source: Topographic Survey, 2009

Map 12.1: Topographic Map of Shailkupa Paurashava

12.2.4 Analysis of peak hour runoff and identification of drainage outfalls

The size and shape of the catchments or sub-catchments for each drain shall be determined by planimeter from 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 intensity 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.

12.2.4.1 Method Used

Drain as the structure is generally develops to free our living area from household waste water and rain water of storm water. The daily waste water discharge from a household is negligible so for the drainage design it is necessary to calculate the storm water.

Urban storm drainage primarily concerns this surface run-off. The primary objective of urban drainage system design is to drain out this storm water either through open surface drains or through underground sewers. An important parameter for the design of storm water systems is the rate and volume of run-off to be conveyed through the system as a consequence of storms. Run-off estimates are carried out based on knowledge of the occurrences of heavy rainstorms and a relation between rainfall and the corresponding run-off. The quantity of run-off again depends on the geometry and physical properties of the catchments.

Rainfall occurs at irregular intervals, and intensities, and frequency and duration vary within catchments. Due to this random nature of occurrence of rain events, the storm drainage system is designed considering estimated run-off based on the analyses of past rainfall records. A widely used statistical description of heavy rainfall is that of intensity–duration–frequency curves that are developed by processing the data for a large number of storm events observed over a number of years, considering the time variation of the rainfall intensity.

Calculation of Drainage Runoff:

The consultant has used the Rational Method for calculation of drainage runoff. It is relatively simple, internationally used technique for designing storm drainage system in urban areas, and according has been selected for use in estimating the design discharge for the proposed storm drains/ khals for Shailkupa Paurashava. Accordingly, the peak

flows at any given point in a drainage system can be calculated by using the following formula:

Q = CIA/360

Where, Q = peak flow in m^3/sec

C = run-off coefficient

I = design rainfall intensity in mm/hr

A = catchments area in hectares

Source: Elementary Hydrology, Vijay P. Singh, 1992

Run-off coefficient:

The run-off coefficient C is defined as the ratio of the rate of run-off to the rate of rainfall during the same time period and is dimensionless. Because, some rainfall is retained in depression or ponds and the run-off is prevented from reaching the drain due to obstructions, or infiltrates into the soil, the run-off coefficient is less than one. **Table-12.6** shows the run-off coefficients, which are commonly used when using the rational method for the individual situations. The value applied is based upon an average for the situation under consideration, and is recommended to be set in the range of 0.40 to 0.48 for fully developed urban areas containing a normal mix of residential and commercial properties. This table shows the common run-off coefficient used for different type of areas.

Rainfall Intensity:

The design rainfall intensity in mm/hr is defined as the average rate of precipitation of a given time period during a storm event. This is a variable value, and is dependent on the particular rainfall characteristics of the area, on the return period selected for the rainfall events, and on the time required for the run-off to flow from the most remote part of the catchment area to the point under consideration (*defined as the time of concentration, Tc in minutes*).

Table 12.6: Common Run-off coefficients for Different Types of Area

Type of Drainage Area		Run-off Coefficient: C
Business	Downtown areas	0.70-0.95
	Neighborhood area	0.50-0.70
Residential	Single-family areas	0.30-0.50
	Multi-units, detached	0.40-0.60
	Multi-units, attached	0.60-0.75
	Suburban	0.25-0.40
	Apartment dwelling areas	0.50-0.70
Industrial	Light areas	0.50-0.80
	Heavy areas	0.60-0.90
	Parks, cemeteries, playgrounds	0.10-0.35
	Rail road yard areas	0.20-0.40
	Unimproved areas	0.10-0.30

Type of Drainage Area		Run-off Coefficient: C
	Streets: Driveways and roofs	0.10-0.95
Lawns	Sandy soil, flat, 2%	0.05-0.10
	Sandy soil, avg. 2-7%	0.10-0.15
	Sandy soil, steep, 7%	0.15-0.20
	Heavy soil, flat, 2%	0.13-0.17
	Heavy soil, avg. 2-7%	0.18-0.22
	Heavy soil, steep, 7%	0.25-0.35

Source: Handbook of Hydrology by-David R Maidment

12.2.4.2 Demand Analysis

In Shailkupa Paurashava the core part of the Paurashava have some man-made drains which are mainly discharge household waste water. The project area has to depend upon the natural canals to drain out the rainy or waste-water. There are no Primary or Secondary drains constructed in the Paurashava to drain out the runoff efficiently. The core area of the Shailkupa Paurashava is at slightly high elevation then any other part of the Paurashava. The man-made drains mainly found in the Ward No. 4 and Ward No. 8 and small portion of Ward Nos. 2, 3 and 5 (*mainly covered Bazar area, Upazila area and Police station area*). The total length of the man made drains is 2.63 km and average width is 0.3 to 0.5 meter (*upto 1 feet*) which is mainly made for the household discharges. As a result during the concentrated heavy rainfall the effect of inadequate drainage, become visible.

Natural drains (*canal*) in the project area mainly act as primary drains. As a result the drainage network design for the area will mostly depends on connecting those canals (*act as primary drains*) by constructing secondary and the tertiary drains to drain out water (*both rain water and house hold discharges*) to the nearby canals. Again 524 numbers of ponds exist in the project area, which have to design as the temporary storage regenerating for rainfall runoff.

In preparing drainage network plan, the following design approach to be followed. In the design approach, the consultant required to consider the practical aspects of desired results, cost efficiency, durability including ease of construction and maintenance. Visible social improvements the urban for population are considered to be the most important and effectively drainage of excess runoff is considered to be the greatest tangible benefit. Reduction of diseases, infant mortality and increase of life span are considered to be the greatest intangible benefits. In line with these considerations, the following broad approach is required to adopt in preparing the drainage master plan for Shailkupa Paurashava.

Channel Improvements

Canal and channel improvement must be limited to the improvement and reconstruction of existing open channels. Construction of Tertiary, Secondary and Primary drains is also sometime necessary to provide backbone for integrated storm drainage system for the

Paurashava. Channel improvement means, deepening, re-sectioning, re-sloping, removal of blockages and clearing of existing channels, underground pipe storm drainage system is not considered appropriate due to its high capital cost where natural slope is not effective. Pipe drain may be used where necessary. But these factors are engineering solution, which are not covered by planning tasks.

Storage and Retention Ponds

Existing borrow pits, ponds, low pockets within the urban areas and agricultural low lands within the fringe area, all act as retention ponds and all these serve to delay the peak floods during heavy storms. In the absence of internal storage areas within the Paurashava area, the existing ponds, low packets etc. continue to serve as reservoir in the coming years, and the Paurashava should endeavor to retain these low lands in the future. Waterbodies having an area equal to or more than 0.15 acres within the Paurashava are declared as retention area. For every mouza such reservoir is available. Those water bodies should not be disturbed or removed by physical interventions by fillings or other means rather should be properly maintained and preserved. And these water bodies should be preserved under "*Playfield, Open space, Park and Natural water reservoir Conservation Act, 2000*".

Rainfall-Intensity- Duration Curves

For determining the storm water flows to be used for design of the urban drainage systems, the rainfall intensities must be known for varying return periods. In particular, the short duration rainfalls (*those lasting from one to three hours*) are of greatest importance so that the Paurashava drainage systems can be designed to rapidly carry the run-off away from the urbanized areas both during and immediately after the storms.

Broad Design of Main and Secondary Drains

The size of the storm drainage channel is usually calculated by using the conventional manning's formula, as follows:

$Q = a\ v$ and

$v = 1/n\ R^{2/3} S^{1/2}$

Where: Q = design flow (m^3/sec)

a = wetted cross-sectional area (m^2)

v = velocity of flow (m/s)

R = hydraulic radius (m)

= area (a) in m^2/wetted perimeter (p) in m

s = longitudinal slope of the drain (m/m)

n = Manning's roughness coefficient

= 0.014 for lined drains (*concrete/plaster*)

= 0.025 for earthen drains (*good condition*)

12.3 Plan for Drainage Management and Flood Control

12.3.1 Plan for Drain Network Development

Sustainable drainage network system, an alternative to conventional drainage is introduced to mimic natural drainage, with the aim of reducing flooding and improving the quality of water draining from urban surfaces (*runoff*). A comprehensive drainage network is developed leaving the existing beels and khals to remain their natural form. There are 11 canals in the project area. These canals are proposed to be connected with the respective catchment area through manmade primary and secondary drains. These drains would receive runoff from other secondary and tertiary drains falling into them and from the land phase of the catchment area.

Drain Network Plan

Drainage network plan is intended primarily for flood mitigation, water logging and erosion control. It comprises of the proposed new drains along with improvement of existing drainage structures, embankment and sidewall. Outfall location of each existing and proposed drain were designated after assessing the flow direction of existing canal network and land slope. There are 27 man-made Secondary and Tertiary drainage networks covering different parts of Wards. Most of drains are pucca with 2 feet average width. Privately developed drains have been found out as dominant which is 46%. The natural drainage network is composed of 11 khals plying within the Paurashava area. Among these khals, most of them are primary khals which were naturally formed. The link khals were excavated long ago for irrigation purpose. Most of these khals are flowing towards south direction and fall into the Kumar River.

Primary drain

Primary drains are called as the main drains. Primary drains cover larger storm drainage area than above discussed tertiary and secondary drains. In ascending order its position is third. Its crosssection 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, river or large lowland area. Primary drains are the rivers and khals. The outfall points should be provided with sluice gate or pump station (*if the outfall/ river water level is higher than the drain water level*) in order to control backflow and water logging in the upstream area to protect river water pollution the outfall has to be equipped with treatment plant.

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 also bigger than tertiary drains. Like tertiary drains, it may run parallel to bigger roads. Secondary drains may run along and through the middle of its storm water contributing area.

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. Tertiary drains generally are the under jurisdiction of municipality and city corporation. These drains or drainage networks are constructed and maintained directly by municipalities and City Corporation. These drains are constructed by brick, cement concrete and sometimes by excavating earth in their alignments. These drains may run parallel to road or across the catchment 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 channeled or lined by brick works. Tertiary drains deliver its discharge usually to secondary drains.

Plot Drains

Plot drains are provided around a building on a plot. In most cases, the drain is made of bricks and 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.

Block Drain

A 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 plots 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 neighbouring blocks or Mohallahs. Block drains carry storm water coming from the plot drains. The shape of the block drain is also rectangular, but bigger than plot drains and its bottom is lower than plot drain. The sketch of the plot drain above also shows the block or Mohallah drain under plot drain.

12.3.2 Outfall of Drains

There is no formal outfall of drains in or outside Shailkupa Paurashava. The secondary drains mainly discharge storm water to the nearby khals and borrow pits, which will be act as primary drain. The existing drainage outfalls can be used. Kumar River and khals are the ultimate outfall for Shialkupa Paurashava. Total 37 drainage outfalls are established for drainage development plan of Shailkupa Paurashava.

12.3.3 Proposal for improvement of the existing drain networks

Paurashava has 36.87 km drainage network at Shailkupa area. This drainage network served mainly Shailkupa Bazar, Upazila Complex area. Based on the results of drainage study it is recommended for the existing drain that:

- Rehabilitate broken drains;
- Cover the open drains based on budget allocation.
- Construction of new channels & rehabilitation of old ones with enough drainage head.
- Construct a new pump drainage network for the area towards canals.
- Remove all un-authorized structures, which developed on drainage structures.
- Regular cleaning and maintenance by the concerned authorities.
- Embarking on a sustained public enlightenment to discourage residents from dumping their refuse into drainage channels.

12.3.3.1 List of proposed new drains

For effective functioning of existing drainage network, some new drains has been proposed in the project area which is listed in **Table-12.7**. The list has been prepared based of analysis of topographic map, existing drainage network, field visits and consultation with the Paurashava officials and local people. The proposed drains along with existing drains and other drainage infrastructures are shown in **Map-12.2**.

Table 12.7: Summary of Proposed Drain

Type of Drain	No. of Drains	Length (m)	Length (km)	%
Secondary Drain	31	25369.60	25.37	40.39
Tertiary Drain	87	37438	37.44	59.61
Total	118	62807.60	62.81	100

Table 12.8: List of proposed new drains

Type	ID	Ward No.	Width (m)	Outfall	Length (km)
Secondary Drain	SD-01	W-2	0.80 m	Khal	0.499
	SD-02	W-2	0.80 m	Khal	0.471
	SD-03	W-3	0.80 m	Khal	1.798
	SD-04	W-4	0.80 m	SD-26	0.555
	SD-05	W-4	0.80 m	Khal	0.330
	SD-06	W-4	0.80 m	Khal	0.475
	SD-07	W-5	0.80 m	Khal	0.582
	SD-08	W-5	0.80 m	Khal	0.451
	SD-09	W-5	0.80 m	Khal	0.505
	SD-10	W-6	0.80 m	Khal	1.189
	SD-11	W-6	0.80 m	Khal	1.572
	SD-12	W-6	0.80 m	Khal	1.643
	SD-13	W-7	0.80 m	Khal	0.838
	SD-14	W-7	0.80 m	Khal	1.542
	SD-15	W-7	0.80 m	Khal	1.905

Type	ID	Ward No.	Width (m)	Outfall	Length (km)
	SD-16	W-7	0.80 m	Khal	2.203
	SD-17	W-7	0.80 m	Khal	0.533
	SD-18	W-7	0.80 m	Khal	1.024
	SD-19	W-7	0.80 m	SD-18	0.285
	SD-20	W-7	0.80 m	SD-14	0.617
	SD-21	W-8	0.80 m	Kumar River	0.359
	SD-22	W-8	0.80 m	Kumar River	0.168
	SD-23	W-8	0.80 m	Kumar River	0.164
	SD-24	W-8	0.80 m	SD-23	0.776
	SD-25	W-8	0.80 m	Kumar River	0.392
	SD-26	W-8	0.80 m	Kumar River	0.297
	SD-27	W-9	0.80 m	Kumar River	0.330
	SD-28	W-9	0.80 m	SD-27	1.081
	SD-29	W-9	0.80 m	Kumar River	0.315
	SD-30	W-9	0.80 m	SD-16	1.618
	SD-31	W-9	0.80 m	SD-30	0.854
Tertiary Drain	TD-01	W-1	0.50 m	Khal	0.969
	TD-02	W-1	0.50 m	Khal	1.173
	TD-03	W-1	0.50 m	Khal	0.864
	TD-04	W-2	0.50 m	Khal	0.534
	TD-05	W-2	0.50 m	SD-03	0.684
	TD-06	W-2	0.50 m	SD-03	0.560
	TD-07	W-2	0.50 m	SD-02	0.186
	TD-08	W-2	0.50 m	SD-02	0.103
	TD-09	W-2	0.50 m	TD-04	0.975
	TD-10	W-2	0.50 m	TD-09	0.225
	TD-11	W-3	0.50 m	SD-03	0.577
	TD-12	W-3	0.50 m	SD-03	0.459
	TD-13	W-3	0.50 m	TD-01	0.657
	TD-14	W-3	0.50 m	Khal	1.003
	TD-15	W-3	0.50 m	Khal	0.309
	TD-16	W-3	0.50 m	TD-17	0.312
	TD-17	W-3	0.50 m	SD-03	0.416
	TD-18	W-4	0.50 m	SD-26	0.444
	TD-19	W-4	0.50 m	SD-26	0.439
	TD-20	W-4	0.50 m	SD-26	0.272
	TD-21	W-4	0.50 m	TD-19	0.147
	TD-22	W-4	0.50 m	TD-19	0.144
	TD-23	W-4	0.50 m	Khal	0.258
	TD-24	W-4	0.50 m	SD-04	0.158
	TD-25	W-4	0.50 m	TD-18	0.097
	TD-26	W-4	0.50 m	SD-12	0.544
	TD-27	W-4	0.50 m	SD-12	0.528
	TD-28	W-4	0.50 m	TD-23	0.077
	TD-29	W-4	0.50 m	TD-23	0.069
	TD-30	W-4	0.50 m	Khal	0.375
	TD-31	W-4	0.50 m	SD-04	0.718
	TD-32	W-4	0.50 m	TD-31	0.162
	TD-33	W-4	0.50 m	TD-31	0.169
	TD-34	W-4	0.50 m	TD-27	0.507
	TD-35	W-4	0.50 m	Khal	0.471
	TD-36	W-4	0.50 m	Khal	0.619
	TD-37	W-5	0.50 m	SD-08	0.202

Type	ID	Ward No.	Width (m)	Outfall	Length (km)
	TD-38	W-5	0.50 m	SD-08	0.284
	TD-39	W-5	0.50 m	SD-08	0.354
	TD-40	W-5	0.50 m	TD-37	0.776
	TD-41	W-5	0.50 m	SD-12	0.178
	TD-42	W-5	0.50 m	SD-07	0.295
	TD-43	W-5	0.50 m	TD-40	0.168
	TD-44	W-5	0.50 m	Khal	0.410
	TD-45	W-5	0.50 m	Khal	0.736
	TD-46	W-6	0.50 m	Khal	0.567
	TD-47	W-6	0.50 m	Khal	0.854
	TD-48	W-6	0.50 m	Khal	0.566
	TD-49	W-7	0.50 m	SD-13	0.322
	TD-50	W-7	0.50 m	SD-13	0.348
	TD-51	W-7	0.50 m	Khal	3.408
	TD-52	W-7	0.50 m	SD-15	0.662
	TD-53	W-7	0.50 m	TD-52	0.294
	TD-54	W-7	0.50 m	TD-55	0.303
	TD-55	W-7	0.50 m	TD-52	0.216
	TD-56	W-7	0.50 m	SD-15	0.205
	TD-57	W-7	0.50 m	Khal	0.659
	TD-58	W-7	0.50 m	TD-49	0.434
	TD-59	W-7	0.50 m	SD-18	0.413
	TD-60	W-7	0.50 m	TD-63	0.213
	TD-61	W-7	0.50 m	TD-63	0.309
	TD-62	W-7	0.50 m	SD-18	0.881
	TD-63	W-7	0.50 m	SD-18	0.362
	TD-64	W-7	0.50 m	SD-13	0.288
	TD-65	W-7	0.50 m	TD-52	0.205
	TD-66	W-7	0.50 m	Khal	0.171
	TD-67	W-7	0.50 m	TD-77	0.475
	TD-68	W-8	0.50 m	SD-15	0.136
	TD-69	W-8	0.50 m	SD-15	0.252
	TD-70	W-8	0.50 m	SD-15	0.108
	TD-71	W-8	0.50 m	SD-15	0.106
	TD-72	W-8	0.50 m	SD-30	0.233
	TD-73	W-8	0.50 m	SD-30	0.185
	TD-74	W-8	0.50 m	SD-31	0.575
	TD-75	W-8	0.50 m	SD-26	0.437
	TD-76	W-8	0.50 m	Khal	0.453
	TD-77	W-9	0.50 m	SD-30	0.321
	TD-78	W-9	0.50 m	SD-30	0.355
	TD-79	W-9	0.50 m	SD-30	0.293
	TD-80	W-9	0.50 m	SD-30	0.270
	TD-81	W-9	0.50 m	SD-30	0.362
	TD-82	W-9	0.50 m	SD-31	0.613
	TD-83	W-9	0.50 m	SD-30	0.216
	TD-84	W-9	0.50 m	SD-31	0.185
	TD-85	W-9	0.50 m	SD-28	0.234
	TD-86	W-9	0.50 m	SD-28	0.221
	TD-87	W-9	0.50 m	SD-24	0.129

Map 12.2: Drainage & Environmental Plan of Shailkupa Paurashava

12.3.3.2 List of Infrastructure measures for Drainage and Flood Control Network

The consultant proposed some drainage structure for the purpose of uninterrupted flow of storm runoff as well as facilitating continuous and smooth traffic movement which is listed in **Table-12.9** below.

Table 12.9: List of proposed drainage structure

ID	Type	Location
BR-01	Bridge	Ward No. 2
BR-02	Bridge	Ward No. 3
BR-03	Bridge	Ward No. 3
BR-04	Bridge	Ward No. 4
BR-05	Bridge	Ward No. 5
BR-06	Bridge	Ward No. 5
BR-07	Bridge	Ward No. 6
BR-08	Bridge	Ward No. 6
BR-09	Bridge	Ward No. 6
BR-10	Bridge	Ward No. 7
BR-11	Bridge	Ward No. 7

12.4 Environmental Management Plan

This section describes the goals and objectives, and methodology and approach to planning of environment management plan.

12.4.1 Goals and Objectives

Following are the overall objectives of environmental management plan:

- To create a sustainable living environment.
- To create awareness among citizens about livable environment.

12.4.2 Methodology and Approach to Planning

The environmental management plan consists of the Supplementary Living Environment Survey, the Comprehensive Ecological Survey and the Water Quality Survey. The Supplementary Living Environment includes water supply, land pollution, sewerage and sanitation, solid waste management, and resettlement of population due to construction of canals and primary drains. The Comprehensive Ecological Survey aims at facilitating comprehensive environmental assessment by subsequent urbanization & implementation of the drainage on the ecological elements of fauna and flora, agricultural and aqua cultural resources etc. The Water Quality Survey is the sampling and analysis of surface water from rivers, natural canals, ponds etc., and from ground water. These are required to be done to ensure necessary urban environment enhancement measures. Moreover, an overall evaluation of environmental condition due to urbanization with flood management and drainage is required in order to justify the necessity of the Drainage Plan. In planning process special attention required to reduce the insect breeding areas, and preserve and management of natural drainage area.

12.4.3 Existing Environmental Condition

The urban environment of the Shailkupa Paurashava includes both build and natural environment. Build environment includes waste management, water, air quality, energy usage, transport network, slum improvement, and disaster mitigation. The urbanization where the build environment overburdens the natural environment cannot be sustainable. But urbanization is vital for countries economic growth. Urban centres concentrate services, infrastructure, labour, knowledge, entrepreneurship and markets.

So in every phase of planning processes all these environmental issues will be evaluated and proper measure will be taken to minimize the adverse environmental impacts on land pollution, water and air quality, biodiversity resources and marine resources by energy usage, transport network, waste management, slum improvement, disaster mitigation etc.

12.4.3.1 Geo-morphology

Geology, Soil and Sub-soil Conditions

Being located in the Khulna Division and in Jhenaidah Zila, the general soil type is following. The Paurashava belongs to Non-calcareous Brown Floodplain soils group whose main characteristics are: Non-calcareous brown sandy loams to clay loams occurring in the old Himalayan piedmont plain, Tista and Old Brahmaputra floodplains and locally in the old Ganges river floodplains. Soils are slightly to strongly acid in reaction. The Paurashava is basically a flat land and average 9.09 above the mean sea level and varying more than 1.5m in elevation. The Kumar River passes through the Paurashava along with several natural canal. And it is under Ganges-Kapotakkha Irrigation project. There is an embankment cum road running parallel north and south connecting Kumer River in the south and Linkage canal in the north. One of the general characteristics of Shailkupa Upazila is abundance of Ponds and ditches which are mostly for culture fisheries. There is a large water depression on the south of the Paurashava.

Climate

Bangladesh is characterized by a tropical monsoon climate with three distinct seasons. The climatic condition of Shailkupa Paurashava falls into mainly three seasons namely winter, summer and monsoon. It is obvious that the flooding at Jhenaidah district is not due to the local monsoon precipitation alone, but rather results from rainwater transported and retained by the Meghna River and its tributaries from northern regions to the south.

Temperature

In Average maximum temperature varies between 30.1°C and 36.3°C and minimum temperature varies between 26.4°C (*December*) and 24.6°C (*January*). The hottest months are March, April, May, June and August. From December to February, Paurashava

experiences cool periods when temperature varies from 12.5°C (*December*) to 14.1°C (*February*).

Humidity

Shailkupa Paurashava lies in the tropical monsoon climatic region and more specially, represents the climate of Brahmanbaria district. The rainy season occurs mainly from June to October. The dry season extends from November to March and is cool and almost rainless, receiving less than an average of 120 mm for the total 5 months period. April to May is the pre-monsoon season, with high temperatures and periodic thunderstorms and the monsoon (*June-October*) is very wet season with heavy rains in regular interval.

Rainfall

In 2009, the Paurashava had experienced 470 mm rain of which about 72% occurred during the monsoon. The duration of maximum rainfall was 16 days in July and the duration of minimum rainfall was 2 days in the months of November, December and January. So it had rained in all the months of that year.

Wind Directions

A cool dry, almost cloudless season from November through February with north-eastern monsoon winds is followed by a transition period, namely the pre-monsoon hot season that comes along with changing wind directions, thunderstorms, and increasing cloud cover from March through May Shailkupa of Jhenaidah District. Single rain events in March, April and May might be the characteristic thunderstorms of the hot dry season. The Monsoon season started at the end of May and lasted until end of October.

Hydrology

Groundwater resource of Bangladesh is identified by three aquifers and these are Upper aquifer or composite aquifer, Main aquifer (*it is at depths 6m in North-West and to 83 m in the South*), Deep aquifer. The main aquifer is separated from deep aquifer by clay layers of varied thickness. In most areas, the main aquifer is hydraulically connected with the overlying composite aquifer. Most of the upper ground water of Bangladesh has almost the same flow direction as the Rivers. At high stream stage during monsoon, there may be direct recharge into the upper aquifer if it is not saturated with rain-water. At low-stream (*dry-season*) stage, there is a discharge from the aquifer into the stream. There is also possible that contaminated ground water from upper catchments source also moving in downward gradient. The groundwater gradient and rate of groundwater flow are controlled by the distance between Rivers and the balance between recharge and evaporation. This varies seasonally. In Bangladesh, hydraulic gradients are very low because of the limited relief.

The contribution of local rainfall to the annual surface runoff is about 25 per cent, with significant seasonal variation. Annual rainfall and evapotranspiration of the country show that there is a substantial excess of rainfall everywhere in the monsoon season. In terms

of quality, the surface water of the country is unprotected from untreated industrial effluents and municipal wastewater, runoff pollution from chemical fertilizers and pesticides, and oil and lube spillage in the coastal area from the operation of sea and River ports. In Bangladesh, hydraulic gradients are very low because of the limited relief. Hand-pump tube wells are unlikely to have a major effect on groundwater flow. Irrigation wells with their larger volumes of abstraction will tend to draw water from groundwater rather than from River recharge and may thereby change the local hydraulic gradients significantly. However, groundwater movement and hence aquifer flushing, is inherently very slow in Bangladesh. Hand-pump tube wells are unlikely to have a major effect on groundwater flow. Irrigation wells with their larger volumes of abstraction will tend to draw water from groundwater rather than from River recharge and may thereby change the local hydraulic gradients significantly. The distribution, nature and size of present-day Rivers also has an important effect on groundwater velocities and as such, Rivers may play a significant role in controlling the short-range variability of groundwater arsenic concentrations through their effect on local hydraulic gradients.

12.4.3.2 Solid Waste and Garbage disposal

Condition of solid waste management at Shailkupa Paurashava is very poor.

HH Waste

There is inadequate solid waste management system in Shailkupa Paurashava. There is one dumping site in the Paurashava. 20 dustbins are available there. There is also lack of awareness among the town dwellers.

Industrial waste

There is a huge amount of industries in the project area. All the industries have their own industrial waste disposal system.

Kitchen Market Waste

Garbages of kitchen markets are dumped to nearby dustbins.

Clinical/ Hospital Waste

Hospital waste is dumped to their own dustbin.

Waste Management System

There are 20 dustbins. 2 waste collection trucks and 2 vans are used to collect solid waste.

Latrine

There is only one public latrine at Shailkupa Paurashava.

12.4.3.3 Brick Field

There are three brickfields in Shailkupa Paurashava.

12.4.3.4 Fertilizer and other chemical Use

Main reasons for land pollution at Shailkupa Paurashava are extensive use of fertilizer in agriculture.

12.4.3.5 Pollutions

Water

Water is considered polluted when it is altered from the natural state in its physical condition and chemical and microbiological composition, so that it becomes unsuitable or less suitable for any safe and beneficial consumption. The used water of a community is called wastewater, or sewage. If it is not treated before being discharged into waterways, serious pollution occurs. Water pollution also occurs when rain water runoff from domestic waste and from agricultural land makes its way back to receiving waters (*Ponds, Canals and Beels*) and into the ground.

In Shailkupa Paurashava there are 519 ponds, 31 ditches, one beel and 11 khals as sources of surface water. The type of surface water is fresh in Shailkupa. Surface water pollution has been found in the study area originating from the use of insecticide and chemical fertilizers in crop fields. Wash out by rain water from crop fields to nearest water sources with chemicals is causing water pollution. Cattle bathing and flow of waste water from domestic use and rain off into the khals and river have also identified as reasons for surface water contamination. The Paurashava authority has been not yet taken any initiatives to control surface water pollution.

Ground water pollution also exists in the Shailkupa Paurashava. A total of 6751 hand tube wells are distributed all over the Paurashava area. Presence of iron in ground water is the reasons for such pollution. Agricultural land in Wards-1, 2, 4 and 6 has pollution from Chemical fertilizers dumping.

Air

Air pollution is the introduction of chemicals, particulate matter, or biological materials that cause harm or discomfort to human or other living organisms, or damages the natural environment, into the atmosphere.

Operations of shallow engine driven vehicles (*Alam Sadhu/ Nochiman/ Kariman*) that are unfriendly to the environment are responsible for air pollution due to, these vehicles uses 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, nose and throat. Long-term exposures can lead to chronic, more serious health problems such as cardiovascular disease, cardiopulmonary disease, and lung cancer.

There are 2 saw mills and 20 rice 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 treatment plant in the industry.

Sound

Noise pollution basically consists of unpleasant human, animal or machines creating sound that disrupt the activity or balance of human or animal life. A common form of noise pollution is from vehicles, principally motor vehicles. Other sources are car alarms, office equipment, factory machinery, construction work, audio entertainment systems, loudspeakers and noisy people.

In the Paurashava, shallow engine driven vehicles like Alam Sadhu/ Nochiman/ Kariman are plying on roads as a mean of local transport. They are making more than 1000 trips per day throughout the Paurashava. Engine generated sounds during their operational time on roads is both a matter of nuisance as well as a source of sound pollution. The Paurashava authority has been already served notice to restrict their movements. Generated sounds from Saw mills at their operational time are also a source of sound pollution existing in Shailkupa Paurashava. In this respect there is no measures have been taken either by Paurashava or by any Public or Private agency.

Land Pollution

Land pollution is basically about contaminating the land surface of the Earth through dumping urban waste matter indiscriminately, dumping of industrial waste, mineral exploitation, and misusing the soil by harmful agricultural practices.

In the Paurashava, land pollution is occurring from extensive use of fertilizer in the agriculture lands and water logging. Extensive use of fertilizer is changing the bio-chemical composition and the lands are loosing their productivity day by day. In 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.

The entire Paurashava is affected. There is no attempt to curb this pollution from either by Paurashava or from other agency.

Arsenic

According to the Environmental study 2009, hand tube well and piped water supplies are the two major options for drinking and cooking water in the Paurashava. Water demand

is meet mainly by hand tube wells and most of the households have their own hand tube wells. Piped water supply is absent in Paurashava area (*Shailkupa Paurashava Information Sheet*). There are some limited provisions of piped water supply of Shailkupa Paurashava. In other wards households themselves establish electric motor instead of hand tube well for piped water supply to meet individuals' water demand. Due to increasing demand for piped water supply and no intervention by the Paurashava authority, environmental hazards can occur by haphazard development of water supply system and water pollution because of contamination. In addition, scarcity of safe drinking water can lead to creation of severe diseases of which cost may be higher than the cost of planned development.

Other Pollution

Shailkupa Paurashava is almost like any other typical Paurashavas of Bangladesh. Among the identified issues of probable threat and risk, improper solid waste management is mentionable. At the present situation, it has been found that there is no solid waste management system exists in the Paurashava. Haphazard and indiscriminate dumping of solid waste may cause deterioration of the local environment in future. Therefore, appropriate initiatives for urban waste management should be taken as quickly as possible to check further degradation of the living environment of the project area.

12.4.3.6 Natural Calamities and Localized Hazards

Cyclone

In 2004 and 2008 there was major cyclone causing 1 crore taka of damages. Lives of four people, crops covering 75 acres land, animals etc. were lost. Around 120 acres of crops and other products were lost in 2008-2009 by drought. And twice the crops and properties covering 500 acres and 300 acres of land were lost in 2008, causing Tk. 70 lac and Tk. 40 lac worth of damages just because of the water logging from heavy remained for a long period.

Erosion

The Paurashava is not an erosion prone area. Light erosion occurs along banks of Kumar river. Copland and homesteads are washed away every year due to erosion of Kumar River. Reduction of storage capacity due to siltation is assumed to be the main reason for such erosion.

Flood

In 2003, a major flood had broken out affecting vast land causing a loss of one crore taka. Again in 2006, another flood occurred which devastated major agriculture crops including properties in the Paurashava. The entire Paurashava was affected. A government grant of only 5 lacs was provided to mitigate the damages caused by flood.

Earthquake

An earthquake is the result of a sudden release of energy in the Earth's crust that creates seismic waves. The seismicity or seismic activity of an area refers to the frequency, type and size of earthquakes experienced over a period of time. The north and north easterly part of Bangladesh is the most active seismic zone and had experienced earthquakes of moderate to high intensity in the past.

Bangladesh has been divided into three generalized seismic zones: zone-I, zone-II and zone-III. Zone-III comprising the southern regions of Bangladesh, which is a zone of less seismic risk with a basic seismic co-efficient of 0.04. Shailkupa Paurashava falls under this zone which is considered as low risky seismic zone of Bangladesh.

Water Logging

Mainly encroachment to natural canals and malfunctioning of 4 manmade canals is responsible. The natural canal along with these man-made canals are mostly encroached, canal bed filled up or lack of maintenance, are the causes of water logging. The effects are serious health hazards like Flu, Diarrhea and cold and Arsenic contamination of surface water. Also contamination of flora and fauna and agricultural land with chemical fertilizers which lay dumped on the ground. No measures have yet been taken by authority to re-excavate the khals.

Inundation within Paurashava areas is experienced in the months of Srabon to Ashwain. Due to influences of rainfall during monsoon, usually the Ward- 2, 3, 4, and 5 suffers from water logging. Rainy season is the season when problems of water logging begin. Generally during rainy season, the water overflows on the both sides of the khal up to 3 ft. In the months of Srabon to Ashwin, the water rises with a height of 3-4 ft. This internal flood or water logging is experienced within the above mentioned Wards during peak monsoon time with high rainfall for long duration. The water logged areas are found along roads, ditches and ponds within Paurashava. There is no attempt to redress Paurashava from Water logging. A proper Drainage Master Plan from LGED and BWDB is required.

Fire Hazard

Fire hazard is a kind of man-made disaster. In Shailkupa Paurashava there was not any mentionable fire hazard occurred.

Other Hazards

Shailkupa Paurashava is almost like any other typical Paurashavas of Bangladesh. Among the identified issues of probable threat and risk, improper solid waste management is mentionable. At the present situation, it has been found that there is no solid waste management system exists in the Paurashava. Haphazard and indiscriminate dumping of solid waste may cause deterioration of the local environment in future. Therefore, appropriate initiatives for urban waste management should be taken as quickly as

possible to check further degradation of the living environment of the remedial measures.

12.5 Plan for Environmental Management and Pollution Control

The urban environment of Shailkupa Paurashava includes both built and natural environment. Urbanization has some increased hazard on natural environment. Where the built environment overburdens the natural environment urbanization cannot be sustainable. The urbanization is vital for countries economic growth. Urban centres concentrate services, infrastructure, labor, knowledge, entrepreneurship and markets. Marketing cities are key generators of economic activities. The urban economics are critically important in national growth and the achievement of development goal. Urbanization is unavoidable. So in every phase of planning processes all these environmental issues shall be evaluated and proper measure shall be taken to minimize the adverse environmental impacts on land pollution, water and air quality, biodiversity resources and marine resources by energy usage, transport network, waste management, slum improvement, disaster etc.

12.5.1 Proposals for Environmental Issues

12.5.1.1 Solid waste management Plan

Solid waste management is not yet an environmental problem in the town because of low density of population and low consumption rate. But in future population will rise and density will increase. So solid waste will pose a major environmental problem in future. It is better to take precautionary measures now to avoid any future hazard.

A waste disposal ground is proposed at the Eastern part of W-6 beside PR-01 road for final dumping of solid waste in order to ensure a habitable environment and to keep the urban environment free from pollution. To solve the solid waste management problem door to door collection program should be introduced. The Paurashava authority along with NGO's and CBO's will collect wastes from the households and storage points daily. The van will move into the wards and whistle to announce its arrival. The same vehicle will cover other institutions, societies, complexes. Thus the system will cover the whole town and will transfer the waste to the proposed waste transfer stations. After that, the Truck/Van of the Paurashava will dump the wastes to the proposed waste disposal ground. A minimum charge will be fixed by the Paurashava authority for waste collection to the inhabitants. The total process is exposed under **Figure-12.1**. The list of Waste Transfer Stations and Waste Disposal Ground is listed in **Table-12.10**.

Figure 12.1: Overview of the Solid Waste Management Plan

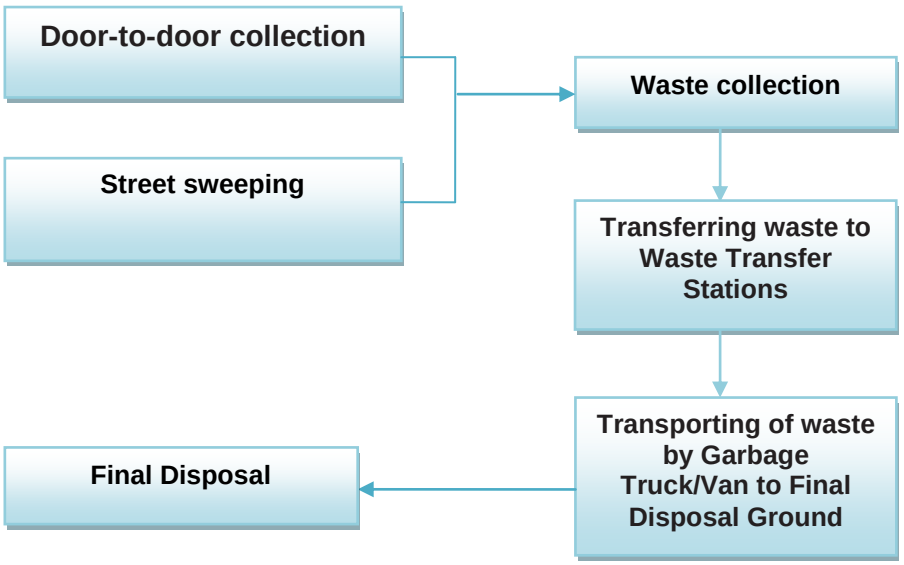


Table 12.10: List of Proposed Drainage and Environmental Management Plan

ID	Proposal	Location	Ward	Area (Acre)
CP	Central Park	Eastern part of W-8 & Northern part of W-9 between SR-13 & TR-68 road	W-8,9	7.59
FS	Fire Station	Northern part of W-5 between PR-01 & SR-11 road	W-5	1.94
NP-01	Neighbourhood Park	Southern part of W-3 between PR-01 & TR-12 road	W-3	3.19
NP-02	Neighbourhood Park	Western part of W-6 beside TR-29 road	W-6	7.03
NP-03	Neighbourhood Park	South-east part of W-7 beside PR-02 road	W-7	9.60
P-01	Park	Central part of W-1 between SR-01 & TR-02 road	W-1	5.39
P-02	Park	Eastern part of W-5 between SR-12 & SR-13 road	W-5	9.15
PG-01	Playground	Central part of W-1 beside SR-01 road	W-1	3.93
PG-02	Playground	Eastern part of W-2 between SR-02 & TR-02 road	W-2	3.25
PG-03	Playground	Central part of W-3 beside PR-01 road	W-3	6.85
PG-04	Playground	Southern part of W-5 beside TR-31 road	W-5	3.30
PG-05	Playground	Western part of W-6 beside TR-29 road	W-6	2.78
PG-06	Playground	South-east part of W-7 between PR-02 & TR-44 road	W-7	2.99
PT-01	Public Toilet	Central part of W-1 beside TR-01 road	W-1	0.12
PT-02	Public Toilet	Central part of W-4 beside SR-03 road	W-4	0.14
PT-03	Public Toilet	Southern part of W-5 beside SR-13 road	W-5	0.11
PT-04	Public Toilet	Western part of W-6 beside TR-29 road	W-6	0.24
PT-05	Public Toilet	Northern part of W-7 beside TR-48 road	W-7	0.11
PT-06	Public Toilet	Southern part of W-9 beside PR-02 road	W-9	0.10
SH	Slaughter House	Eastern part of W-8 between TR-32 & TR-33 road	W-8	0.19
ST	Stadium	Southern part of W-4 near PR-01, SR-03 & SR-05 road	W-4	10.69
WDG	Waste Disposal Ground	Eastern part of W-6 beside PR-01 road	W-6	10.96
WTS-01	Waste Transfer Station	Northern part of W-1 near TR-05 road	W-1	0.26
WTS-02	Waste Transfer	Eastern part of W-3 between TR-13 & TR-15 road	W-3	0.25

ID	Proposal	Location	Ward	Area (Acre)
	Station			
WTS-03	Waste Transfer Station	Central part of W-5 near TR-30 road	W-5	0.26
WTS-04	Waste Transfer Station	Central part of W-9 beside TR-75 road	W-9	0.26

Mitigation Measures:

- Introduction home collection system.
- Creation of solid waste transfer stations at important locations.
- Creation of a dumping site for disposal of solid waste.
- Use of sanitary land fill method for treatment of waste at the dumping site.

12.5.1.2 Open space, wet-land and relevant features protection Plan

Open Space Promotion

Present open space ratio is only 0.03 acre per thousand. If the plan is implemented by the year 2031, the ratio will be 2.63 acres per thousand population. But there will be hardly any scope to provide further open space. So, the provision of open space must be implemented in the study area for the greater interest of the future urban dwellers.

Mitigation Measures:

- The open space provisions have to be implemented to save future town environment.
- Adequate fund is needed to be allotted to execute open space development.
- No plan should be allowed in locations of open space as per plan.
- Landowners may be motivated to donate land for open space development.

Wetland Protection

Most of the natural khals flowing through the town have been encroached by land hungry people. At many places the khals have been filled up. All these activities are causing khals to get squeezed lowering their capacity to drain enough water during monsoon. If this trend continues, it will increase flood risk and water logging in the low-lying town.

Mitigation Measures:

- Strict measures should be taken to recover state property from encroachers.
- Wherever land fill has been done, re-excavation has to be done to recover khals.
- Marking pillars should be set up to mark khas lands of the khal area.
- Vegetation may be created along the khal creating buffer zone between khal and the private property.

12.5.1.3 Ground Water Pollution

Though ground water is not a major source of drinking water supply in the study area, yet ground water pollution by salinity and iron is a serious problem for future water supply. It is a major threat to health for those who use ground water for drinking purpose. So in future, when population rises further excessive ground water extraction will aggravate contamination situation.

Mitigation Measures:

Following mitigation measures may be adopted:

- Expand use of surface water by protecting existing ponds and excavating new ponds.
- Introduce and popularize rain water harvesting system.
- Reduce dependency on ground water.

12.5.1.4 Surface Water Pollution

Various surface water sources of the town are regularly polluted by deliberate drainage of waste water in respect of P^H, turbidity and coliform bacteria when compared with national standard. But present pollution level is low due to low density of population and no industrial agglomeration. The main sources of surface water pollution are, urban waste water, sanitary sewage and solid waste dumping. With the implementation of this plan the pollution level may further increase as population and activity will increase leading to increase in waste water, sanitary sewage and solid waste dumping.

Mitigation Measures:

- Abolish katcha and hanging latrines.
- Encourage practice of sanitary latrines.
- Take measures against indiscriminate dumping of solid waste.
- Improve sanitation conditions of slaughter house, fish market and katcha bazar.
- Propaganda for public awareness.
- In future set up sewerage treatment plant to treat waste water.

12.5.2 Natural calamities and regular hazard mitigation proposals

12.5.2.1 Protection plans addressing Natural Calamities

a. Natural Calamities

Cyclone is a rare natural calamity in the study area. It affects the poor people mostly who can not build houses with permanent materials. Cyclones also destroy trees and other establishments causing economic losses. It is not possible to prevent cyclones, but it is possible to reduce the losses by cyclones.

Mitigation Measures:

- Provide housing loan to build houses with permanent materials.

- Take measures to promote employment and reduce poverty.
- Take appropriate measures for post disaster loss mitigation.

b. Flood Protection

Kumar river passes through the middle part of the Paurashava. The road along the river has eroded to some extent. In this Plan, road besides the river has been provided. With implementation of Master Plan (*MP*) Project, the whole project area will be protected from flooding.

Enhancement Activities:

Arrangement of pump drainage to canals during high flood when gravitational drainage fails. Pump of excess water will save the area from internal flooding.

Responsible Organizations: *BWDB and Paurashava*

c. Earthquake

Earthquake is among the most destructive and terrifying disaster that nature can unleash. Bangladesh sits on several seismically active faults are the focal point of tremors. Shailkupa is located in the seismic zone 3 and so it has low risk to earthquake. Unplanned and unregulated urbanization and disregard to BNBC rules in building construction aggravate the situation more. With the implementation of SMP the planned urbanization will strictly follow the actual zoning plan and following of BNBC rule will minimize the earthquake damage. In DMDP Urban Area Plan Volume-II, (*Part-3, Interim Planning Rules*) development restriction considering the geological fault line areas states "*Structures above 2 storeys situated within 500 meters of a geological fault is not allowed unless built to the BNBC standards for Seismic Zone 3 (BNBC Section 6 Chapter 2.25)*".

Enhancement Activities:

- Ensure all new buildings are designed and constructed following the guideline of BNBC.
- Development of a comprehensive plan for managing post earthquake situation.
- Train community workers who would carry out the initial search and rescue efforts.
- Launch a massive public awareness campaign.

Responsible Organizations: *Paurashava, MOFDM, Civil Defense, Fire Service and DoE*

d. Protection Plan addressing regular hazards

Fire Hazard

Though fire hazard is low in the town it might increase in future with increased urbanization. Fire hazard will be severe when katcha housing will be built by low income poor people of the town. To avoid fire hazard following mitigation measures are recommended.

Mitigation Measures:

- Set up modern fire extinguishing devises.
- Discourage people from using low quality electrical wire in building and industries.
- Ensure periodical checking of electrical lines.
- Advise low income dwellers about cooking safety.
- Create awareness among people about the dangers of fire hazard.

e. Protection Plan addressing encroachment and other relevant issues

Implementation of SMP activities like roads, drainage, bridge/culvert, housing and industrial estates and bazars will radically change the natural topography and land use pattern of the area. The agricultural area will be converted into urban and semi-urban area. The present green scenic beauty will disappear, water bodies will be lost due to rapid urbanization.

Mitigation:

- Careful planning to minimize the change of the area.
- Avoid water bodies during construction of roads, housing and industrial estates.
- Practice good architectural/engineering design during planning of housing estates, buildings and the intersections of main roads.
- Enhancement of plantation and gardening to increase the scenic beauty of the town.
- Preserve the ponds, chhoras and large water bodies.
- Strict implementation of Environment Conversation Act (*ECA*), 1885
- Propaganda for public awareness

Responsible Organizations: *Paurashava, DoE and Forest Department*

12.6 Plan Implementation Strategies

12.6.1 Regulations to implement the Drainage and Flood Plan

Management of a drainage system is more difficult than its construction. It requires not only an institutional set up but also huge resources for regular maintenance. The present engineering set up of the Paurashava is highly inadequate to manage the future drainage network. It must be equipped not only with adequate manpower but also sufficient number of logistics and equipment will be necessary for sound maintenance of the drainage system. For Shailkupa Paurashava with its meager revenue earning it will be extremely difficult to go for regular maintenance of the drainage system without government assistance. So, the Paurashava must be provided with sufficient budget allocation to maintenance going on regularly. The next strategy will be to create awareness among the citizens not to dispose of solid waste in the drains and get them

clogged. This can be done by regular publicity, engaging NGOs for motivation and the last imposing punitive measures like, fine on the waste disposer.

12.6.2 Implementation, monitoring, Evaluation and Coordination of the Plan

The implementation, monitoring and evaluation strategies of Structure Plan have been illustrated in **Chapter-9** of **Part-A**. ***The Drainage Plan*** should also be implemented, monitored and evaluated under the same strategy by strengthening capacity of the Paurashava and forming a Monitoring and Evaluation Committee (*MEC*).

As ***The Drainage Plan*** is a plan with a period of 20 years (2011-2031), it will be implemented on phase wise according to priority. The proposals have been prioritized based on the priority needs, since Bangladesh is a least developed country and it has a very limited budget for infrastructure development. Besides, the Paurashava Authority itself is not capable of financing this huge cost.

The Drainage Plan will be implemented gradually following prioritized Drainage proposals including improvement of existing drain, proposed new drain, bridges/culvert, cross drain etc. Phasing of proposals was done based on the priority. The **Phase-I** of the proposals, to be also incorporated in the Ward Action Plan, will be implemented within first 5 year (2011-2016) of the plan period. The consultants have proposed **Phase-II, Phase-III** and **Phase-IV** of the proposals to be implemented within consecutive 5 years for Ward Action Plan. The details of phasing are shown in **Table-12.11, Table-12.12, Table-12.13** and **Table-12.14**. After each 5 years the Plan will be evaluated, updated and new Ward Action Plan will be formulated under the changing circumstances.

Table 12.11: Phasing of Proposed Drains (Phase-I)

Phase-I (2011-2016)				
Type	ID	Ward No.	Width	Length (km)
Secondary Drain	SD-03	W-3	0.80 m	1.798
	SD-04	W-4	0.80 m	0.555
	SD-05	W-4	0.80 m	0.330
	SD-08	W-5	0.80 m	0.451
	SD-10	W-6	0.80 m	1.189
	SD-11	W-6	0.80 m	1.572
	SD-12	W-6	0.80 m	1.643
	SD-13	W-7	0.80 m	0.838
	SD-14	W-7	0.80 m	1.542
	SD-15	W-7	0.80 m	1.905
	SD-16	W-7	0.80 m	2.203
	SD-17	W-7	0.80 m	0.533
	SD-20	W-7	0.80 m	0.617
	SD-30	W-9	0.80 m	1.618
	SD-31	W-9	0.80 m	0.854
Tertiary Drain	TD-49	W-7	0.50 m	0.322
	TD-50	W-7	0.50 m	0.348
	TD-51	W-7	0.50 m	3.408
	TD-52	W-7	0.50 m	0.662
	TD-57	W-7	0.50 m	0.659

Phase-I (2011-2016)				
Type	ID	Ward No.	Width	Length (km)
	TD-66	W-7	0.50 m	0.171
	TD-67	W-7	0.50 m	0.475
	TD-68	W-8	0.50 m	0.136
	TD-72	W-8	0.50 m	0.233
	TD-73	W-8	0.50 m	0.185
	TD-74	W-8	0.50 m	0.575
	TD-77	W-9	0.50 m	0.321
	TD-78	W-9	0.50 m	0.355
	TD-79	W-9	0.50 m	0.293
	TD-80	W-9	0.50 m	0.270
	TD-82	W-9	0.50 m	0.613

Table 12.12: Phasing of Proposed Drains (Phase-II)

Phase-II (2016-2021)				
Type	ID	Ward No.	Width	Length (km)
Secondary Drain	SD-01	W-2	0.80 m	0.499
	SD-02	W-2	0.80 m	0.471
	SD-07	W-5	0.80 m	0.582
	SD-18	W-7	0.80 m	1.024
	SD-22	W-8	0.80 m	0.168
	SD-23	W-8	0.80 m	0.164
	SD-25	W-8	0.80 m	0.392
	SD-26	W-8	0.80 m	0.297
Tertiary Drain	TD-14	W-3	0.50 m	1.003
	TD-18	W-4	0.50 m	0.444
	TD-19	W-4	0.50 m	0.439
	TD-20	W-4	0.50 m	0.272
	TD-26	W-4	0.50 m	0.544
	TD-27	W-4	0.50 m	0.528
	TD-30	W-4	0.50 m	0.375
	TD-31	W-4	0.50 m	0.718
	TD-37	W-5	0.50 m	0.202
	TD-38	W-5	0.50 m	0.284
	TD-39	W-5	0.50 m	0.354
	TD-53	W-7	0.50 m	0.294
	TD-54	W-7	0.50 m	0.303
	TD-55	W-7	0.50 m	0.216
	TD-58	W-7	0.50 m	0.434
	TD-62	W-7	0.50 m	0.881
	TD-65	W-7	0.50 m	0.205
	TD-69	W-8	0.50 m	0.252
	TD-75	W-8	0.50 m	0.437
	TD-76	W-8	0.50 m	0.453

Table 12.13: Phasing of Proposed Drains (Phase-III)

Phase-III (2021-2026)				
Type	ID	Ward No.	Width	Length (km)
Secondary Drain	SD-06	W-4	0.80 m	0.475
	SD-09	W-5	0.80 m	0.505
	SD-21	W-8	0.80 m	0.359
	SD-24	W-8	0.80 m	0.776
	SD-28	W-9	0.80 m	1.081
Tertiary Drain	TD-02	W-1	0.50 m	1.173
	TD-05	W-2	0.50 m	0.684
	TD-06	W-2	0.50 m	0.560
	TD-11	W-3	0.50 m	0.577
	TD-12	W-3	0.50 m	0.459
	TD-13	W-3	0.50 m	0.657
	TD-21	W-4	0.50 m	0.147
	TD-22	W-4	0.50 m	0.144
	TD-34	W-4	0.50 m	0.507
	TD-35	W-4	0.50 m	0.471
	TD-40	W-5	0.50 m	0.776
	TD-56	W-7	0.50 m	0.205
	TD-59	W-7	0.50 m	0.413
	TD-60	W-7	0.50 m	0.213
	TD-61	W-7	0.50 m	0.309
	TD-63	W-7	0.50 m	0.362
	TD-64	W-7	0.50 m	0.288
	TD-70	W-8	0.50 m	0.108
	TD-71	W-8	0.50 m	0.106
	TD-81	W-9	0.50 m	0.362
	TD-85	W-9	0.50 m	0.234
	TD-86	W-9	0.50 m	0.221
	TD-87	W-9	0.50 m	0.129

Table 12.14: Phasing of Proposed Drains (Phase-IV)

Phase-IV (2026-2031)				
Type	ID	Ward No.	Width	Length (km)
Secondary Drain	SD-19	W-7	0.80 m	0.285
	SD-27	W-9	0.80 m	0.330
	SD-29	W-9	0.80 m	0.315
Tertiary Drain	TD-01	W-1	0.50 m	0.969
	TD-03	W-1	0.50 m	0.864
	TD-04	W-2	0.50 m	0.534
	TD-07	W-2	0.50 m	0.186
	TD-08	W-2	0.50 m	0.103
	TD-09	W-2	0.50 m	0.975
	TD-10	W-2	0.50 m	0.225
	TD-15	W-3	0.50 m	0.309
	TD-16	W-3	0.50 m	0.312
	TD-17	W-3	0.50 m	0.416
	TD-23	W-4	0.50 m	0.258
	TD-24	W-4	0.50 m	0.158
	TD-25	W-4	0.50 m	0.097
	TD-28	W-4	0.50 m	0.077

Phase-IV (2026-2031)				
Type	ID	Ward No.	Width	Length (km)
	TD-29	W-4	0.50 m	0.069
	TD-32	W-4	0.50 m	0.162
	TD-33	W-4	0.50 m	0.169
	TD-36	W-4	0.50 m	0.619
	TD-41	W-5	0.50 m	0.178
	TD-42	W-5	0.50 m	0.295
	TD-43	W-5	0.50 m	0.168
	TD-44	W-5	0.50 m	0.410
	TD-45	W-5	0.50 m	0.736
	TD-46	W-6	0.50 m	0.567
	TD-47	W-6	0.50 m	0.854
	TD-48	W-6	0.50 m	0.566
	TD-83	W-9	0.50 m	0.216
	TD-84	W-9	0.50 m	0.185

With regards to Plan implementation strategy 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 Shailkupa 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, its monitoring of plan implementation will be affected. However, plan evaluation can be accomplished by means of out-sourcing.

CHAPTER-13

PLAN FOR URBAN SERVICES

13.1 Introduction

Sensible urban planning is critical to the healthy growth of cities. Unplanned growth leads a number of problems, creating misery for urban dwellers and making remedying of those difficulties. Yet flawed urban planning is little better, or perhaps worse, than no urban planning at all. It is thus important, when taking on such an enormous task as the drafting of an Urban Area Plan for a Paurashava, to ensure that the plan is well considered and likely to be conducive to good health and well-being of the urban dwellers.

During the year 1984 to 2003, Urban Development Directorate (*UDD*) was prepared a series of Landuse/ Master Plans for Upazila and Zila Shahars of Bangladesh as a part of decentralization effort of the government. Under that project, the Shailkupa Upazila Shahar was planned but the project area considered in the plan was far away from the planning area considered in the Paurashava Town Infrastructure Development Project.

13.2 Analysis of Existing Condition and Demand of the Services

The Paurashava is too poor in development of urban services. With the development of physical condition of the Paurashava, substantial development will be needed for those services. Drinking water supply, Sewerage and Sanitation facilities and Dumping of solid wastes should be emphasized as primary consideration. All the people are dependent on hand tube well 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.

Water Supply: The water supply within the Paurashava is mainly by hand tube wells owned by house owners and insignificant number from irrigation equipment like shallow tube wells and deep tube wells. The DPHE is working with other NGOs like Grameen Manbik Unnayan Sangshta, World Vision, BRAC etc., for investigating the drinking water quality. They collect water samples from both newly constructed as well as in operation hand tube wells for investigating the arsenic level and other minerals content of ground water. However, within the Paurashava any arsenic contaminated hand tube well not yet identified. Most poor people in urban periphery has no hand tube well of their own. They collect water from nearby water bodies for household usages and drinking water from neighbour's tube well. The water table within Paurashava boundary ranges from 12 ft to 25 ft and is lower during winter. During winter, hand tube wells become dried up and people suffer from scarcity of safe water. Moreover the ground water of the Shailkupa

Paurashava is heavily loaded with iron. During winter in hand tube wells the concentration of iron increases causing the suffering of the people of the Paurashava.

Electricity: Rural Electrification Board (*REB*) is mainly responsible for electricity supply in the Paurashava. PDB works for power production and distribution, while REB is responsible for distribution only. Both, PDB and REB have their own plans for power supply in the town, which is executed in phases, depending on demand for power. In its infrastructure plan has shown the future power supply network of the town. The required electricity facility within the Paurashava will be provided through existing power system master plan of both REB and PDB. But the greatest problem of power supply in the entire country remains to be handicapped by the shortage of supply due to low production.

Telecommunication: The town enjoys the networks of all mobile and PSTN telecommunication companies operating in the country. Besides, there also exist landlines of BTCL, the national telephone company. Due to easy and cheaper access to mobile, the demand for land lines has decreased substantially.

Gas supply: Area for gas related facilities is not proposed in the plan, because there is already gas system in the Paurashava. If land required in future for gas related facilities will be allocated from propose urban differed area. Gas network has been shown along all major roads and to the designated industrial site.

Projection: The projection of utility service depends on the growth of population and the need assessment of the Paurashava inhabitants. After population projection it is found that, population of this area will be 44,159 (*according to the linear method*) that belong to the trend line method in the year 2031 (see **Table-13.1**). Projection on utility services also depends on present condition urban services and facilities and future demand of those services.

Demand analysis: Existing utility facilities of the Paurashava are not sufficient and established without following any standard. Therefore, Team Leaders of all packages and urban planners from Project Management Office (*PMO*) have worked out and prepared different standards for projection of future facilities as per the requirement of Paurashava. Following of those standards have considered for the future demand with ensuring the quality and quantity of utility facilities.

Table 13.1: Standard of Utility Services and future need

Facility	Standard	Existing Facility (acre)	Standard of Proposed Facility (acre) (2031)
Drainage	1.00 acre / 20,000 population	-	2.21
Water supply	1.00 acre / 20,000 population	-	2.21
Gas	1.00 acre / 20,000 population	-	2.21
Solid waste disposal site	4 –10 acres / Upazila HQ	-	10
Waste transfer station	0.25 acres / per waste transfer station	-	0.75

Facility	Standard	Existing Facility (acre)	Standard of Proposed Facility (acre) (2031)
Electric sub-station	1.00 acre / 20,000 population	-	2.21
Telephone exchange	0.5 acre / 20,000 population	1.17	1.10
Fuel Station	0.5 acre / 20,000 population	-	1.10
Total		1.17	21.79

Source: Project Management Office, 2010

13.3 Proposals for Addressing Urban Services and Implementation Strategies

Water supply: Location of **water treatment plant** may be on a large plot (*on 2.21 acres of land*) with good access, close to source of water. It should be located upstream of any polluting development. **Desalination plant** may be located on large plot close to the river, upstream from any polluting activities. **Water reservation tanks** may be constructed on medium size plot in key locations throughout the Paurashava, preferably in an elevated positioning relation to the area it is intended to serve, so as to maintain / increase pressure.

All water is carried by underground pipes of various diameters. The closer they are to the original source of treated water, the larger the pipe and therefore, trench to accommodate it must be. These pipes should be contained within road reserves.

Sewerage facilities: Location of **sewerage treatment plant** may be on large plot (*on 2.21 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.

If a sewerage network were to be installed, the sewerage originating throughout the Paurashava would be carried by means of underground pipes and culverts. These should be accommodated within road reserves.

Electricity: Electricity power station may be located on a large plot out of Paurashava with good accessibility. About **132/33KV switching station** may be established on a large plot (*on 2.21 acres of land*) on the edge of the Paurashava with good accessibility. About **33/11KV switching stations** may be established on medium sized plots in a small number of key locations throughout the Paurashava. **Electricity sub-station** may be constructed on small plots throughout the Paurashava. These can be accommodated on the plots they serve (*industries*) or in road corridors.

Telephone: No additional **telephone exchange** is needed for the Paurashava. If required, it will need a medium size plot (*on 1.10 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.

Telephone exchange lines can be either overhead, pole mounted or underground using newer Optical Fiber Cables. Both of these are carried to localized exchanges and then

onto small roadside exchanges. From these connections are carried on poles to individual premises. All networks can be accommodated within road reserves.

Gas supply: In the Paurashava, gas supply is not provisioned. If, in future (*within 10 years*), gas is being supplied by the government to the Paurashava, some necessary steps should be considered by the authority. They are, in case of **gas manifold station**, may be located on small to medium sized plot (*on 2.21 acres of land*) on the main ring, at the fringe of the Paurashava. **Upazila regulator station** may be located on small plots throughout the Paurashava. These will be located at the break-off point on the main line, where smaller diameter spurs extend into the area that the gas will serve. When gas supply will be available in the Paurashava, all gas will be supplied by varying diameter underground pipes. These can be accommodated in road reserves.

Table 13.2: Proposed Utility Services

ID	Proposal	Ward	Area (Acre)	Mouza Name
FS	Fire Station	W-5	1.94	Shailkupa
PT-01	Public Toilet	W-1	0.12	Shailkupa
PT-02	Public Toilet	W-4	0.14	Shailkupa
PT-03	Public Toilet	W-5	0.11	Fazilpur
PT-04	Public Toilet	W-6	0.24	Aushia
PT-05	Public Toilet	W-7	0.11	Hobibpur
PT-06	Public Toilet	W-9	0.10	Jhaudia
SH	Slaughter House	W-8	0.19	Shailkupa
WDG	Waste Disposal Ground	W-6	10.96	Khalkula
WTS-01	Waste Transfer Station	W-1	0.26	Shailkupa
WTS-02	Waste Transfer Station	W-3	0.25	Shailkupa
WTS-03	Waste Transfer Station	W-5	0.26	Shailkupa
WTS-04	Waste Transfer Station	W-9	0.26	Kobirpur

Source: Proposed by the consultant

13.4 Regulations to Address the Proposals

Local Government (Paurashava) Act, 2009 (*Act No. XLXVIII of 2009*) was enacted in 6th October 2009. According to the 2nd Schedule, Sl. No. 10, the Paurashava may provide supply of wholesome water sufficient for public and private purposes. Frame and execute water supply scheme for the construction and maintenance of such works for storage and distribution of water. In case of private sources of water supply, it is said that, all private sources of water supply within the Paurashava shall be subject to control, regulation and inspection by the Paurashava. No new well, water pump or any other source of water for drinking purposes shall be dug, constructed or provided except with the sanction of the Paurashava.

The 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 heal 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 **s**ection 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 13.1: Utility Services Plan of Shailkupa Paurashava

13.5 Implementation, Monitoring and Evaluation of the Urban Services Plan

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

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

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

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

- the purpose to be achieved by the development controls;
- where controls should be applied;
- what aspect of development needs to be controlled;
- what type of development controls are required;
- what degree or level of development control is required;
- who will be affected by the required control;
- who will be affected by the controls and in what manner;
- when the controls should be applied;
- what will be the likely impact of the controls;
- how and by whom will the controls be administered and enforced.

Development control as an instrument of plan implementation may be selectively applied within the Urban Services 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 efficiently 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

14.1 Introduction

The third tier of the preparation of Master Plan of Shailkupa Paurashava is Ward Action Plan. The Ward Action Plan prepared under the framework of Structure Plan and Urban Area Plan. The Action Plan is undertaken for each of the nine wards of the Shailkupa Paurashava. This plan mainly describes the development proposals in detail as well as the prioritized schemes in the light of higher-level plan (*Urban Area Plan*).

14.1.1 Background

Ward Action Plan is a vital part of the Master plan package as far as spatial development and development control is concerned. Absence of Ward Action Plan not only hampers undertaking development projects but also leads to uncontrolled and unwanted spatial development. The Ward Action Plan enables detailed view of proposed land use and development for Shailkupa Town for a period of 5 (five) years with keeping in view the need over a time span of 20 years. The provision of Ward Action Plan is inherent in the Structure Plan with some specific purposes. These are:

a. Provide basic micro level infrastructure and services in the study area through systematic planning, under the framework of Structure Plan.

b. Create congenial environment to promote economic activities.

c. Improve drainage system and protect natural water channels from encroachment.

d. Create service centres to promote urban growth.

14.1.2 Content and form of Ward Action Plan

The Ward Action Plan will be the smaller units of Structure Plan, expose their problems and opportunities and propose development proposals for improve of the problems as well as to promote development. Combining the areas of common use enables putting them into future uniform land use. Within the Paurashava Area one ward has been considered a Ward Action Plan. The Ward Action Plan ensures better management of planning and development. The following indicators needed to adopt in preparation of the Ward Action Plan. These are:

a) Area of Ward, b) Physical Boundary, c) Road Networks, d) Population Growth and density, e) Landuse pattern and f) Potentiality & development opportunity.

The Ward Action Plan has been contained 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. It also contains the phasing of proposals and the

means of implementation. The Proposals Map show where the policies and proposals apply.

In addition to indicating the priorities, a Ward Action Plan includes proposals identified by other Agencies and bodies expected to happen within the period of the Plan. However, any dates and costs shown against proposals are liable to change as programs and the availability of resources are revising annually.

14.1.3 Linkage with the Structure and Urban Area Plan

Ward Action Plan is the 3rd component of the Master Plan package. The other two upper level components are Structure Plan and Urban Area Plan. Structure Plan lay 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.

14.2 Derivation of Ward Action Plan

The Ward Action Plan is derived from the conceptual framework, and guidelines and strategies for development under Structure Plan and detailed proposals of Urban Area Plan. Ward Action Plan is aimed to provide detailed infrastructure plan to guide the physical development of Shailkupa town including its all economic and social activities. This plan adheres to the policy directives spelled out in the Structure Plan.

14.2.1 Revisiting of Structure Plan and Urban Area Plan

To guide long term growth of the Paurashava, potential locations of major development areas are identified and the Structure Plan Area is broadly classified into nine categories, namely Established Urban Area, Sub Urban Area, New Urban Area, Recreational Facility, Circulation Network, Restricted Area, Urban Peripheral Area, Agriculture Area and Water Retention Area. The Urban Area Plan is prepared under the framework of Structure Plan and the infrastructure identified for improvement and development are listed as proposals in the Urban Area Plan. The broad classification of lands in the Structure Plan and detailed proposals in the Urban Area Plan form the basis for Ward Action Plan.

14.2.2 Prioritization

The prioritization of project proposals in Ward wise Action Plan are made on the basis of urgency for development depending on the needs of people and the town's requirement for infrastructure development.

14.2.3 Ward wise Action Plan

The Ward Action Plan is prepared for each of the nine Wards and is presented in order of their serial number. The Ward Action Plans are a series of detailed spatial development plans of different use and facilities. The plans comprise maps of appropriate scale supported by explanatory report. The Ward Action Plans have been formulated for execution within a period of 5 years. They do not initially cover the entire Structure Plan

area. While all sub-areas will eventually require Ward Action Plan, only priority areas are to be dealt with initially. The aim of a Ward Action Plan is to prevent haphazard urban development and ensure livable environment in areas that are likely to be urbanized soon. Initially Detailed Area Plan should be covered for only those areas where action is needed immediately or where development pressure is high.

14.3 Action Plan for Ward No. 01

14.3.1 Road Network Development Plan of Ward No. 01

The existing road network of Ward No. 01 is 9.04 km where 1.81 km road is pucca, 2.71 km road is semi-pucca and 4.52 km road is Katcha. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. All of the roads of this Paurashava will be constructed as a pucca road in different phases of Plan. Road widening is considered all of the existing road. Proposals for Roads for Ward No. 01 is shown in **Table-14.1** and **Map-14.3.1**.

Table 14.1: Proposal of Roads for Ward No. 01

Road Type	ID	Length (km)	Proposed RoW	Proposal Type
Secondary Road	SR-01	3.385	60 ft	Pucca
Tertiary Road	TR-01	0.970	30 ft	Pucca
	TR-02	1.877	40 ft	Pucca
	TR-03	2.099	30 ft	Pucca
	TR-04	3.573	40 ft	Pucca
	TR-05	1.453	30 ft	Pucca
	TR-06	1.182	30 ft	Pucca

14.3.2 Drainage Development Plan of Ward No. 01

Drain is necessary for discharge all its waste water and storm water. The plan proposes 3.01 kilometers of new drains for Ward No. 01 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan. Proposals for Drains for Ward No. 01 is shown in **Table-14.2** and **Map-14.3.2**.

Table 14.2: Proposal of Drains for Ward No. 01

Drain Type	ID	Construction Type	Length (km)	Av. Width (m)	Outfall
Tertiary Drain	TD-01	Pucca	0.969	0.50 m	Khal
	TD-02	Pucca	1.173	0.50 m	Khal
	TD-03	Pucca	0.864	0.50 m	Khal

14.3.3 Urban Services Development Plan of Ward No. 01

The urban services is the pre condition of any potential development. Public Toilet, Ward Centre, Waste Transfer Station, Neighbourhood Market, Park, Playground, Hospital and Secondary School are proposed here. The proposal for service facilities of Ward No. 01 is shown in **Table-14.3** together with mouza name and plot number.

Table 14.3: Proposal of Development Proposals for Ward No. 01

ID	Name of Proposal	Area (acre)	Mouza Name	Plot No.
PT-01	Public Toilet	0.12	Shailkupa	2805-2806, 2811-2812, 2816
WC-01	Ward Centre	0.51	Shailkupa	2807, 2811-2812
WTS-01	Waste Transfer Station	0.26	Shailkupa	727-728, 741, 743
NM-01	Neighbourhood Market	0.90	Shampur	435-443, 456-457
P-01	Park	5.39	Shampur	473, 475-504, 552, 570, 572-578, 584, 735
PG-01	Playground	3.93	Shampur	261-263, 265, 354-369, 371-373
HOS-01	Hospital	5.90	Shampur	439-440, 447-465
			Shailkupa	761, 2803, 2812-2819
HS-01	Secondary School	6.30	Shampur	354, 365-367, 369-387, 391-393, 428-436, 414-445, 760

14.3.4 Priority Tasks

The following priorities has identified after the Public consultation meeting at Shailkupa Paurashava.

Table 14.4: Priority Tasks for Ward No. 01

Priority-1		Priority-2	
Type	ID	Type	ID
Road	SR-01, TR-02	Road	TR-03, TR-04
Drain	TD-02	Drain	TD-01
Dev. Proposal	PT-01, WC-01, WTS-01	Dev. Proposal	NM-01, P-01
Priority-3		**Priority-4**	
Type	ID	Type	ID
Road	TR-01	Road	TR-05, TR-06
Drain	TD-03	Drain	-
Dev. Proposal	PG-01	Dev. Proposal	HOS-01, HS-01

Map 14.1: Landuse Plan for Ward Action Plan of Ward No. 01

Map 14.2: Drainage & Utility Services Plan for Ward No. 01

14.4 Action Plan for Ward No. 02

14.4.1 Road Network Development Plan of Ward No. 02

The existing road network of Ward No. 02 is 8.46 km where 2.79 km road is pucca, 2.47 km road is semi-pucca and 3.20 km road is Katcha. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. All of the roads of this Paurashava will be constructed as a pucca road in different phases of Plan. Road widening is considered all of the existing road. Proposals for Roads for Ward No. 02 is shown in **Table-14.5** and **Map-14.4.1**.

Table 14.5: Proposal of Roads for Ward No. 02

Road Type	ID	Length (km)	Proposed RoW	Proposal Type
Primary Road	PR-01	6.125	100 ft	Pucca
Secondary Road	SR-02	2.551	60 ft	Pucca
Tertiary Road	TR-07	0.595	30 ft	Pucca
	TR-08	0.175	30 ft	Pucca
	TR-09	0.477	30 ft	Pucca
	TR-10	2.053	40 ft	Pucca
	TR-11	1.996	40 ft	Pucca

14.4.2 Drainage Development Plan of Ward No. 02

Drain is necessary for discharge all its waste water and storm water. The plan proposes 4.24 kilometer of new drains for Ward No. 02 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan. Proposals for Drains for Ward No. 02 is shown in **Table-14.6** and **Map-14.4.2**.

Table 14.6: Proposal of Drains for Ward No. 02

Drain Type	ID	Construction Type	Length (km)	Av. Width (m)	Outfall
Secondary Drain	SD-01	Pucca	0.499	0.80 m	Khal
	SD-02	Pucca	0.471	0.80 m	Khal
Tertiary Drain	TD-04	Pucca	0.534	0.50 m	Khal
	TD-05	Pucca	0.684	0.50 m	SD-03
	TD-06	Pucca	0.560	0.50 m	SD-03
	TD-07	Pucca	0.186	0.50 m	SD-02
	TD-08	Pucca	0.103	0.50 m	SD-02
	TD-09	Pucca	0.975	0.50 m	TD-04
	TD-10	Pucca	0.225	0.50 m	TD-09

14.4.3 Urban Services Development Plan of Ward No. 02

The urban services is the pre condition of any potential development. Tempo Stand, Ward Centre, Playground and Vocational Institute are proposed here. The proposal for service facilities of Ward No. 02 is shown in **Table-14.7** together with mouza name and plot number.

Table 14.7: Proposal of Development Proposals for Ward No. 02

ID	Name of Proposal	Area (acre)	Mouza Name	Plot No.
TS-01	Tempo Stand	0.19	Shailkupa	5087, 5155-5156
WC-02	Ward Centre	0.52	Shailkupa	4401-4404, 4406
PG-02	Playground	3.25	Shailkupa	1357-1359, 1362, 1382-1590, 4146
VI	Vocational Institute	8.28	Shailkupa	4430-4434 ,4436-4440, 4444-4445, 4491, 4505-4507, 4509-4515, 4517-4527, 4572-4575

14.4.4 Priority Tasks

The following priorities has identified after the Public consultation meeting at Shailkupa Paurashava.

Table 14.8: Priority Tasks for Ward No. 02

Priority-1		Priority-2	
Type	ID	Type	ID
Road	PR-01, SR-02	Road	TR-11
Drain	SD-01, SD-02	Drain	TD-05, TD-06
Dev. Proposal	TS-01, WC-02	Dev. Proposal	PG-02
Priority-3		Priority-4	
Type	ID	Type	ID
Road	TR-09, TR-10	Road	TR-07, TR-08
Drain	TD-04, TD-07	Drain	TD-08, TD-09, TD-10
Dev. Proposal	VI	Dev. Proposal	-

Map 14.3: Landuse Plan for Ward Action Plan of Ward No. 02

Map 14.4: Drainage & Utility Services Plan for Ward No. 02

14.5 Action Plan for Ward No. 03

14.5.1 Road Network Development Plan of Ward No. 03

The existing road network of Ward No. 03 is 9.67 km where 2.02 km road is pucca, 5.98 km road is semi-pucca and 1.67 km road is Katcha. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. All of the roads of this Paurashava will be constructed as a pucca road in different phases of Plan. Road widening is considered all of the existing road. Proposals for Roads for Ward No. 03 is shown in **Table-14.9** and **Map-14.5.1**.

Table 14.9: Proposal of Roads for Ward No. 03

Road Type	ID	Length (km)	Proposed RoW	Proposal Type
Tertiary Road	TR-12	0.419	30 ft	Pucca
	TR-13	0.515	30 ft	Pucca
	TR-14	0.611	30 ft	Pucca
	TR-15	0.324	30 ft	Pucca
	TR-16	0.443	30 ft	Pucca

14.5.2 Drainage Development Plan of Ward No. 03

Drain is necessary for discharge all its waste water and storm water. The plan proposes 5.53 kilometers of new drains for Ward No. 03 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan. Proposals for Drains for Ward No. 03 is shown in **Table-14.10** and **Map-14.5.2**.

Table 14.10: Proposal of Drains for Ward No. 03

Drain Type	ID	Construction Type	Length (km)	Av. Width (m)	Outfall
Secondary Drain	SD-03	Pucca	1.798	0.80 m	Khal
Tertiary Drain	TD-11	Pucca	0.577	0.50 m	SD-03
	TD-12	Pucca	0.459	0.50 m	SD-03
	TD-13	Pucca	0.657	0.50 m	TD-01
	TD-14	Pucca	1.003	0.50 m	Khal
	TD-15	Pucca	0.309	0.50 m	Khal
	TD-16	Pucca	0.312	0.50 m	TD-17
	TD-17	Pucca	0.416	0.50 m	SD-03

14.5.3 Urban Services Development Plan of Ward No. 03

The urban services is the pre condition of any potential development. Ward Centre, Waste Transfer Station, Neighbourhood Park, Playground, Primary School and Secondary School are proposed here. The proposal for service facilities of Ward No. 03 is shown in **Table-14.11** together with mouza name and plot number.

Table 14.11: Proposal of Development Proposals for Ward No. 03

ID	Name of Proposal	Area (acre)	Mouza Name	Plot No.
WC-03	Ward Centre	0.49	Shailkupa	3539, 3972-3973, 3975-3977, 4082, 9999
WTS-02	Waste Transfer Station	0.25	Shailkupa	3537, 3539, 4082, 9999
NP-01	Neighbourhood Park	3.19	Horidebpur	195, 232, 253-267, 274-279
			Shailkupa	3862-3865
PG-03	Playground	6.85	Shailkupa	3368-3370, 3380-3383, 3401-3404, 3410-3417, 3419-3439
PS-01	Primary School	2.67	Shailkupa	3364-3368, 3371, 3433-3439, 3549, 3555-3556, 9999
HS-02	Secondary School	4.15	Shailkupa	3367, 3555-3559, 3568-3571, 3573, 3575

14.5.4 Priority Tasks

The following priorities has identified after the Public consultation meeting at Shailkupa Paurashava.

Table 14.12: Priority Tasks for Ward No. 03

Priority-1		Priority-2	
Type	ID	Type	ID
Road	TR-13, TR-14	Road	TR-15
Drain	SD-03, TD-14	Drain	TD-11, TD-12
Dev. Proposal	WC-03, WTS-02	Dev. Proposal	PG-03
Priority-3		Priority-4	
Type	ID	Type	ID
Road	TR-16	Road	TR-12
Drain	TD-13, TD-15	Drain	TD-16, TD-17
Dev. Proposal	PS-01	Dev. Proposal	HS-02

Map 14.5: Landuse Plan for Ward Action Plan of Ward No. 3

Map 14.6: Drainage & Utility Services Plan for Ward No. 03

14.6 Action Plan for Ward No. 04

14.6.1 Road Network Development Plan of Ward No. 04

The existing road network of Ward No. 04 is 19.57 km where 6.74 km road is pucca, 5.54 km road is semi-pucca and 7.29 km road is Katcha. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. All of the roads of this Paurashava will be constructed as a pucca road in different phases of Plan. Proposals for Roads for Ward No. 04 is shown in **Table-14.13** and **Map-14.6.1**.

Table 14.13: Proposal of Roads for Ward No. 04

Road Type	ID	Length (km)	Proposed RoW	Proposal Type
Secondary Road	SR-03	0.550	60 ft	Pucca
	SR-04	0.857	60 ft	Pucca
	SR-05	0.530	60 ft	Pucca
	SR-06	0.745	60 ft	Pucca
	SR-07	1.288	80 ft	Pucca
	SR-08	6.186	80 ft	Pucca
	SR-09	3.202	60 ft	Pucca
	SR-10	0.451	80 ft	Pucca
Tertiary Road	TR-17	0.165	30 ft	Pucca
	TR-18	0.646	40 ft	Pucca
	TR-19	0.812	40 ft	Pucca

14.6.2 Drainage Development Plan of Ward No. 04

Drain is necessary for discharge all its waste water and storm water. The plan proposes 7.56 kilometers of new drains for Ward No. 04 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan. Proposals for Drains for Ward No. 04 is shown in **Table-14.14** and **Map-14.6.2**.

Table 14.14: Proposal of Drains for Ward No. 04

Drain Type	ID	Construction Type	Length (km)	Av. Width (m)	Outfall
Secondary Drain	SD-04	Pucca	0.555	0.80 m	SD-26
	SD-05	Pucca	0.330	0.80 m	Khal
	SD-06	Pucca	0.475	0.80 m	Khal
Tertiary Drain	TD-18	Pucca	0.444	0.50 m	SD-26
	TD-19	Pucca	0.439	0.50 m	SD-26
	TD-20	Pucca	0.272	0.50 m	SD-26
	TD-21	Pucca	0.147	0.50 m	TD-19
	TD-22	Pucca	0.144	0.50 m	TD-19
	TD-23	Pucca	0.258	0.50 m	Khal
	TD-24	Pucca	0.158	0.50 m	SD-04
	TD-25	Pucca	0.097	0.50 m	TD-18
	TD-26	Pucca	0.544	0.50 m	SD-12
	TD-27	Pucca	0.528	0.50 m	SD-12
	TD-28	Pucca	0.077	0.50 m	TD-23
	TD-29	Pucca	0.069	0.50 m	TD-23

Drain Type	ID	Construction Type	Length (km)	Av. Width (m)	Outfall
	TD-30	Pucca	0.375	0.50 m	Khal
	TD-31	Pucca	0.718	0.50 m	SD-04
	TD-32	Pucca	0.162	0.50 m	TD-31
	TD-33	Pucca	0.169	0.50 m	TD-31
	TD-34	Pucca	0.507	0.50 m	TD-27
	TD-35	Pucca	0.471	0.50 m	Khal
	TD-36	Pucca	0.619	0.50 m	Khal

14.6.3 Urban Services Development Plan of Ward No. 04

The urban services is the pre condition of any potential development. Parking Area, Public Toilet, Tempo Stand, Ward Centre, Community Centre, Graveyard, Super Market, Resettlement Zone, Stadium and Youth Development Centre are proposed here. The proposal for service facilities of Ward No. 04 is shown in **Table-14.15** together with mouza name and plot number.

Table 14.15: Proposal of Development Proposals for Ward No. 04

ID	Name of Proposal	Area (acre)	Mouza Name	Plot No.
PA	Parking Area	0.35	Shailkupa	4654-4655, 5806-5807
PT-02	Public Toilet	0.14	Shailkupa	4659-4660
TS-02	Tempo Stand	0.27	Shailkupa	4585-4586
WC-04	Ward Centre	0.51	Shailkupa	6197-6200
CC	Community Centre	1.25	Shailkupa	6241-6248, 6250
GY	Graveyard	0.98	Shailkupa	4482-4485, 4577
SM	Super Market	3.94	Shailkupa	4657,4659-4660, 4662, 4664, 4665, 4677-4678, 4681-4684, 4696-4697
RZ	Resettlement Zone	16.73	Shailkupa	4704-4718, 6131-6138, 6173, 6174, 6177, 6178, 6181-6197, 9999
ST	Stadium	10.69	Shailkupa	4684-4696,4701-4603, 4705-4707, 6162-6171, 6175
YDC	Youth Development Centre	0.56	Shailkupa	4716, 4785-4786, 6197, 6200-6201

14.6.4 Priority Tasks

The following priorities has identified after the Public consultation meeting at Shailkupa Paurashava.

Table 14.16: Priority Tasks for Ward No. 04

Priority-1		Priority-2	
Type	ID	Type	ID
Road	SR-03, SR-04, SR-08, SR-09	Road	SR-06, SR-07, SR-10, TR-18
Drain	SD-04, SD-05, TD-18, TD-19, TD-20	Drain	SD-06, TD-21, TD-26, TD-27, TD-30, TD-31
Dev. Proposal	PA, PT-02, TS-02, WC-04	Dev. Proposal	CC, GY
Priority-3		Priority-4	
Type	ID	Type	ID
Road	SR-05, TR-19	Road	TR-17
Drain	TD-22, TD-23, TD-24, TD-25, TD-34, TD-35	Drain	TD-28, TD-29, TD-32, TD-33, TD-36
Dev. Proposal	SM, RZ	Dev. Proposal	ST, YDC

Map 14.7: Landuse Plan for Ward Action Plan of Ward No. 04

Map 14.8: Drainage & Utility Services Plan for Ward No. 04

14.7 Action Plan for Ward No. 05

14.7.1 Road Network Development Plan of Ward No. 05

The existing road network of Ward No. 05 is 16.36 km where 4.60 km road is pucca, 6.73 km road is semi-pucca and 5.03 km road is Katcha. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. All of the roads of this Paurashava will be constructed as a pucca road in different phases of Plan. Proposals for Roads for Ward No. 05 is shown in **Table-14.17** and **Map-14.7.1**.

Table 14.17: Proposal of Roads for Ward No. 05

Road Type	ID	Length (km)	Proposed RoW	Proposal Type
Secondary Road	SR-11	1.295	60 ft	Pucca
	SR-12	1.860	60 ft	Pucca
	SR-13	1.895	80 ft	Pucca
Tertiary Road	TR-20	0.578	40 ft	Pucca
	TR-21	0.782	40 ft	Pucca
	TR-22	0.309	40 ft	Pucca
	TR-23	0.275	30 ft	Pucca
	TR-24	0.644	30 ft	Pucca
	TR-25	0.285	40 ft	Pucca
	TR-26	0.550	40 ft	Pucca
	TR-27	0.404	30 ft	Pucca
	TR-28	0.064	30 ft	Pucca
	TR-29	1.990	40 ft	Pucca
	TR-30	0.844	40 ft	Pucca
	TR-31	1.640	30 ft	Pucca
	TR-32	0.067	40 ft	Pucca
	TR-33	0.779	40 ft	Pucca

14.7.2 Drainage Development Plan of Ward No. 05

Drain is necessary for discharge all its waste water and storm water. The plan proposes 4.94 kilometers of new drains for Ward No. 05 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan. Proposals for Drains for Ward No. 05 is shown in **Table-14.18** and **Map-14.7.2**.

Table 14.18: Proposal of Drains for Ward No. 05

Drain Type	ID	Construction Type	Length (km)	Av. Width (m)	Outfall
Secondary Drain	SD-07	Pucca	0.582	0.80 m	Khal
	SD-08	Pucca	0.451	0.80 m	Khal
	SD-09	Pucca	0.505	0.80 m	Khal
Tertiary Drain	TD-37	Pucca	0.202	0.50 m	SD-08
	TD-38	Pucca	0.284	0.50 m	SD-08
	TD-39	Pucca	0.354	0.50 m	SD-08
	TD-40	Pucca	0.776	0.50 m	TD-37
	TD-41	Pucca	0.178	0.50 m	SD-12
	TD-42	Pucca	0.295	0.50 m	SD-07
	TD-43	Pucca	0.168	0.50 m	TD-40
	TD-44	Pucca	0.410	0.50 m	Khal
	TD-45	Pucca	0.736	0.50 m	Khal

14.7.3 Urban Services Development Plan of Ward No. 05

The urban services is the pre condition of any potential development. Fire Station, Public Toilet, Ward Centre, Waste Transfer Station, Neighbourhood Market, Tempo Stand, Eidgah, Hospital, Playground, College and Park are proposed here. The proposal for service facilities of Ward No. 05 is shown in **Table-14.19** together with mouza name and plot number.

Table 14.19: Proposal of Development Proposals for Ward No. 05

ID	Name of Proposal	Area (acre)	Mouza Name	Plot No.
FS	Fire Station	1.94	Shailkupa	4706, 5832-5834, 5848-5853
PT-03	Public Toilet	0.11	Fazilpur	231, 303, 456
WC-05	Ward Centre	0.55	Fazilpur	247-249, 252, 303
WTS-03	Waste Transfer Station	0.26	Shailkupa	5995-5996
NM-02	Neighbourhood Market	1.15	Fazilpur	303, 449-457, 465
TS-03	Tempo Stand	0.25	Fazilpur	230, 232-234, 236
ED	Eidgah	0.65	Shailkupa	6390-6391, 6395-6396
HOS-02	Hospital	4.84	Shailkupa	4706, 5834, 5838-5839, 5842-5848, 5852-5856, 5859, 5862, 5964
PG-04	Playground	3.30	Fazilpur	257, 263, 265-272, 275, 9999
C-01	College	6.57	Shailkupa	5856-5859, 5912-5915, 5920, 5953, 5955- 5960, 5963-5964
P-02	Park	9.15	Pathanpara	35-46, 62, 65-80, 95-99, 102-03, 186

14.7.4 Priority Tasks

The following priorities has identified after the Public consultation meeting at Shailkupa Paurashava.

Table 14.20: Priority Tasks for Ward No. 05

Priority-1		Priority-2	
Type	ID	Type	ID
Road	SR-13, TR-29, TR-30, TR-31	Road	SR-11, SR-12, TR-20, TR-21
Drain	SD-07, SD-08, TD-37	Drain	SD-09, TD-38, TD-39
Dev. Proposal	FS, PT-03, WC-05, WTS-03	Dev. Proposal	NM-02, TS-03
Priority-3		Priority-4	
Type	ID	Type	ID
Road	TR-22, TR-23, TR-24, TR-26, TR-27	Road	TR-25, TR-28, TR-32, TR-33
Drain	TD-40, TD-41, TD-42	Drain	TD-43, TD-44, TD-45
Dev. Proposal	ED, HOS-02, PG-04	Dev. Proposal	C-01, P-02

Map 14.9: Landuse Plan for Ward Action Plan of Ward No. 5

Map 14.10: Drainage & Utility Services Plan for Ward No. 05

14.8 Action Plan for Ward No. 06

14.8.1 Road Network Development Plan of Ward No. 06

The existing road network of Ward No. 06 is 17.86 km where 2.68 km road is pucca, 5.92 km road is semi-pucca and 9.26 km road is Katcha. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. All of the roads of this Paurashava will be constructed as a pucca road in different phases of Plan. Road widening is considered all of the existing road. Proposals for Roads for Ward No. 06 is shown in **Table-14.21** and **Map-14.8.1**.

Table 14.21: Proposal of Roads for Ward No. 06

Road Type	ID	Length (km)	Proposed RoW	Proposal Type
Tertiary Road	TR-34	1.481	30 ft	Pucca
	TR-35	1.419	30 ft	Pucca
	TR-36	0.853	40 ft	Pucca
	TR-37	0.575	30 ft	Pucca
	TR-38	0.096	30 ft	Pucca

14.8.2 Drainage Development Plan of Ward No. 06

Drain is necessary for discharge all its waste water and storm water. The plan proposes 6.39 kilometers of new drains for Ward No. 06 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan. Proposals for Drains for Ward No. 06 is shown in **Table-14.22** and **Map-14.8.2**.

Table 14.22: Proposal of Drains for Ward No. 06

Drain Type	ID	Construction Type	Length (km)	Av. Width (m)	Outfall
Secondary Drain	SD-10	Pucca	1.189	0.80 m	Khal
	SD-11	Pucca	1.572	0.80 m	Khal
	SD-12	Pucca	1.643	0.80 m	Khal
Tertiary Drain	TD-46	Pucca	0.567	0.50 m	Khal
	TD-47	Pucca	0.854	0.50 m	Khal
	TD-48	Pucca	0.566	0.50 m	Khal

14.8.3 Urban Services Development Plan of Ward No. 06

The urban services is the pre condition of any potential development. Public Toilet, Ward Centre, Waste Dumping Ground, Neighbourhood Park, Neighbourhood Market, Playground and Old Home are proposed here. The proposal for service facilities of Ward No. 06 is shown in **Table-14.23** together with mouza name and plot number.

Table 14.23: Proposal of Development Proposals for Ward No. 06

ID	Name of Proposal	Area (acre)	Mouza Name	Plot No.
PT-04	Public Toilet	0.24	Aushia	2643-2644, 2651-2652, 3027
WC-06	Ward Centre	0.57	Aushia	2763, 2776-2777, 2780-2783
WDG	Waste Dumping Ground	10.96	Khalkula	243, 267-276, 367-373, 377, 403, 406, 408-443, 451-459
NP-02	Neighbourhood Park	7.03	Aushia	2384, 2392, 2395-2413, 2441-2454, 2465-2468, 2472, 3054
NM-03	Neighbourhood Market	2.34	Aushia	2412, 2415-2419, 2429-2433, 2442-2444
PG-05	Playground	2.78	Aushia	2349, 2351, 2362, 2367, 2375-2384
OH	Old Home	0.54	Aushia	2515, 2946-2947, 2950

14.8.4 Priority Tasks

The following priorities has identified after the Public consultation meeting at Shailkupa Paurashava.

Table 14.24: Priority Tasks for Ward No. 06

Priority-1		Priority-2	
Type	ID	Type	ID
Road	TR-34, TR-35	Road	TR-36
Drain	SD-10, SD-11	Drain	SD-12
Dev. Proposal	PT-04, WC-06, WDG	Dev. Proposal	NP-02
Priority-3		Priority-4	
Type	ID	Type	ID
Road	TR-37	Road	TR-38
Drain	TD-46, TD-47	Drain	TD-48
Dev. Proposal	NM-03, PG-05	Dev. Proposal	OH

Map 14.11: Landuse Plan for Ward Action Plan of Ward No. 06

Map 14.12: Drainage & Utility Services Plan for Ward No. 06

14.9 Action Plan for Ward No. 07

14.9.1 Road Network Development Plan of Ward No. 07

The existing road network of Ward No. 07 is 15.10 km where 1.31 km road is pucca, 7.55 km road is semi-pucca and 6.24 km road is katcha. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. All of the roads of this Paurashava will be constructed as a pucca road in different phases of Plan. Road widening is considered all of the existing road. Proposals for Roads for Ward No. 07 is shown in **Table-14.25** and **Map-14.9.1**.

Table 14.25: Proposal of Roads for Ward No. 07

Road Type	ID	Length (km)	Proposed RoW	Proposal Type
Primary Road	PR-02	3.246	100 ft	Pucca
Secondary Road	SR-14	0.507	60 ft	Pucca
	SR-15	0.428	60 ft	Pucca
	SR-16	1.293	60 ft	Pucca
	SR-17	0.354	60 ft	Pucca
	SR-18	4.362	80 ft	Pucca
Tertiary Road	TR-39	0.884	40 ft	Pucca
	TR-40	0.769	40 ft	Pucca
	TR-41	0.572	30 ft	Pucca
	TR-42	0.281	30 ft	Pucca
	TR-43	1.148	40 ft	Pucca
	TR-44	0.942	40 ft	Pucca
	TR-45	0.227	20 ft	Pucca
	TR-46	0.974	40 ft	Pucca
	TR-47	0.358	30 ft	Pucca
	TR-48	0.230	20 ft	Pucca
	TR-49	0.322	30 ft	Pucca
	TR-50	0.230	30 ft	Pucca
	TR-51	0.336	40 ft	Pucca
	TR-52	0.446	40 ft	Pucca
	TR-53	0.864	40 ft	Pucca
	TR-54	0.211	20 ft	Pucca
	TR-55	0.710	40 ft	Pucca
	TR-56	0.944	40 ft	Pucca
	TR-57	0.873	40 ft	Pucca

14.9.2 Drainage Development Plan of Ward No. 07

Drain is necessary for discharge all its waste water and storm water. The plan proposes 19.12 kilometers of new drains for Ward No. 07 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan. Proposals for Drains for Ward No. 07 is shown in **Table-14.26** and **Map-14.9.2**.

Table 14.26: Proposal of Drains for Ward No. 07

Drain Type	ID	Construction Type	Length (km)	Av. Width (m)	Outfall
Secondary Drain	SD-13	Pucca	0.838	0.80 m	Khal
	SD-14	Pucca	1.542	0.80 m	Khal
	SD-15	Pucca	1.905	0.80 m	Khal
	SD-16	Pucca	2.203	0.80 m	Khal
	SD-17	Pucca	0.533	0.80 m	Khal
	SD-18	Pucca	1.024	0.80 m	Khal
	SD-19	Pucca	0.285	0.80 m	SD-18
	SD-20	Pucca	0.617	0.80 m	SD-14
Tertiary Drain	TD-49	Pucca	0.322	0.50 m	SD-13
	TD-50	Pucca	0.348	0.50 m	SD-13
	TD-51	Pucca	3.408	0.50 m	Khal
	TD-52	Pucca	0.662	0.50 m	SD-15
	TD-53	Pucca	0.294	0.50 m	TD-52
	TD-54	Pucca	0.303	0.50 m	TD-55
	TD-55	Pucca	0.216	0.50 m	TD-52
	TD-56	Pucca	0.205	0.50 m	SD-15
	TD-57	Pucca	0.659	0.50 m	Khal
	TD-58	Pucca	0.434	0.50 m	TD-49
	TD-59	Pucca	0.413	0.50 m	SD-18
	TD-60	Pucca	0.213	0.50 m	TD-63
	TD-61	Pucca	0.309	0.50 m	TD-63
	TD-62	Pucca	0.881	0.50 m	SD-18
	TD-63	Pucca	0.362	0.50 m	SD-18
	TD-64	Pucca	0.288	0.50 m	SD-13
	TD-65	Pucca	0.205	0.50 m	TD-52
	TD-66	Pucca	0.171	0.50 m	Khal
	TD-67	Pucca	0.475	0.50 m	TD-77

14.9.3 Urban Services Development Plan of Ward No. 07

The urban services is the pre condition of any potential development. Public Toilet, Ward Centre, Bus Terminal, Tempo Stand, Truck Terminal, Wholesale Market, College, General Industrial Zone, Neighbourhood Park and Playground are proposed here. The proposal for service facilities of Ward No. 07 is shown in **Table-14.27** together with mouza name and plot number.

Table 14.27: Proposal of Development Proposals for Ward No. 07

ID	Name of Proposal	Area (acre)	Mouza Name	Plot No.
PT-05	Public Toilet	0.11	Hobibpur	142-143, 145-146
WC-07	Ward Centre	0.49	Hobibpur	333-336, 341, 9999
BT	Bus Terminal	1.44	Hobibpur	146-147, 150-154
TS-04	Tempo Stand	0.29	Hobibpur	138, 140-143, 145
TT	Truck Terminal	1.02	Hobibpur	132, 136-139, 2348
WM	Wholesale Market	4.30	Hobibpur	362-371
			Kobirpur	3-11
C-02	College	10.59	Jhaudia	212-238, 240-244, 257, 953-959, 2190, 2192-2201, 2257-2274, 2289-2290
IZ	General Industrial Zone	23.12	Hobibpur	179-180, 2324-2325, 237-285, 312-322

ID	Name of Proposal	Area (acre)	Mouza Name	Plot No.
			Kobirpur	1-2
			Shailkupa	9999
NP-03	Neighbourhood Park	9.60	Hobibpur	2228-2229
			Jhaudia	238-240, 244, 451-455, 960, 2251-2258, 2273-2302, 2305-2306
PG-06	Playground	2.99	Hobibpur	1966-1967, 1969-1970, 1974-1977, 2217, 2223-2231

14.9.4 Priority Tasks

The following priorities has identified after the Public consultation meeting at Shailkupa Paurashava.

Table 14.28: Priority Tasks for Ward No. 07

Priority-1		Priority-2	
Type	ID	Type	ID
Road	PR-02, SR-16, SR-18, TR-40, TR-43, TR-46	Road	SR-17, TR-39, TR-41, TR-44, TR-54, TR-55, TR-56, TR-57
Drain	SD-13, SD-14, SD-15, SD-16, SD-17, SD-20, TD-49, TD-50	Drain	SD-18, TD-51, TD-52, TD-57, TD-66, TD-67
Dev. Proposal	PT-05, WC-07	Dev. Proposal	BT, TS-04, TT
Priority-3		Priority-4	
Type	ID	Type	ID
Road	SR-14, SR-15, TR-52, TR-53	Road	TR-42, TR-45, TR-47, TR-48, TR-49, TR-50, TR-51
Drain	SD-19, TD-53, TD-54, TD-55, TD-58, TD-62, TD-65	Drain	TD-56, TD-59, TD-60, TD-61, TD-63, TD-64
Dev. Proposal	WM, C-02	Dev. Proposal	IZ, NP-03, PG-06

Map 14.13: Landuse Plan for Ward Action Plan of Ward No. 07

Map 14.14: Drainage & Utility Services Plan for Ward No. 07

14.10 Action Plan for Ward No. 08

14.10.1 Road Network Development Plan of Ward No. 08

The existing road network of Ward No. 08 is 7.91 km where 2.40 km road is pucca, 3.26 km road is semi-pucca and 2.25 km road is katcha. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. All of the roads of this Paurashava will be constructed as a pucca road in different phases of Plan. Road widening is considered all of the existing road. Proposals for Roads for Ward No. 08 is shown in **Table-14.29** and **Map-14.10.1**.

Table 14.29: Proposal of Roads for Ward No. 08

Road Type	ID	Length (km)	Proposed RoW	Proposal Type
Tertiary Road	TR-58	0.268	20 ft	Pucca
	TR-59	0.250	30 ft	Pucca
	TR-60	0.638	40 ft	Pucca
	TR-61	0.156	20 ft	Pucca
	TR-62	0.147	30 ft	Pucca
	TR-63	0.118	30 ft	Pucca
	TR-64	0.121	20 ft	Pucca
	TR-65	1.876	30 ft	Pucca
	TR-66	0.589	30 ft	Pucca
	TR-67	1.640	40 ft	Pucca
	TR-68	1.955	40 ft	Pucca
	TR-69	0.229	40 ft	Pucca

14.10.2 Drainage Development Plan of Ward No. 08

Drain is necessary for discharge all its waste water and storm water. The plan proposes 4.64 kilometers of new drains for Ward No. 08 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan. Proposals for Drains for Ward No. 08 is shown in **Table-14.30** and **Map-14.10.2**.

Table 14.30: Proposal of Drains for Ward No. 08

Drain Type	ID	Construction Type	Length (km)	Av. Width (m)	Outfall
Secondary Drain	SD-21	Pucca	0.359	0.80 m	Kumar River
	SD-22	Pucca	0.168	0.80 m	Kumar River
	SD-23	Pucca	0.164	0.80 m	Kumar River
	SD-24	Pucca	0.776	0.80 m	SD-23
	SD-25	Pucca	0.392	0.80 m	Kumar River
	SD-26	Pucca	0.297	0.80 m	Kumar River
Tertiary Drain	TD-68	Pucca	0.136	0.50 m	SD-15
	TD-69	Pucca	0.252	0.50 m	SD-15
	TD-70	Pucca	0.108	0.50 m	SD-15
	TD-71	Pucca	0.106	0.50 m	SD-15
	TD-72	Pucca	0.233	0.50 m	SD-30
	TD-73	Pucca	0.185	0.50 m	SD-30
	TD-74	Pucca	0.575	0.50 m	SD-31
	TD-75	Pucca	0.437	0.50 m	SD-26
	TD-76	Pucca	0.453	0.50 m	Khal

14.10.3 Urban Services Development Plan of Ward No. 08

The urban services is the pre condition of any potential development. Slaughter House, Ward Centre, Cattle Market, Primary School and Central Park are proposed here. The proposal for service facilities of Ward No. 08 is shown in **Table-14.31** together with mouza name and plot number.

Table 14.31: Proposal of Development Proposals for Ward No. 08

ID	Name of Proposal	Area (acre)	Mouza Name	Plot No.
SH	Slaughter House	0.19	Shailkupa	6549
WC-08	Ward Centre	0.50	Kobirpur	290, 297-300, 6549
CM	Cattle Market	0.57	Shailkupa	6474, 6546, 6549
PS-02	Primary School	1.97	Kobirpur	109, 113-116, 118-120
CP	Central Park	7.59	Fazilpur	9999
			Shailkupa	6549

14.10.4 Priority Tasks

The following priorities has identified after the Public consultation meeting at Shailkupa Paurashava.

Table 14.32: Priority Tasks for Ward No. 08

Priority-1		Priority-2	
Type	ID	Type	ID
Road	TR-65, TR-67, TR-68	Road	TR-58, TR-59, TR-60, TR-66
Drain	TD-68, TD-72, TD-73, TD-74	Drain	SD-22, SD-23, SD-25, SD-26
Dev. Proposal	SH, WC-08	Dev. Proposal	CM
Priority-3		Priority-4	
Type	ID	Type	ID
Road	TR-61, TR-62, TR-69	Road	TR-63, TR-64
Drain	SD-21, TD-69, TD-75, TD-76	Drain	SD-24, TD-70, TD-71
Dev. Proposal	PS-02	Dev. Proposal	CP

Map 14.15: Landuse Plan for Ward Action Plan of Ward No. 8

Map 14.16: Drainage & Utility Services Plan for Ward No. 08

14.11 Action Plan for Ward No. 09

14.11.1 Road Network Development Plan of Ward No. 09

The existing road network of Ward No. 09 is 12.58 km where 2.41 km road is pucca, 6.06 km is semi-pucca and 4.11 km road is Katcha. This length of roads will not be able to serve the entire area in future when settlements will increase. New road spaces being created on community efforts are usually very narrow. All of the roads of this Paurashava will be constructed as a pucca road in different phases of Plan. Road widening is considered all of the existing road. Proposals for Roads for Ward No. 09 is shown in **Table-14.33** and **Map-14.11.1**.

Table 14.33: Proposal of Roads for Ward No. 09

Road Type	ID	Length (km)	Proposed RoW	Proposal Type
Secondary Road	SR-19	0.203	60 ft	Pucca
Tertiary Road	TR-70	0.287	20 ft	Pucca
	TR-71	0.339	20 ft	Pucca
	TR-72	0.253	20 ft	Pucca
	TR-73	0.240	30 ft	Pucca
	TR-74	0.145	30 ft	Pucca
	TR-75	0.313	20 ft	Pucca
	TR-76	0.597	40 ft	Pucca

14.11.2 Drainage Development Plan of Ward No. 09

Drain is necessary for discharge all its waste water and storm water. The plan proposes 7.40 kilometers of new drains for Ward No. 09 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan. Proposals for Drains for Ward No. 09 is shown in **Table-14.34** and **Map-14.11.2**.

Table 14.34: Proposal of Drains for Ward No. 09

Drain Type	ID	Construction Type	Length (km)	Av. Width (m)	Outfall
Secondary Drain	SD-27	Pucca	0.330	0.80 m	Kumar River
	SD-28	Pucca	1.081	0.80 m	SD-27
	SD-29	Pucca	0.315	0.80 m	Kumar River
	SD-30	Pucca	1.618	0.80 m	SD-16
	SD-31	Pucca	0.854	0.80 m	SD-30
Tertiary Drain	TD-77	Pucca	0.321	0.50 m	SD-30
	TD-78	Pucca	0.355	0.50 m	SD-30
	TD-79	Pucca	0.293	0.50 m	SD-30
	TD-80	Pucca	0.270	0.50 m	SD-30
	TD-81	Pucca	0.362	0.50 m	SD-30
	TD-82	Pucca	0.613	0.50 m	SD-31
	TD-83	Pucca	0.216	0.50 m	SD-30
	TD-84	Pucca	0.185	0.50 m	SD-31
	TD-85	Pucca	0.234	0.50 m	SD-28
	TD-86	Pucca	0.221	0.50 m	SD-28
	TD-87	Pucca	0.129	0.50 m	SD-24

14.11.3 Urban Services Development Plan of Ward No. 09

The urban services is the pre condition of any potential development. Public Toilet, Ward Centre, Waste Transfer Station, Hospital, Secondary School, Low Income Housing Project and Neighbourhood Market are proposed here. The proposal for service facilities of Ward No. 09 is shown in **Table-14.35** together with mouza name and plot number.

Table 14.35: Proposal of Development Proposals for Ward No. 09

ID	Name of Proposal	Area (acre)	Mouza Name	Plot No.
PT-06	Public Toilet	0.10	Jhaudia	573-576
WC-09	Ward Centre	0.54	Jhaudia	743, 746-747, 763-764, 967
WTS-04	Waste Transfer Station	0.26	Kobirpur	414-416
HOS-03	Hospital	6.19	Jhaudia	581-600, 602-613
HS-03	Secondary School	3.63	Jhaudia	680, 681, 686-697, 704-706, 969
LIHP	Low Income Housing Project	9.16	Jhaudia	366-397, 413-423, 428-436, 782, 963
NM-04	Neighbourhood Market	0.90	Jhaudia	568-574

14.11.4 Priority Tasks

The following priorities has identified after the Public consultation meeting at Shailkupa Paurashava.

Table 14.36: Priority Tasks for Ward No. 09

Priority-1		Priority-2	
Type	ID	Type	ID
Road	TR-75, TR-76	Road	SR-19, TR-70
Drain	SD-30, SD-31, TD-77, TD-78	Drain	SD-28, TD-79, TD-80, TD-82
Dev. Proposal	PT-06, WC-09, WTS-04	Dev. Proposal	HOS-03, HS-03
Priority-3		Priority-4	
Type	ID	Type	ID
Road	TR-71, TR-72	Road	TR-73, TR-74
Drain	TD-81, TD-85, TD-86, TD-87	Drain	SD-27, SD-29, TD-83, TD-84
Dev. Proposal	LIHP	Dev. Proposal	NM-04

Map 14.17: Landuse Plan for Ward Action Plan of Ward No. 09

Map 14.18: Drainage & Utility Services Plan for Ward No. 09

14.12 Implementation Guidelines

The Master Plan of Shailkupa Paurashava will be an effective tool for planned urban development, if it is implemented properly with legal enforcement. The different components of the Master Plan have varied implications if they are not implemented in an integrated manner. There is no separate laws related directly to the implementation of Master Plan of the Paurashavas in the country other than the Local Government (Paurashava) Act, 2009 and some relevant national policies and laws as discussed in **Chapter-5** under the Structure Plan.

However, the legal provisions that have been made in the Local Government (Paurashava) Act, 2009 can effectively be applied in the implementation of the Master Plan of Shailkupa Pouashava for the time being along with other relevant national policies and laws that have also implications at Paurashava level, such as Playfield, Open space, Park and Natural water reservoir Conservation Act, 2000 and Bangladesh National Building Code, 1993. Other national policies, guidelines and laws relevant to population, agriculture, environment, tourism, building materials, building construction etc. have implications for the implementation of various components including the Ward Action Plan of the Master Plan of Shailkupa Paurashava.

Therefore, until specific laws and guidelines are made by the government for the Paurashavas in Bangladesh for the implementation of Master Plans, the existing laws, policies and guidelines should be strictly followed so that the goal and objectives of these plans are achieved. Effective application of the various existing policies and laws require prudent exercise of professional knowledge and expertise, which is lacking in the existing human resources of the Paurashavas in Bangladesh. In particular, the Paurashavas require professional urban/town planner(s) in the set up of their manpower. In this context, there is an urgent need for the creation of a planning division/section in the existing set up of the Paurashava Organogram.

14.12.1 Proposals for Mitigation of Identified Issues

The critical issues of planning and development identified in the Structure Plan have been addressed through the preparation of Urban Area Plan and Ward Action Plan. The proposals made in these plans resolve the issues addressed in the Structure Plan.

14.12.2 Comparative Advantage of Master Plan

The Paurashavas in Bangladesh do not have any practicing plans at present in regard to organized development of land use or infrastructure. This situation has been continuing over a long period of time in the past promoting spontaneous land and infrastructure development. As a result, there are examples of unplanned development creating discomfort to the people living in almost all Paurashavas in the country. The implementation of the currently prepared Master Plan of the Paurashava will remove those obstacles by applying the principles, guidelines and proposals of various

components of its Master Plan. The Ward Action Plan prepared following the Urban Area Plan will solve the most pressing needs of the town in infrastructure development.

14.13 Conclusion

In order to make the Plans sustainable through people's participation, it is now emphasized involvement of the local stakeholders in the planning development process. Such participation creates a sense of ownership of the Plan among the stakeholders that brings support for the plan and helps to create favorable conditions to implement the plan provisions. Keeping this approach in mind the present Structure Plan, Urban Area Plan and Ward Action Plans for Shailkupa Paurashava has been prepared. It will shape and guide the growth of city in order to meet its social, cultural, environmental, economical, recreational and many other needs of city dwellers.

The Shailkupa Paurashava will be not only the custodian of the Plan, it will also be responsible for implementing much of the development projects. Besides, it will also be responsible for monitoring implementation of the development projects by other urban development and service giving agencies. This situation calls for strengthening the existing capacity of Paurashava to handle future volume of work.

The current plan opens up a new horizon of development opportunities and land use control through policy guidelines in broad sense and detailed development proposals unto a very micro level. The land use areas have been marked indicating the mouza and dag numbers. It is expected that control of land use development contrary to the Plan can now be prevented more easily. This will require exercise of power with more vigor and sincerity.

It is not possible for the government alone to go for plot to plot development as per plan with its meager resources. This calls for involving stakeholders, particularly, the land owners in the development process. Such initiative is possible at the local level infrastructure development, where the land owners will be directly benefited. In case of wider level development the development authority can take initiatives for infrastructure cost realization from land owners though evolving innovative mechanism.

Rule of law must be established. A culture of law obedience must be created among the people in general and such practice should start with government agencies first, who often are found not following the regulations of building plan approval. It is hardly possible for the government to control all irregularities unless the people themselves become conscious and cooperative. If necessary stringent measures should be taken against the violators to make people abide by laws.

Regular monitoring of the plan implementation is necessary together with monitoring of urban development trend in new areas. Monitoring would help early detection of problems and suggesting solutions for their amelioration. An early measure in tackling

problems cannot only save huge public money, but also the miseries of the city dwellers. It is expected that the proper implementation of this Plan with close monitoring will make this prosperous city livable, healthy and will bring overall socio-economic development in future.