Government of the People's Republic of Bangladesh

Ministry of Local Government, Rural Development & Cooperatives

Local Government Division

SHIBGANJ 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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SHIBGANJ 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

SHIBGANJ PAURASHAVA

SHIBGANJ, CHAPAI NAWABGANJ

SHIBGANJ PAURASHAVA MASTER PLAN: 2011-2031

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SHIBGANJ PAURASHAVA

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Preface

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

However, presently, the Paurashavas has the legal mandate to take initiatives of formulating development plans, providing infrastructure and other services and creating opportunities for people to initiate developments with sustainable and harmonic approach. In this regards, Shibganj 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 Shibganj Paurashava.

Master Plan of Shibganj 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 AQUA Consultants & Associates Ltd. and set up a Project Management Office (PMO) deploying a Project Director, Deputy Project Director, experienced Urban Planners as Individual Consultant and support staffs. Regular monitoring, evaluation and feedback from PMO had also accelerate the pace and quality of the master plan preparation tasks. During formulation of the Master Plan, the Paurashava authority along with the project & the Consultant ensure people's opinion, observation and expectation in various ways: conducting sharing meetings, Public Hearing etc. At the end of the formulation process, the Paurashava completed all procedures necessary for its approval as per the related clauses and sub-clauses of the Local Government (Paurashava) Act, 2009. 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 Shibganj 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 Shibganj Paurashava will be necessary to implement this Master Plan successfully and make this Paurashava developed and livable. I hope Shibganj Paurashava will be a model Paurashava in Bangladesh through building itself green and sustainable by successful implementation of this Master Plan.

(Md. Shamim Kabir)
Mayor
Shibganj Paurahsava

Executive Summary

The Master Plan Report of Shibganj Pourashava has been prepared and submitted by the consultant AQUA-SCPL-RCC consortium for the partial fulfilment of the requirements stated in the Terms of Reference (ToR) for Upazila Towns Infrastructure Development Project (UTIDP; package- 9) being implemented by Local Government Engineering Department (LGED) under the Ministry of Local Government Rural Development and Co-operatives (LGRD&C) Ministry of Government of the People's Republic of Bangladesh. 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 Shibganj Paurashava Master Plan (Structure Plan, Urban Area Plan and Ward Action Plan)".

Prior to starting the Master Plan report the consultant undertook field visit and organized a meeting with the stakeholders to understand the growth pattern, problems and prospects in future developing aspects of the project area. Existing Paurashava boundary covering an area of 5023.89acres was delineated as planning area for preparation of Master Plan with due emphasis on local and regional development agenda for next 20 years.

The pattern of settlements in the Paurashava reflects that the Paurashava still possesses predominantly the rural characteristics. No planned residential area exists in the Paurashava. Structures are established without any planning standard and in haphazard manner. Population density of the Paurashava area is found 2100/ sq. km in the year 2011. The Growth Rate of Shibganj Paurashava is estimated to be 1.79 %. The expected population for 2031 is 60878 which are much higher than the present population (42693) of Shibganj Paurashava. The gross density of the area will be 12ppa (person per acre).People in this Paurashava mostly belong to middle income groups. Only a small number of people belong to higher income group. According to BBS 2001, among the economically active age group of population, 33.97% are found engaged directly in Employment activities while 32.37% are found not engaged in employment activities. Not working population found about 67.03%, whereas looking for work found 2.37% and 32.68% of population found engaged in house hold work. The major occupations found are farming, fishing, business and trading, services in government, non-government and private organizations, day-laboring in agriculture.

Shibganj Paurashava is located on the eastern bank of Padma River, which is the tributary of Mohananda River; Shibganj is situated in the north-western border of the country. It is located about 30 km to the west of ChapaiNawabgonj District headquarter and about 350 km to the north-west of Capital City of Dhaka. It is well connected by road with all over the country via Rajshahi Divisional headquarter. A major highway (Rajshahi-Nawabganj-SonaMosjid Road) passes through the Paurashava connecting Sona Masjid Land Custom Station with Rajshahi.

Maximum level of Shibganj Paurashava is 28.29 m and lowest point is recorded as 17.62 m. Average elevation of Shibganj Paurashava area is derived as 21.67m. Average spot height gives the indication of relative of various wards. It seen that ward 2, 4, and 5 are comparatively high land area. From Surface Analysis, it can be found that the western part of the Paurashava is comparatively higher than other areas. The western part comprises of parts of ward 1, 4, 5 and 9. From the surface analysis map it can be deduced that most of the area of ward 9 are low compare to others. For Shibganj Paurashava mean spot height for Agricultural Land is found to be 21.46mPWDwhereas the mean spot height found for roads/Circulation network is about 22.84

mPWD and mean spot height found for residential is about 22.80mPWD. In Shibganj Paurashava there are about 115.36 Km road out of which 46.16 is Pucca, 32.82 km is semi-pucca and 36.39 km is Katcha.

The project area is predominantly agricultural in character. Land use survey reveals that agriculture is the most dominant land use category of the Shibganj Paurashava which comprises 82.76% of the total land area of the Paurashava. The land under agriculture purpose use is mostly double cropped area, which are low-lying depressions and remain under water during the monsoon flood. Paurashava Commercial, educational and mixed use lands are very much negligible in percentage. Core areas (Ward Nos.2, 4 and 5) of the town along this highway and its close vicinity developed with diversified land use without any proper planning guidelines causing many difficulties such as, traffic congestion, drainage problems and environmental degradations etc. for the town. Existence of PaglaRiver and quite a good number of canals in and around the Paurashava created opportunities for cultured fisheries in the Paurashava area. Good transportation linkage within the region and other parts of the country and potential for agriculture and fishery has created abundant scope for establishment of agro-based industries with adequate forward and backward linkages in the Paurashava.

The structure plan (Part-A) area consist of different zones (Core Area, Fringe Area, Peripheral Area, New Urban Area, Agriculture, Water body and Major Circulation) and it covers the entire Paurashava. Agricultural area (2771.93 acres) is the highest percentage of land (55.17%). The core area covers only 350.70 acres of land and the percentage is 6.97%.

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 Shibganj 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, Proposals for Urban Services. The future housing area estimates on a recommended planning standard of 100/150 persons per acre. With this standard, the maximum land required to accommodate total projected population (60,878) in the year 2031 will be 118.76 acres. Existing residential land of Shibganj Paurashava is 613.743 acres and net residential density of 69 persons per acre. The consultant, therefore, recommended almost 1100 acres of land for both urban residential and rural settlement and for different urban services for the population of the Paurashava in 2031 (net density will be about 41 persons per acre). Total commercial land in 2031 has been fixed at 51.39 acres, Education 57.82 acres, open space 68.65 acres and transport 4.89acres.

The Transportation and Traffic Management Plan covers the scope of improvement of the existing network and system and plan proposals for new development. The proposals on improvement and new development are made for the project area up to 2031. The existing circulation network of Shibganj Paurashava is 115.36 km and the proposed circulation network is 127.73km of 347.94 acre excludes existing. The primary road (Bypass Road) has been proposed 150ft (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'.Two truck terminals; eight tempo stands is proposed to cover the whole area. It is also focused on parking facilities and built passenger shed.

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 Shibganj Paurashava that shall be responsible for the approval of drainage improvements. Natural canal in Shibganj Paurashava is acting as a critical role in entire Paurashava. Total area devoted to water bodies in Shibganj Paurashava is around 43.79 acres. Present man made drain is about 14.24km and all this drains is pucca. The proposed drain of Shibganj Paurashava is about 81.78km where 6.76 is primary drain; 24.03 is secondary drain and 50.98 is Tertiary drain. This will designated up to 2031.

Shibganj Paurashava is lacking for sewerage system and people are used to dispose household sewer to the surface drains and or surface water bodies. This Paurashava does not possess good solid waste management system. Thoughthere remain twelve vehicles (one garbage truck and eleven Garbage van) for solid waste disposal, those are not properly functioning. There was no designated dumping area in Shibganj Paurashava. In proposed plan 5 acres of land is reserved for dumping ground and it is located in ward no 1. Total 03 waste transfer stations have been proposed in core area.

In Part-C of the report contains Ward Action Plan of each individual Ward and this Development Proposals will be implemented within 1st to 5th year of 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 therein 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 line ministry (LGRD&C) 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 Shibganj Paurashava under “UTIDP” emphasizes on having proper guidelines and planning standards by the Paurashava for ensuring sustainable and planned development of the Paurashava.

Preparation of Master Plan for Paurashavas under
Upazila Towns Infrastructure Development Project (UTIDP)

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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 Center
Hat	Weekly an occasional Market
Paurashava	Municipality

Chapter 1: Introduction

1.1 General

Urbanization in Bangladesh is moving at a rapid pace. Between1961 to 1981, the average urban growth rate was 8%. The present average growth rate is about 4.5%. According to the population census of 2001, the share of urban population was about 23.29% and at present it is approximately 25%. By the year 2015, the share of urban population will be about 37% of the national population. The importance of urban development is emphasized in terms of its role in the national economy. More than 60% of the national GDP is derived from the non-agricultural sectors that are mainly based in urban areas. Again, the most foreign exchange earning sectors, like, garment and knitwear enterprises are agglomerated in urban areas. These sectors earn over 70% of the foreign exchange. Remittance is also a major sector of foreign exchange earnings and a large share of the remittance goes into the purchase of urban land. Surplus remittance is invested in business and manufacturing located in urban areas. These phenomena indicate the increasing role of urban areas being played in the national economy. The expansion of urban economy leads to the growth of urban population and concomitant haphazard urban spatial growth without planning. The rapid urbanization is marked by the creation of Paurashavas, whose number at present stands at 322. Paurashavas are created not only to provide urban services to their citizens, but also to create a livable environment through development of planned and environmentally sound living space.

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

Under the above circumstances, it is high time to think about solving the problems of the Paurashavas that might otherwise be emerged critically in the future. To overcome all likely problems to come in future, the Paurashavas should go for planned development through preparation and implementation of a Master Plan. The Master Plan can be prepared exercising the power conferred to them by the Local Government (Paurashava) Act, 2009. The Upazila Town Infrastructure Development Project (UTIDP) aims to prepare Master Plan for 223 Upazila level Paurashavas and Kuakata Tourism center under 12 packages for a period of next 20 years. The project has provisions for separate plans for land use control, drainage and environment, traffic and transportation management and improvement. The project also aims to prepare a Ward Action Plan (WAP) to ensure systematic execution of future infrastructure development projects. There is also aim to prepare proposals to enhance Paurashava revenue so that it becomes more capable to meet its own capital needs.

Out of the total 223 Paurashavas Shibganj is one of 20 Paurashavas within Chapai Nawabganj Region under Package 09. The location of within Bangladesh is shown in **Map 1-1**.

Map 1-1: Paurashava within Bangladesh

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

1.2 Philosophy of the Preparation of Master Plan

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

1.3 Objectives of the Master Plan

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

a) Find out development issues and potentials of the Paurashava and make a 20- year development vision for the Paurashava and prepare a Master Plan in line with the vision for the development;

b) Plan for the people of Paurashava to develop and update provisions for better transport and communication network, housing, roads, markets, bus terminals, sanitation, water supply, drainage, solid waste management, electricity, education, leisure and such other infrastructure facilities for meeting the social and community needs of the poor and the disadvantaged groups for better quality of life;

c) Prepare a multi-sector short and long term investment plan through participatory process for better living standards by identifying area based priority-drainage master plan, transportation and traffic management plan, other need specific plan as per requirement in accordance with the principle of sustainability;

d) Provide controls for private sector development, with clarity and security in regard to future development;

e) Provide guideline for development considering the opportunity and constrains of future development of the Upazila Town; and

f) Prepare a 20-year Master Plan to be used as a tool to ensure and promote growth of the Shibganj 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 UTIDP Project is aimed for substantial development of infrastructure and services for the Paurashava with optimum provision of opportunities for Paurashava dwellers and making scope for extending services to surrounding areas.

The current project is preparing a Master plan of the Paurashava, where the existing condition and different problems are identified, studied and analyzed and the probable solutions are to be sought

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

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

1.5 Scope of Work

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

1. Visits have been made to the Paurashava at different stages of work of the preparation of Master Plan of Shibganj Paurashava.
2. Feasibility for preparation of Master Plan has been submitted to the office of the PD, UTIDP.
3. An Inception Seminar has been organized at the Paurashava level to inform the Paurashava about the scope and Terms of Reference for the preparation of Master Plan. A thorough investigation has been made based on potential scope and opportunities available in the Paurashava to develop a 20 year development vision for it linking the ideas and view of the Paurashava people.
4. Determination of the study area and planning area has been done based on existing condition, demand of the Paurashava and potential scope for future development. A detailed survey has been conducted on the existing conditions of socio-economic, demographic, transportation and traffic, physical features, topographic, and land use of the Paurashava area following the approved format and data have been collected from primary and secondary sources. Analysis of such data and information has been carried out to find out the possible area of intervention to forecast future population of the Paurashava (15-20 years), vis-a-vis assess their requirement for different services, such as physical infrastructure facilities, employment generation, housing, right of way and land requirement for the existing and proposed roads, drains, playgrounds, recreation centers and other environmental and social infrastructure. The following major tasks have been accomplished:

a. Identification and investigation of the existing natural and man-made drains, natural river system, the extent and frequency of floods, area of planning intervention have been done. Other works include study of the contour and topographic maps produced by the relevant agencies and review of any previous drainage Master Plan available for the Paurashava.

b. A comprehensive (storm water) Drainage Master Plan for a plan period of 20 years has been prepared considering all relevant issues including discharge calculation, catchments areas, design of main and secondary drains along with their sizes, types and gradients and retention areas with preliminary cost estimates for the proposed drainage system.

c. Recommendations have been made on planning, institutional and legal mechanisms to ensure provision of adequate land for the establishment of proper rights of way for (storm water) drainage system in the Paurashava.

d. Collection and assessment of the essential data relating to existing transport Land Use Plan, relevant regional and national highway development plans, accident statistics, number and type of vehicles registered for each Paurashava have been made.

e. Assessment has been made on the requirements of critical data and data have been collected through reconnaissance and traffic surveys, which should estimate present traffic volume, forecast the future traffic growth, identification of travel patterns, areas of traffic conflicts and their underlying causes.

f. Study has been conducted on the viability of different solutions for traffic management and development of a practical short term traffic management plan has been accomplished, including one way systems, restricted access for large vehicles, improved signal system, traffic islands, roundabouts, pedestrian crossings, deceleration lanes for turning traffic, suitable turning radius, parking policies and separation of pedestrians and rickshaws etc.

g. Assessment has been done on the non-pedestrian traffic movements that are dominated by cycle rickshaw. Special recommendations should be made as to how best to utilize this form of transport without causing unnecessary delays to other vehicles. Proposals should also consider pedestrians and their safety, with special attention for the children.

h. Assessment has been made on the current land use with regard to road transportation, bus & truck stations, railway stations etc, and recommendations to be provided on actions to optimize this land use.

i. Preparation of a Road Network Plan based on topographic and base Map prepared under the Project. Recommendation has been made on the road development standards, which serve as a guide for the long and short term implementation of road. Also Traffic and Transportation Management Plan and traffic enforcement measure have been suggested.

j. Preparation of the Master Plan with all suitable intervention, supported by appropriate strategic policy, outline framework, institutional arrangement and possible source of fund for effective implementation of the plan.

k. Preparation of a plan has been set out proposed Master Plan at 3-levels namely Structural Plan, Urban Area Plan and Ward Action Plan.

l. At the first level, policies and strategies have been worked out for the preparation of a Structure Plan for each Paurashava under the package. The Master Plan has been prepared consisting of Structural Plan, Land Use Plan, Transportation and Traffic Management Plan, Drainage and Environmental Management Plan and Ward Action Plan.

m. A total list of primary and secondary roads, drains and other social infrastructures for each Paurashava for a plan period of next 20 years has been made. Examining and classifying according to the existing condition, long, medium and short term plans have been proposed and estimated cost for improvement of drain and road alignment and other infrastructures have been prepared.

n. In line with the proposed Master Plan, a Ward Action Plan has been proposed with list of priority schemes for the development of roads, drains, traffic management and other social infrastructures for implementation during the first five years of plan period.

o. With the help of concerned Paurashava, at least 2 public consultation meetings or seminars have been organized, one for discussion on Interim Report and the other on Final Report on the proposed Master Plan. Beneficiary's point of view has been integrated in the plan with utmost careful consideration.

p. Preparation and submission of Master Plan and Report with required standards as per the TOR.

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 ShibganjPaurashava are as follows:

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

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

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

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

Chapter 2: Introduction to Structure Plan

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

2.1 Background of the Paurashava

As per the Local Government (Paurashava) Act 2009, the Paurashavas in Bangladesh are categorized mainly into A, B, and C classes based mainly on annual income of the Paurashava. There is also a separate category called "Special Class", basically for industrial and commercial hubs of Narayanganj and Tongi within the Dhaka Metropolitan Development Area (DMDA).

Shibganjis a A-category Paurashava with an area of 20.331sq. km (5023.892 acre) that was established in 1992 with 9 wards following the Paurashava Ordinance 1977. Shibgonj is situated in the north-western border of the country. It is located about 30 km to the west of Chapai Nawabgonj District headquarter and about 350 km to the north-west of Capital City of Dhaka. It is well connected by road with all over the country via Rajshahi Divisional headquarter. A major highway (Rajshahi-Nawabganj-Sona Mosjid Road) passes through the Paurashava connecting Sona Masjid Land Custom Station with Rajshahi. This regional road provides the most important north-western link of Bangladesh to Shibgonj, and to Sona Masjid. The location of within Rajshahi District is shown in**Map 2-1**.

Shibganj is an ancient growth center of historical importance. In 18th century, people of from different places like Murshidabad, Kharadah and Burdwan of India came here and settled in this area. With their settlements, the place became a "Gonj" (Growth Center). It is learnt from the previous name of the Upazila was Shergonj. Sher Shah was believed to have founded this town and the place came to known as Shergonj. Subsequently the name was changed into Shibgonj by the people of Hindu Community to commemorate the honor and respect to their God Shiva.

Shibgonj is located within the flood plain of Padma River. Mohananda River originates from Padma at the foothill of the Himalayan mountain range near Darjeeling in West Bengal and enters into Bangladesh near Bholahat Upazila of Chapai Nawabganj district and passes through Gomastapur, Chapai Nawabganj and SHIBGANJ Upazila. Shibgonj Paurashava is located on the eastern bank of Pagla River, which is the tributary of Mohananda River.The Paurashava is comprised of 9 Wards, 20 Sheets and 15 Mouzas.

Shibganj Paurashava is situated within the flood plain of Padma River where the river is on east to Shibganj. A major highway (Rajshahi-Nawabganj-Sona Mosjid Road) is passed through the Paurashava. At national level, the area is recognized as economically backward.The predominant agriculture along with some small scale industries, trade and commerce, public sector organizations, academic institutions and informal sector provide the major base of economic activities in Shibganj area. Many agricultural Products produced in this area are exported throughout the country. The area became more important after construction of Jamuna Bridge. A significant number of garments worker live in this upazila and they contribute much more the national garments sector for a long period. In recent years, the severe flooding was occurred in

1988 and 1998. Duration of the flooding was more than 2 months and flood level was 1 to 3 meters above the surface. The extensive peripheral areas of Paurashava jurisdiction are comparatively low and are flooded each year during the monsoon. There exist a small number of unsanitary pools, kharis (canal), ditches and filth within the Paurashava. These depressions serve as catchments basin and help in reducing the flood intensity and also mitigate the flood damages during and after heavy rainfall in the monsoon period. Most of the buildings within the town are constructed in normal height but the houses outside the urban areas are mostly constructed on the elevated land of 3 and 4 meters above natural ground level to keep them free from annual flooding.

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.

Map 2-1: Location Map of Shibganj Paurashava within Rajshahi Division

2.3 Objectives of the Structure Plan

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

- Description of the Paurashava's administrative, economic, social, physical environmental growth, functional linkage and hierarchy in the national and regional context; catchments area; population; land use and urban services; agencies responsible for different sectoral activities, etc.
- Identification of urban growth area based on analysis of patterns and trends of development, and projection of population, land use and economic activities for next 20 years.
- Identification and description of physical and environmental problems of Shibganj 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 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

Concept

Structure Plan is a kind of guide plan, or framework plan, or an indicative plan that is presented with maps and explanatory texts in a broader planning perspective than other components of Master Plan. Structure Plan indicates the broad magnitudes and directions of urban growth, including infrastructure networks, the placement of major facilities such as hospitals and upazila complex. A Structure Plan is not intended to specify detailed lot by lot land use or local road configurations and development proposals. Rather it identifies the areas where growth and change are such that more detailed local and action plans are needed. Structure Plan does not require excessive effort in gathering data and it is flexible and dynamic and can be changed to accommodate demanded changes. The present Structure Plan is an overall long term strategic plan for the Paurashava Shahar (Town).

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

Content and Format of the Structure Plan

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

2.5 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. Structure Plan can contain two Urban Area Plan for the time period of 10 years each and four Ward Action Plan for the time period of 5 years each.

2.6 Structure Plan Area

The total area of Shibganj Paurashava Structure Plan is 5024.48acres that include total area of Paurashava, and there is no extended area in the structure plan of Paurashava. All the 9 wards of the Paurashava are covered by Structure Plan area.

Chapter 3: Existing Development Status of Shibganj Paurashava

This chapter of the report makes a review of the various issues related to existing growth trend of the Paurashava and unveils its problems. The existing scenario in development status concerning socio-economic, physical infrastructure and environment are presented in the following paragraphs.

3.1 Social Development

Development is a dynamic issue. Measurement of social development essentially requires time series data. Consultant collected recent data of the project area by means of sample survey (5% of total households) with no reference to previous situation. Population census reports are the only sources of information for Paurashava level data, but they cover only a selected number of issues that are not sufficient to make a qualitative judgment of social improvement. It makes a review of social development based on available population census data of 1991 and 2001 and presents the current situation using the sample socio-economic survey data. This social review indicates positive social development in Shibganj Paurashava. As per household survey, present average household size of the Paurashava is 4. This indicates the success of family planning programme at Shibganj Paurashava though the figure is still much higher than the national average (4.8%). Success is also achieved in education sector. Literacy rate is 69.55%. The employment situation is also slightly improved in this Paurashava.

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.

3.2.1 Economic Activities

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 25.59 % labour force is engaged with small business while people engaged in agricultural activities are about 22.43%. So a fair portion of people is engaged in agriculture for their livelihood. According to BBS 2001, 16.1% house holds found depend directly on services, as the main source of income. 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.

Industry

Except some small scale processing units, there is virtually no manufacturing, as such, in the Paurashava. The town actually has no strong industrial base. There are a number of rice processing units 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 small business. The bazar located at Ward 6 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, 1.37% of total population was engaged in light industries and 3.52% of total population were engaged in construction. In transport sector 6.85%, and in the Business sector 22.92% people were engaged.

Agriculture

Sample survey by the consultant reveals that about 25 percent of the income earners in the Paurashava are engaged in small business. Besides about 42.33% are agro laborers living in the Paurashava (BBS, 2001). 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 82% of the Paurashava lands are still under agriculture.

Agro-based

As the Paurashava is mostly rural 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 , the concentration of informal businesses is found around the bazar area, transport terminal and stoppage areas and also near the river bank.

3.2.2 Existing Employment Pattern

Out of the employed male population, More than 25 percent is engaged in business. Since secondary sector employment is seriously lacking in the town, people move to self-employment like small business. Trading has not been found feasible as employment in the town, mainly, because of lower level of affordability of the people powered by remittance they receive from abroad regularly. Of the total 141 working population of surveyed households of Shibganj Paurashava, 52.65 percent is in the active working force.

About .6 percent 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. 1.2% males are employed in government/autonomous organizations. It is observed that no 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.

Small business is an important source of income in this region. About 37.1% of the Paurashava households get involves in this sector.

3.3 Population

According to BBS 2011, the total population of Shibganj Paurashava was 42693 and the density of population was 2100 persons/ sq.km with an annual growth rate of 1.79. At Present, Ward 04is the most densely populated area. The density per sq.km is 9886in this Ward, followed by 4304 in Ward no. 02 and 4218for Ward no. 03.

Table 3-1: Population Distribution in Shibganj Paurashava

WARD NO	Area (in sq. km)	Population 2001 (BBS)	Density (persons/ sq.km)	Population 2011	Density (persons/ sq.km)
WARD-1	3.82	3502	916	4031	1055
WARD-2	1.05	3744	3573	4510	4304
WARD-3	1.32	4853	3675	5569	4218
WARD-4	0.42	3211	7671	4130	9866
WARD-5	1.37	5344	3907	6417	4692
WARD-6	1.84	4086	2220	4886	2655
WARD-7	2.76	3633	1315	4480	1622
WARD-8	2.12	3563	1683	4051	1913
WARD-9	5.63	3800	674	4619	820
Total	20.33	35736	1758	42693	2100

Sex Ratio

The average sex ratio (males per 100 females) for the project area is 100: 107, slight lower than the national average (100:106).

Again, percentage of elderly (65+) male population is much higher than the percentage of elderly female population. In the total population, however, the male population outnumbers the female population. These are some interesting information that can be observed from sample household survey at Shibganj Paurashava.

Marital Status

According to the BBS 2011, the percentage of married women is about 64.7 whereas the percentage is 54.7 for males. A negligible percentage of population is widow or widower. There is no respond of divorce, which is a good social aspect for the Paurashava.

Religious Status

Religious composition of population has various implications for area planning and overall welfare of the population. Almost 94 percent people of the study area belong to the Muslim community followed by only 5 percent Hindu.

Education

The survey shows the Level of Education of respondents in Shibganj Paurashava. about 25.37 %respondents have education level of class I-V, 16.59% have education level of class VI-X, 8.54 % have education level SSC, 10.49 % of have education level of HSC.. About 25.85 % people are illiterate in Shibgonj Paurashava. But the percentage of the people having education at the graduation level and above is not that satisfactory and it is only 11.1%. Women are lagging behind in respect of education in all the levels. According to the Census report 2011, a literacy rate in Shibganj Paurashava is about 66.8% for males and 57.1% for females. This indicates that over the last decade the literacy rate has increased to a great extent.

Monthly Income and Expenditure of the Household

About 60% of the total surveyed population is in the income level up to BDT 15000. The income level BDT 20000 and above comprises very low percentage (2 %) of the households in the Paurashava. It appears that the most of the people in this Paurashava are of middle income group. Income and expenditure level is given in **Fig 3-1**.

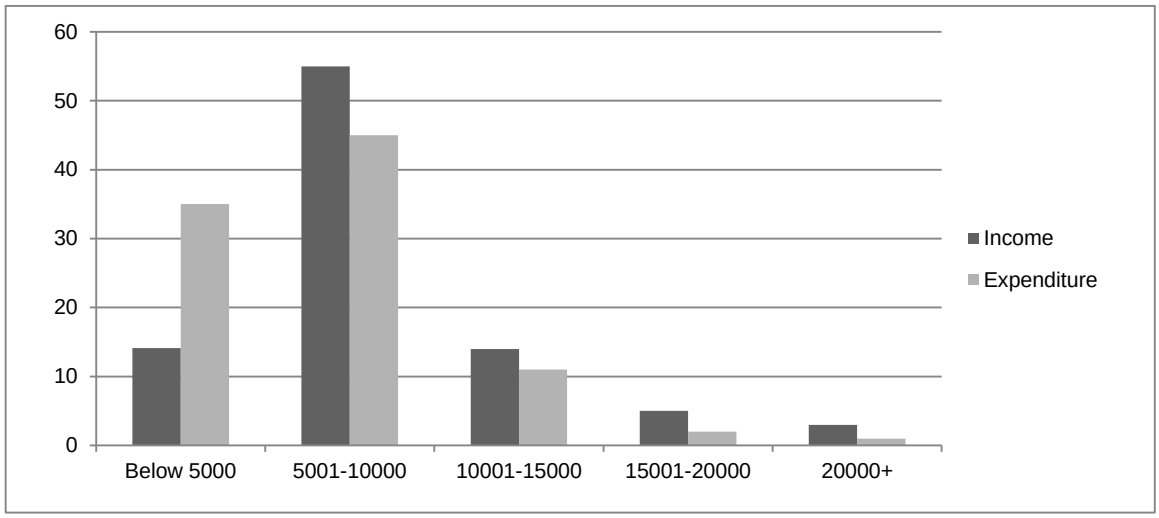


Fig 3-1: Percentage Distribution of the Household by Monthly Income and Expenditure at Shibganj Paurashava

Of the other hand, The Survey reveals that in most of the cases households have to spend all their earnings without any savings. People, earning more than BDT 20,000, can save negligible portion of their earnings.

Migration pattern

In this Paurashava there is no significant migration scenario. Only 4 people out of total sample have been found migrated in this Paurashava. And they migrated in this Paurashava due to river bank erosion.

3.4 Physical Infrastructure Development

Buildings and Structures

Paurashava has mainly grown following the major transport networks and the banks of the rivers. Buildings and structures developed are based on road network system of the Paurashava. The dweiiling units in the project area is dominated by Katcha structure (57.30%) followed by Semi-

pucca (36.99%), and lastly Pucca (5.71%). maximum Pucca structures are located in the Ward Nos. 4 which is 29.46% only of all the structures.

In ShibganjPaurashava it is found that, about 98.42% structures are single storied. The Survey findings also reveal that, amongst 9 Wards highest percentage of 1 storied building found in Ward no. 4, highest number of 2 storied building in Ward no. 6 and highest number of 3 storied building in Ward no. 4. In this Paurashava it is found that about 0.26% structures (11) are used for Governmental institution. It can be noticed that these governmental offices are located in wards in 4, 5, 6, 7 and 8 only. Paurashavas education, health, recreation, commercial and automobile facilities are mainly located in the Ward nos. 04, 06 and 07.

Transport and Communication

The Paurashava has no formal bus terminal and tempo stand, but it has two bus stoppages. Land beside Rajshahi--Shibganj Road and roadsides are being used for parking.

Within the Paurashava there exits no rail way. The mighty river Padma River plays an important role as a water transport system in Paurashava with Rajshahi and other upazillas especially for carrying sand, soli and other goods.

3.5 Utility Services

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

Electricity

In Shibganj Paurashava there is electricity connection. The survey finding shows that there are 952 electric poles within the Paurashava area. In Shibganj Paurashava there is one electric substation located on ward 5. Map 3.11 shows the location of electric poles in Shibganj Paurashava. In ward no 6 there is the highest number of electric pole and in ward no 4 there is the lowest number of electric pole in Shibganj Paurashava. The people of the Paurashava complained that they face severe problem of load shedding.

Water Supply

In Shibganj Paurashava, there are mainly two ways of water supply facilities. These are tube-well and piped water supply. Water supply network is under construction so about 100% of the households are using hand tube wells and deep tube wells as main source of water supply for drinking and cooking purpose. 90% of the residents use pond water for washing and bathing purpose.

Telecommunication

As a Paurashava, telephone network exists in Shibganj Paurashava. According to survey, the Paurashava accommodates 22 telephone poles. Besides land phone the Paurashava is well served by the private own mobile operator companies.

Solid Waste Management

Solid waste collection and disposal in Shibganj Paurashava is the responsibility of Paurashava authority. The logistics for collection and disposal of solid wastes include 2 sweepers for collection and 1 garbage truck for transportation. There are 3 dustbins, but there is no dumping site in the

Paurashava. The collected waste is dumped into the wetland. CBO or NGO based collection system does not exist within the Paurashava area.

Gas Supply

The Paurashava has no gas supply facility at present.

Drains

It has been found that the entire drains of Shibganj Paurashava are Pucca. The field survey indicates that there is moderate amount of drainage in Shibganj Paurashava. In this Paurashava, there is 14.24 km drain and the no. of drain is 39.

3.6 Environmental Issues

Surface water of ponds, canals and rivers at is observed to be fresh and free from salinity. Water Development Board has taken a project to protect the Paurashava from river erosion by constructing embankment. With the development of a planned drainage system some environmental problem will be minimized.

Paurashava authority has taken initiative to reduce surface water pollution. At present, 50% inhabitants of the Paurashava use sanitary latrine.

From the overall survey findings, it has been revealed that the inhabitants of the Paurashava do not face any severe environmental problem. The problems that exist here can be mitigated through proper planning of the Paurashava.

The urban environment of Shibganj Paurashava includes both built and natural environment. Urbanization has some increased hazards on natural environment. Where the built environment overburdens the natural environment urban development cannot be sustainable. The urbanization is vital for country's economic growth. Urban centers concentrate services, infrastructure, labor, knowledge, entrepreneurship and markets. Cities and towns are key generators of economic activities. The urban economies are critically important in national economic growth and 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. The town of Shibganj is no different from other towns of Bangladesh, but as disasters are concerned it is highly vulnerable to at least one disaster, earthquake, due to its location in a particular seismic zone. Geological explorations and extractions make the area More vulnerable to any other town of the country. So care should be taken in construction of buildings in the town. Buildings are needed extra care to make them earthquake resistance to reduce loss of life and property. Special building codes are needed to prepare particularly for this region.

Some areas of the Paurashava are subject to water logging. Some part of ward 3, 4, 5, 6, and 7 area experience little drainage problem. Paurashava in not normally affected by flood from the adjacent rivers. But the Paurashava is almost regularly affected by the storm water during monsoon period due to the inability of the existing drainage system to cope up with the situation. The existing drains cannot discharge the huge volume of storm water efficiently to the defined out falls. Because of prevailing such situation, local flooding occurs in many places of the Paurashava.

3.7 Institutional Capacity

The implementation of the Master Plan will require strengthening of the capacity of the Paurashava Authority. Although the capacity building is going in different ways by the government, the institutional capacity building for implementing the Master Plan of the Paurashava has not yet been seriously considered. This will be an important task for the government to restructure the organogram and include the required technical staff with appropriate job description for addressing the issues of implementing the Master Plan.

Existing Manpower

According to Paurashava manual, there should have been 36 officials and staff engaged in a"A" class Paurashava to manage the engineering, administrative, health, family planning, and conservancy works within the Paurashava area. In the organogram, Mayor is the head of the institution. Chief Executive Officer coordinates the three major divisions. These divisions are Engineering (headed by Executive Engineer), Administrative (headed by Secretary), and Conservancy, Health and Family Planning (headed by Health Officer). In this organogram, both full time and contractual officials are included.

Existing manpower scenario of Shibganj Paurashava is not so good. There is acute shortage of manpower in each section of the Paurashava. The important posts lying vacant are the Posts, Assistant Engineer and the Town Planner. Though a standard 'A' class Paurashava comprises of 27 personnel in Engineering Department, but Shibganj Paurashava has to depend on 12 personnel in Engineering Department. Again in the administrative section the Paurashava has to depend on only 14 personnel for the administrative works.

Paurashava Town Planning and Implementation Capacity of Master Plan

At present, the Paurashava has no town planning section or any appropriate manpower, especially Town planner to prepare or implement town plan. The existing capacity of the Paurashava is seriously inadequate to implement the Paurashava Master Plan. The Paurashava must strengthen its capacity to implement its Master Plan, when it is completed by employing requisite manpower.

Conservancy and Health Services

Conservancy service of Shibganj Paurashava is also very poor. Paurashava has no fixed waste dumping land. The waste collection and dumping is operated in traditional way. Conservancy department of the Paurashava is not established yet. Staffs are recruited on contract basis to convey the work of conservancy service. There is no community based organization (CBO) for introducing house to house waste collection system in the Paurashava.

There is only one Upazila Health Complex exists in the Paurashava area but the service which is provided has failed to provide serve the quality service.

Logistic Support/Equipment

According to the Paurashava manual, an"A" class Paurashava should get logistic support/equipment to continue the work properly. This includes one jeep, one road roller (5-7 ton), two trucks/tractors, two motor cycles, three bicycles (according to the needs of the Paurashava), one mixture machine, one type writer machine, one photocopier machine and one duplicating machine. Paurashava got almost all of these logistic supports from the government, except the jeep and truck/tractor. Additionally, they have one Computer and printer for official support.

3.8 Urban Growth Area

The main concentration of development observed around the Bazar located in ward 4. Most of the administrative offices, Upazila Complex, Upazila Health Complex, Police Station, Post Office, District Dak Banglow are located in ward 6 (mouza). Locations of these administrative offices institutions and commercial center along the regional highway and C&B road have been leading to linear development of the town. Another concentrated development also observed around the Ward no 8. New development is taking place linearly along the Bypass Road.

The future growth potential of Shibganj Paurashava is moderate. Recent trend in population increase indicates that high population density will not be a big problem in this Paurashava. However, it is obvious, and more likely that the growth of this Paurashava will follow natural increase and a little migration in population.

Analyzing the existing structure of the Paurashava and other growth factors it is expected that the future growth direction will occur in Growth direction indicates that Chak Daulatpur, Chelabot Khani, located in the Eastern part of the project area having higher concentration of development pressure and the surroundings of the Bypass raod area of Shibganj Paurashava are highly dense. Several factors will lead such future growth direction.

In the middle part, along the main road the area have more urban characteristics with More urban facilities compared to boundary part of the Paurashava, Middle part is More developed and have More urban and civic facilities compared to other part. In the Middle part of the Paurashava there exists Upazila Headquarter; and other urban areas, which is much More developed that the existing Paurashava.

The main road which passes the Paurashava meets important urban areas like C& B raodand Bypass Road in middle part. West and north part of the Paurashava is not much likely to physical expansion.

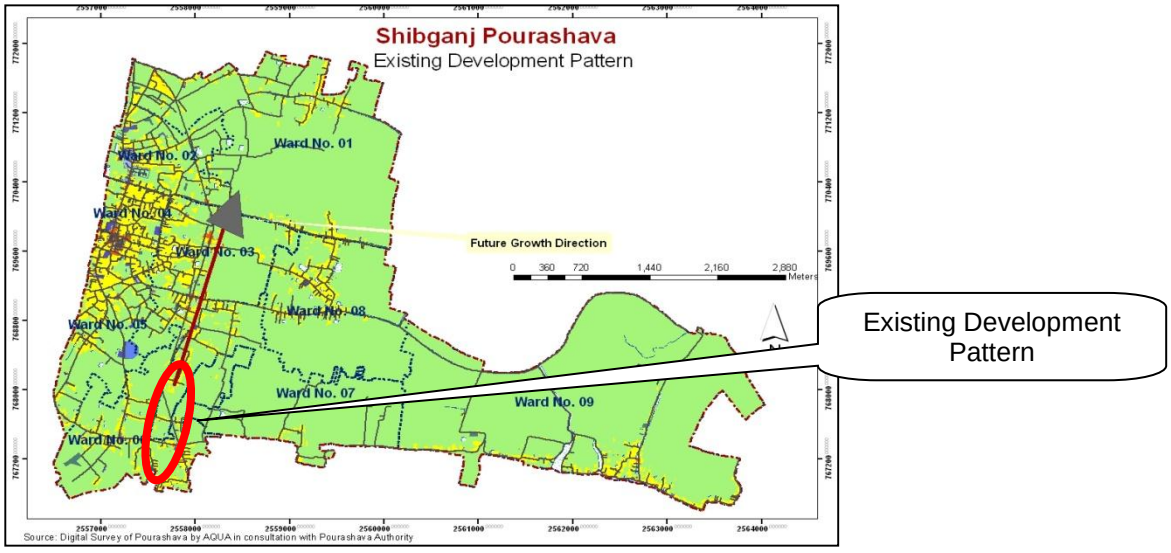


Fig 3-2: Future Growth Direction of Shibganj Paurashava

3.9 Catchments Area

It is widely recognized that there is a strong interdependence of social, economic and environmental development between rural and urban areas. The cities and towns play an

important role in rural development as markets for their goods and products, and also as the sites for food processing and other agricultural related activities, and as source of non-farm income, especially from wage labour. On the other hand, urban areas rely on rural areas for food production, labour, and raw materials for manufacturing and markets for their products. This linkage is stronger in samll town like the Paurashavas, primarily due to their proximity to the surrounding rural hinterland. People of the catchment areas can access public service offices and hospitals in the towns with less difficulty than offices in cities, while schools and other facilities serve a large number of the catchment area population, contributing significantly to rural development.

The favorable location has benefits in two ways: it allows people to come to to purchase goods and services, and it allows businesses, including wholesale businesses, to deliver goods and services to places outside the town. Shibganj is the Upazila Headquarters. The Upazila comprises 1 Paurashava namely Shibganj Paurashava and 15 Unions. It is one of the Upazila of Chapai Nawabganj district. As Upazila headquarters it has the administrative functions as well as those that go with its more established role related to its status as a Paurashava.

Transport and communication connectivity is an important factor for economic development of an area. Though is located about 30 km to the west of Chapai Nawabganj District headquarter and about 350 km to the north-west of Capital City of Dhaka., it has a good road communication network with Rajshahi and nearby Upazila towns.. The regional transportation network is shown in **Map 3-1**.

3.10 Land Use and Urban Services

The general land uses of the project area are shown in Table 10.1 in Chapter 10. In the land use pattern of the Paurashava, 17 types of land uses are found. It is clearly evident from the table that agricultural land use (almost 82.76%) dominates the Paurashava area, followed by residential (12.22%), water bodies (1.24%), road network and transport and communication (only 1.86%), and government services and educational land use occupy same percentage of land (0.45%). Paurashava has experienced major development along the river Baral which is a tributary of Padma.

Settlemets are found particularly in the areas of higher elevation following linear pattern along side the roads and More specifically around the central bazar. The trend of settlement growth is greater in areas close to the main road. The core part of the Paurashava is the most built up part of the planning area. Apart from core area, in most of the other areas, residential developments have taken place as dispersed settlements on high lands. Dispersed settlements make provision of services difficult.

3.11 Paurashava 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 Shibganj 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 Shibganj 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.

Map 3-1: Communication Network of Chapai Nawabganj Region showing Connectivity with Paurashava

3.12 Role of Agencies for Different Sectoral Activities

The successful implementation of Structure Plan depends upon the efficiency of the stakeholders and the degree of integration and coordination among them. Structure Plan of a town involves a complex affair having numerous stakeholders influencing the decision making process of development.

Care has been taken for all programmes and projects to be developed in a sound manner technically, socially, environmentally and institutionally with full participation of local communities. Due care has been taken so that there have no significant adverse internal or external environmental impacts. Sustainable urban development based on a continuous dialogue between the actors involved in urban development is needed to improve the urban environment. It is expected that after the completion and implementation of the Master Plan and as well as the mentioned projects and programmes of other organizations in Shibganj, this small town will develop with its full potential.

Development Schemes Implemented by the GOs

The recent infrastructure development schemes implemented by the Government includes roads, road lights etc.

Shibganj is an agriculture-based urban area and Upazila Agriculture Office has a significant influence on its agricultural sector. Central Government use subsidy for the betterment of the farmers. Local office distributes fertilizer to the poor farmers with 20 kg per head through the Paurashava. Some times, the agriculture office distributes 10 kg per head to balance between demand and allocation of fertilizer. Besides, agriculture office also arranges training workshops for the farmers on modern techniques of cultivation that increase production.

Upazila Fisheries and Livestock Office distribute fish fry and fertilizers for fish and vaccination of poultry and other livestock to the people free of cost. They also arrange training session to train the people. Upazila Parisad some times takes initiatives for afforestation and distribution of saplings.

Upazila Health Complex only implements a few activities like vaccination, training on child and mother health etc.

Electrification of is operated by Polli Biddutayan Board (Rural Electrification Board- REB) that has a Master Plan to avail 100% electrify in the whole Upazila including the Paurashava area. The Master Plan explains the basis of electrification to the residents and the commercial establishments on a priority.

DPHE recently conducted a survey in 14 villages among the 22 villages to know the arsenic contamination level of Shibganj. It covers Paurashava and its surrounding areas. Main responsibility of DPHE within the Paurashava is to design water supply network, implement and maintain the network. The authority has prepared water supply network for Shibganj Paurashava, but failed to implement it.

Local Government and Engineering Department (LGED) has upcoming project of construction of road, culverts and box culverts within the Paurashava.

Development Schemes Implemented by the NGOs

There is no mentionable infrastructure development project undertaken by the NGO's in the Paurashava. Several NGOs are working in Shibganj to develop socio-economic condition and to alleviate poverty of the local people providing infrastructure service and other facilities. Operationally important NGOs are Asroy, Human Right Organization, Bangladesh Warrior's Sanshad, BRAC and Social Work Centre.

Development Schemes Implemented by Private Sector

There are a few development works that have been implemented by private sector. Some commercial activities and private schools have been developed by private initiative.

Chapter 4: Critical Issues for Planning

Deficiency in infrastructure and services is one of the major critical problems of the Paurashavas in Bangladesh, and 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 Shibganj Paurashava.

4.1 Socio-Economic and Demographic Issues

Most of the Paurashavas in Bangladesh are basically urban centers 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. SinceShibganj 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 Shibganj Paurashava is not yet planned and developed to serve a town. 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 cannot 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 Israil more intersection. 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 Shibganj 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

Shibganj has no formal bus and truck terminals and designated parking space for tempos and slow moving vehicles, such as rickshaws, van or cart. It has few bus stoppages along the main road. 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 Shibganj 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 Shibganj 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 Shibganj 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 Shibganj Paurashava is very poor. There are only 12 dustbins. One truck and two push carts 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 Related Other Issues

Paurashava is located under Chapai Nawabganj District. The Shibganj Paurashava is important in the national context for some reasons. It is well connected by road with all over the country via Rajshahi Divisional headquarter. The Padma, is of hydrographical importance of the area. Many agricultural Products produced in this area are exported throughout the country. As the Paurashava is located adjacent to the Indian Border so it has a great importance in case of Internationl business.

4.6 Disaster Issues

As Shibganj is located along the tectonic plate boundary, the Paurashava is moderately vulnerable to earthquake. Mitigation measures following building designs and construction rules are to be suggested in the Plan of the Paurashava town. In the flood of 2004, most of the households were affected by flood at Shibganj Paurashava. About 78.26 percent of these affected households lost crops. In the planning and designing of the drainage system, the aspect of flooding has to be considered seriously.

4.7 Land Use Control

A Land Use Plan of the town was prepared in 1988 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 UDD, but remained under the administrative control of the Ministry of LGRD & C. 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 cannot be imagined. The preparation of Master Plan is mandatory as per Local Government (Paurashava) Act 2009.

4.8 Laws and Regulations

Absence of adequate planning and development control is a problem in all urban areas of Bangladesh and is no exception. A number of legislative measures are there to help the administration of urban area, urban development and management. But all of these planning laws cannot be readily enforced and many of them are not adequate in regulating planned development. Due to lack of proper implementation and enforcement, many important laws are mostly not applied by the urban local governments. As a result, weakness in the implementation of planned development in the Paurashava remains to be a critical problem and has to be addressed.

A substantial portion of national resource is invested in building construction in both public and private sectors. In order to ensure optimum return of this investment and to achieve satisfactory performance of the buildings in terms of safety, serviceability, health, sanitation and general welfare of the people, building construction needs to be controlled and regulated. Legislative measure for such control has been provided in the East Bengal Building Construction Act, 1952 and from time to time, regulations have been promulgated by the government under the Section 18 of this Act. As per law, it is mandatory to get any structure approved from appropriate authority before construction. Permission for building construction in the Paurashava is administered by this authority within its jurisdiction. However, as elsewhere in the country, noncompliance to these rules is also observed here.

a. Weak Local Government

Though Paurashava is a democratically elected urban local government, its authority is limited to work as a local government. In most cases, prior government permission is required before taking any legal action against unscrupulous acts. Section- 66, Section-69 (1) and (2), Section- 72 (4), Section-32 (2) of the Local Government (Paurashava) Act, 2009 are few examples. This is one of the reasons that there has been a little progress in decentralization of governance at local level in Bangladesh.

b. Lack of Fund

Local bodies in this country are in constant shortage of funds as is the case in . The sources of the Paurashavas income are generally taxes, rates, fees and charges levied by it, and rents and profits accruing from individuals and institutions. The government grants, profits from investments, receipts accruing from the trusts placed with it, loans raised by it and proceeds from other services are the other sources of income for the Paurashava.

The lack of efficient manpower, poor assessment system, and weak legal enforcement for practicing an efficient revenue generation and collection system are the main reasons for the current weakness in the financial management. It is widely accepted that there are also corrupt practices in our public institutions in delivering services, which require to be addressed through institutional and legal reforms.

c. Public Participation in Plan Making Process

The planning and development Acts of earlier times had contained a little scope for the authorities concerned to seek public opinion on their city/town plans prepared before they are sent to the government for final approval. Not having any scope for public participation is against the democratic norms of an elected urban local government like the Paurashava Authority. The authority must involve people by law in the planning and development process, and hear their views, needs and grievances to mitigate problems. This vital aspect should be incorporated in a stronger manner in the law through revision.

d. Coordination of Activities of Public Sector Development Agencies

There are a large number of public sector development agencies working in the town and surrounding areas, but there is lack of coordination among activities of these development agencies. Absence of coordination results wastage of resources and often brings misery to the people. This is commonly evident in our urban development works, for example, as one agency digs the streets for telecommunication network and repairs the streets, another agency starts

digging for sewerage ducts. Effective coordination by law in this case is necessary for an integrated approach in development saving time and resources. There should be legal provisions for such coordination by the Paurashava Authority to ensure accountability of the agencies working for their respective jobs in the Paurashava area.

e. New Rules for Practicing Planning Standards

At present, there is no standard for infrastructure, services and facilities provided by the public sector. There is need to formulate standard rules for services and facilities and get incorporated in the Local Government (Paurashava) Act, 2009 to secure public interests. A standard has been set in the UTIDP for future land use proposals in the Master Plan of the Paurashava.

f. Betterment fee

Due to failure of execution of the powers of charging betterment fee, all the benefits of land value enhancement due to Paurashava development of infrastructure go to the adjacent landowners or the persons having interest therein. A proper execution of betterment fees will help increase in revenue earning of the Paurashava.

g. Penalty for Violation of Plan Provisions

The penalty for violation of plan provisions provided in the Ordinance (Section 49) is only Tk. 5000/- and for delay Tk.50/day, if violation continues further after notification. This is an extremely low rate of penalty, which should be revised for a substantial increase to prevent any violation effectively. The penalty provision should be more stringent to ensure enforcement of plan provisions.

4.9 Existing Problems and Weaknesses in the Development

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

a) 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.

b) 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 vibrant urban center, 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: Reviews 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 t0o 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 upgradation 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. Until such qualified 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.

Paurashava has no Town Planner and 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 river 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.
- cater 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 one percent 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 large areas of agricultural lands are unnecessarily being included within Paurashava. Sometimes, it is about 70% 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 a forestation 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 a forestation 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/river 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 percent 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 BNBC 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 (BC) rules to ensure healthy and environment friendly building development. The last BC Rules were prepared in 1996. However, due to special characteristics of building development in Dhaka city a separate set of BC Rules 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.

Restriction on Cutting of Hills (Section 3C)

The Act forbids cutting of any hill without prior permission of appropriate authority.

Removal of Unauthorized Building (Section 7)

The Act empowers the authority to remove any building that has been built violating the BC rules. 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 Zakiganj Paurashava in particular. The Local Government (Paurashava) Act, 2009 the Building Construction Act 1952, the BNBC, the Playfield, Open space, Park and Natural water reservoir Playfield, Open space, Park and Natural water reservoir 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/Ordinance, Policies, 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.

Act/Ordinance, Policies, Rules	Relevance with Paurashava Master Plan
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 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.

Act/Ordinance, Policies, Rules	Relevance with Paurashava Master Plan
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 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; 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 percent 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 Goverment 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 BNBC 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

Act/Ordinance, Policies, Rules	Relevance with Paurashava Master Plan
	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

The future growth projection is helpful to draw mechanisms for improving and guiding long-term development strategies, identifying existing problems and future demand and making possible suggestions, to formulate viable projects for urban development and increase management capabilities of the concerned authority.

6.1 Projection of Population

It is a difficult task to collect detailed information of population for a recently declared Paurashava in Bangladesh. Perhaps no single factor is more important for planning than the size and composition of a region's population and the way it changes in the future. Estimation of future population for a specific period of a particular area is one of the most difficult tasks in the planning process. For Bangladesh, population projection is a very difficult task as the required data are not available for the particular area of a Paurashava and same is the case for Shibganj.

The population figures collected from secondary sources, especially for the Paurashava were very much ambiguous. So for the final projection, several discussions were made with experts and BBS officials. Following the annual growth rate for the study area available from the 2001 Population Census, the projection up to the year 2031 with five years interval has been made.

The data found from several sources is arranged in different formats according to their requirement and analysis. So, comparison of data between different sources is very difficult. As a result, projection with various sources of information on population shows variable results in the calculation. Migration information is not available in population census by BBS as it only considers the natural growth rate. But actual population projection requires both natural growth rate and migration rate. For this unavailability of migration rate, population projection becomes very difficult.

By the formula population in any requisite year can be projected using the following equation which is also known as Geometric Progression Method of the following formula.

Pn = Po (1+R/100) 10----------(i)

As projections are based on the assumption that the past trends will continue to operate in the future, population of current year (according to BBS, 2011) have been taken to estimate the future population. The existing population of Shibganj Paurashava is 42693 in 2011 within an area of 5024.48 acres. According to 2011 Population Census, the population was 35736. With an annual growth rate of 1.79%, the forecasted population of Shibganj Paurashava will be-

Pn = Po (1+R/100) n
Pn = 42693 (1+1.79/100) 20
Pn = 60878

The existing population of Shibganj Paurashava is 42693 in 2011 within an area of 5024.48acres. According to 2001 Population Census, the population was 35736. With an annual growth rate of 1.79%, the forecasted population of Shibganj Paurashava will be 60878 in the year 2031. The gross density of the area will be 12 ppa (person per acre). Due to the maximum concentration of residence in Ward no. 04, the density of population will also be higher (57 ppa) in this area. **Table 6-1** shows ward wise population distribution of Shibganj Paurashava based on growth rate 1.79%.

Table 6-1:Population Projection with Density for Shibganj Paurashava Up to 2031

Ward	Area (Acre)	Pop'01	PPA	Pop'11	PPA	Pop'16	PPA	Pop'21	PPA	Pop'26	PPA	Pop'31	PPA
1	944.49	3502	4	4031	4	4405	5	4814	5	5260	6	5748	6
2	258.95	3744	14	4510	17	4928	19	5386	21	5885	23	6431	25
3	326.28	4853	15	5569	17	6086	19	6650	20	7267	22	7941	24
4	103.44	3211	31	4130	40	4513	44	4932	48	5389	52	5889	57
5	337.98	5344	16	6417	19	7012	21	7663	23	8374	25	9150	27
6	454.75	4086	9	4886	11	5339	12	5835	13	6376	14	6967	15
7	682.55	3633	5	4480	7	4896	7	5350	8	5846	9	6388	9
8	523.28	3563	7	4051	8	4427	8	4837	9	5286	10	5776	11
9	1392.17	3800	3	4619	3	5047	4	5516	4	6027	4	6586	5
Total	5023.89	35736	7	42693	8	46653	9	50981	10	55710	11	60878	12

Source: BBS, 2001. Estimation by the Consultant
Note: Annual Medium Growth rate for Population projection has been considered as 1.79%.

Table 6-2 shows the ward wise population growth of Shibganj Paurashava up to 2031 at a High population growth rate consider as 2.29%.

Table 6-2: Population Projection with Density for Shibganj Paurashava Up to 2031

Ward	Area (Acre)	Pop'01	PPA	Pop'11	PPA	Pop'16	PPA	Pop'21	PPA	Pop'26	PPA	Pop'31	PPA
1	944.49	3502	6	4031	4	4514	5	5055	5	5661	6	6340	7
2	258.95	3744	3	4510	17	5051	20	5656	22	6334	24	7093	27
3	326.28	4853	19	5569	17	6237	19	6984	21	7821	24	8759	27
4	103.44	3211	14	4130	40	4625	45	5179	50	5800	56	6496	63
5	337.98	5344	8	6417	19	7186	21	8048	24	9012	27	10092	30
6	454.75	4086	16	4886	11	5472	12	6128	13	6862	15	7685	17
7	682.55	3633	5	4480	7	5017	7	5618	8	6292	9	7046	10
8	523.28	3563	7	4051	8	4537	9	5080	10	5689	11	6371	12
9	1392.17	3800	4	4619	3	5173	4	5793	4	6487	5	7265	5
Total	5023.89	35736	6	42693	8	47810	10	53541	11	59959	12	67146	13

Source: BBS, 2001. Estimation by the Consultant
Note: High Growth rate for Population projection has been considered as 2.29%.

Table 6-3 shows the ward wise population growth of Shibganj Paurashava up to 2031 at a low annual population growth rate consider as 1.29%.

Table 6-3: Population Projection with Density for Shibganj Paurashava Up to 2031

Ward	Area (Acre)	Pop'01	PPA	Pop'11	PPA	Pop'16	PPA	Pop'21	PPA	Pop'26	PPA	Pop'31	PPA
1	944.49	3502	6	4031	7	4298	5	4582	5	4886	5	5209	6
2	258.95	3744	3	4510	3	4808	19	5127	20	5466	21	5828	23
3	326.28	4853	19	5569	21	5938	18	6331	19	6750	21	7196	22
4	103.44	3211	14	4130	17	4403	43	4695	45	5006	48	5337	52
5	337.98	5344	8	6417	9	6842	20	7295	22	7777	23	8292	25
6	454.75	4086	16	4886	17	5209	11	5554	12	5922	13	6314	14
7	682.55	3633	5	4480	5	4777	7	5093	7	5430	8	5789	8
8	523.28	3563	7	4051	8	4319	8	4605	9	4910	9	5235	10
9	1392.17	3800	4	4619	4	4925	4	5251	4	5598	4	5969	4
Total	5023.89	35736	6	42693	7	45519	9	48531	10	51743	10	55168	11

Source: BBS, 2001. Estimation by the Consultant
Note: Low Growth rate for Population projection has been considered as 1.29%.

With an annual growth rate of 2.29% (assuming higher growth rate), the forecasted population of Shibganj Paurashava will be 67146 in the year 2031. The gross density of the area will be 13 ppa (person per acre). Due to the maximum concentration of residence in Ward no. 04, the density of population will also be higher (63 ppa) in this zone.

Again, with low growth rate of 1.29%, the forecasted population of Shibganj Paurashava will be 55168 in the year 2031. The gross density of the area will be 11 ppa (person per acre). Due to the maximum concentration of residence in Ward no. 04, the density of population will also be higher (52ppa) in this zone.

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 centers. 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 small 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 centers 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.

Table 6-4 shows the work force of Paurashava. From the BBS- 2011, it is revealed that the among the economically active age group of population, 3220 male people are engaged in agricultural activities, while 447 male are engaged in services activities and only 409male are engaged in industrial activities. The major occupations found are farming, services, business and trading, services in government, non-government and private organizations, day-laboring in agriculture. From the Household Survey it is revealed that the Agricultural (farming) activities are the dominant occupation class in the town. The percentage of the people engaged in this occupation is in a major portion. The next highest occupation class found is the small business and private service. Most of the households' earning members often adopt a secondary occupation which indicates that under-employment is very much prevalent in the project area.

In the project area, most of the economically active population whose age is 10 years and above are involving in agriculture (farming), small business and transport sector.

Table 6-4: Existing Working Force for Shibganj Paurashava

Total	Not Working	Looking for Work	House hold Work	Agriculture	Industry	Water, Electric & Gas	Construction	Transport	Hotels & Restaurant	Business	Service	Others
26707	8569	605	8729	3220	409	12	631	444	43	2029	447	1569
%	32.09	2.27	32.68	12.06	1.53	0.04	2.36	1.66	0.16	7.60	1.67	5.87
Total	67.03			32.97								

Source: Community Series (Zila: Chapai Nawabganj), Bangladesh Population Census-2011

However, it is extremely difficult to make any precise projection about future economy of this small urban center. 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.

Thoug agriculture is an important source of income mainly in Chapai Nawabganj region, services play an significant role in this area. Remittance is the main source of income of 50percent of the household of Paurashava (BBS, 2011 and household survey). They mainly invested on land, which is considered the safest investment, as the land value never falls. Without investment in basic industries, it is unlikely that the local economy will experience a major boost in the near future. Both government and private initiatives will bring prospective up gradation of the economy through proper policy for utilization of the remitted money inflow. It is the high time to create some special incentive packages for their investment make a rewarding role in the economy of the country.

6.3 Projection of Land use

Projected land use is a critical component to a comprehensive plan. The forecast determines the amount of land needed to accommodate future growth, and includes the land required for residential, commercial and industrial uses. In some instances, a community may have enough vacant lands within its boundary to accommodate its forecasted population increases and land use demands. In other instances, there may be a need to consider land outside a community's boundaries to accommodate this increase. According to land use projection it is reveals that there is no land required for residential purpose in the year 2031. Including existing commercial activities, the total commercial land in 2031 has been fixed at 25.05 acres. Again need of educational land for projected population will be 88.27acres and 16.70acres of land for community facilities. A huge land (130.89acres) will require for open space and recreational facilities covering play field, park, neighborhood, park and stadium. The projection and demand on land requirements as per the planning standard approved by the PMO office of UTIDP project are discussed details in Chapter-10 and Section 10.1.2.

Chapter 7: Landuse Zoning Policies and Development Strategies

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

7.1 Zone of Structure Plan Area

To guide long term growth within the Structure Plan Area by means of demarcation of the future growth areas and indication of potential locations of major development zones are broadly classified into seven categories. Table 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** and Appendix-1 shows the structure plan of Paurashava.

Table 7-1: Structure Plan Policy Zoning

Zoning	Description of the Zone	Area (acre)	%
Core Area	This area is also known as built-up area. This is defined as the area which has the highest concentration of services; it also has the highest population concentration and density. It will absorb most population growth during the Land use Plan (2011-2031) period.	350.70	6.97
Fringe Area	This zone is developing areas which will take further decades to reach the population densities of the urban core area. Low initial densities in these areas do not justify supply of a full range of services as they will initially be underused. However, it is essential that planning and reservation of rights of way, at least for primary networks, be undertaken soon to enable provision when justified by increased density levels and allowed by resources.	321.14	6.39
Peripheral Area	This is the zone where a slow trend of urbanization is continuing in unplanned manner. The area identified in the Structure Plan as the likely choice for new urban development beyond the core area. Ideally, it might be reasonable to provide primary infrastructure networks in this area to foster development and encouraged to enable a more rapid urbanization in a planned way.	862.25	17.15
New Urban Area	This zone will be the required additional area for future planned urban development as per population projection. New facilities and services like road, drains, footpath, waste transfer station and other civic services will be provided. This area is proposed to grow within 2031.	325.98	6.48
Agriculture	Agricultural land (also agricultural area) denotes the land suitable for agricultural production, both crops and livestock. It is one of the main resources in agriculture. The land under annual crops, such as cereals, other technical crops, potatoes, vegetables, and melons; also includes land left temporarily fallow; land under permanent crops (e.g., fruit plantations);	2771.93	55.17
Water body	Water body containing an area equals to or more than 0.25 acres excluding those of khal, irrigation canal and river will be treated as this category.	43.94	0.87
Major Circulation	Major circulation contains major road network and railways linkage with regional and national settings.	347.93	6.92
Total		**5024.48**	**100.00**

Map 7-1: Structure Plan Zone of Paurashava

7.1.1 Core Area

Total 350.70 acres of land, which covers 6.97% of Structure Plan area, is declared as Core Area (**Map 7-1** and **Fig 7-1**). It is located with in Ward nos.2, 3, 4, and 5. It includes the highest concentration of services area for an example, schools, post office, police box, Bazar area etc. and it has the highest potentiality of development. Because the town developed based on the Bazar, which is located at the centre of the Paurashava, there are differences in levels of provision, particularly between the formally developed and planned areas and the majority of unplanned areas. Levels of provision should be maintained in the planned areas. Since these areas are forecasted to show density increase and increased demand and therefore will require regular upgrading. The main thrust to improve services should be in the unplanned zones, particularly where the deficiencies already are great and quality of life will sharply decline when the services also have to cater for the additional population. Mentioned that, core area is identified into two separate locations in this municipality.

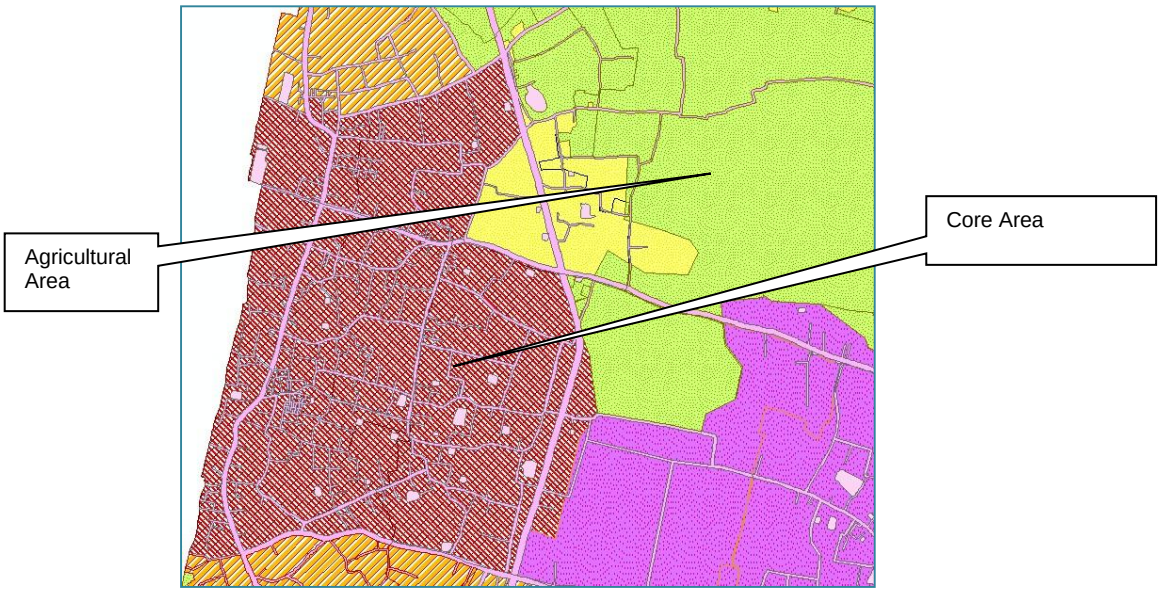


Figure 7-1: Total Core Area of Paurashava

7.1.2 Fringe Area

A total of 321.14 acres of land covering only 6.39% of Structure Plan area is declared as Fringe Area (**Map 7-1** and **Fig 7-2**). Maximum fringe are of proposed structure plan is located south east corner of Core area. It covers large portion area of Ward nos. 2, 5, and 7. This area mainly proposed, where a slow trend of urbanization is continuing in unplanned manner. The area is identified in the Structure Plan as the likely choice for new urban development beyond the core area. Ideally, it might be reasonable to provide primary infrastructure networks in this area to foster development encouraging a more rapid urbanization in a planned way.

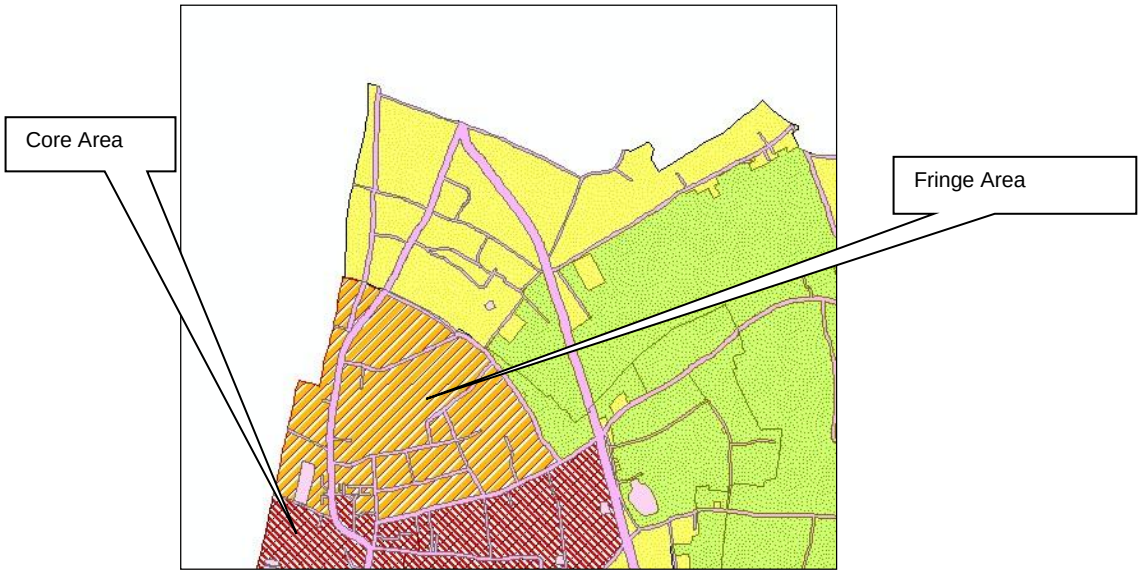


Figure 7-2: Proposed Fringe Area beside Core Area

7.1.3 Peripheral Area

A total of 862.25 acres of area, which covers 17.15 % of Structure Plan area, is declared as Urban Peripheral Area (**Map 7-1** and **Fig 7-3**). Maximum peripheral area is in Ward nos. 1, 6, 7 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.

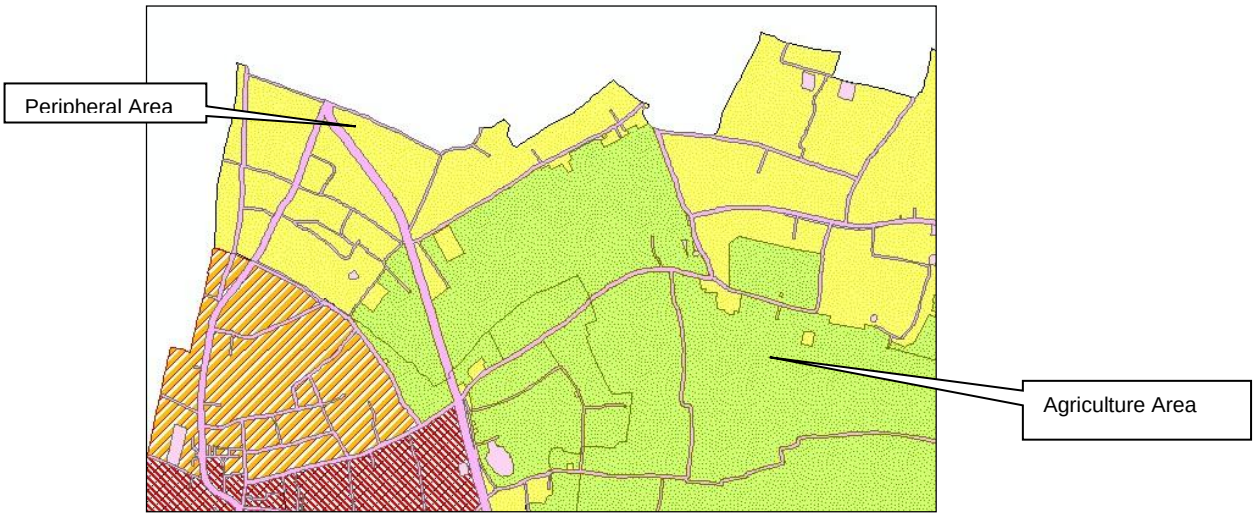


Figure 7-3: Proposed Peripheral Area in South East Corner of Paurashava

7.1.4 New Urban Area

Total 326.98 acres of land covering 6.48 % of Structure Plan area is declared as New Urban Area (**Map 7-1** and **Fig 7-4**). New urban area mainly located within Ward nos. 3 and 8. All these wards has partially involved with new urban area. It is assumed that town will be developed based on established as trade center which is mostly depends on successfully custom ghat and establish trading relation with others. So most of the new urban lands in Ward nos. 3 and 8 will be use to meet the extra pressure of development trend for this for this reason.

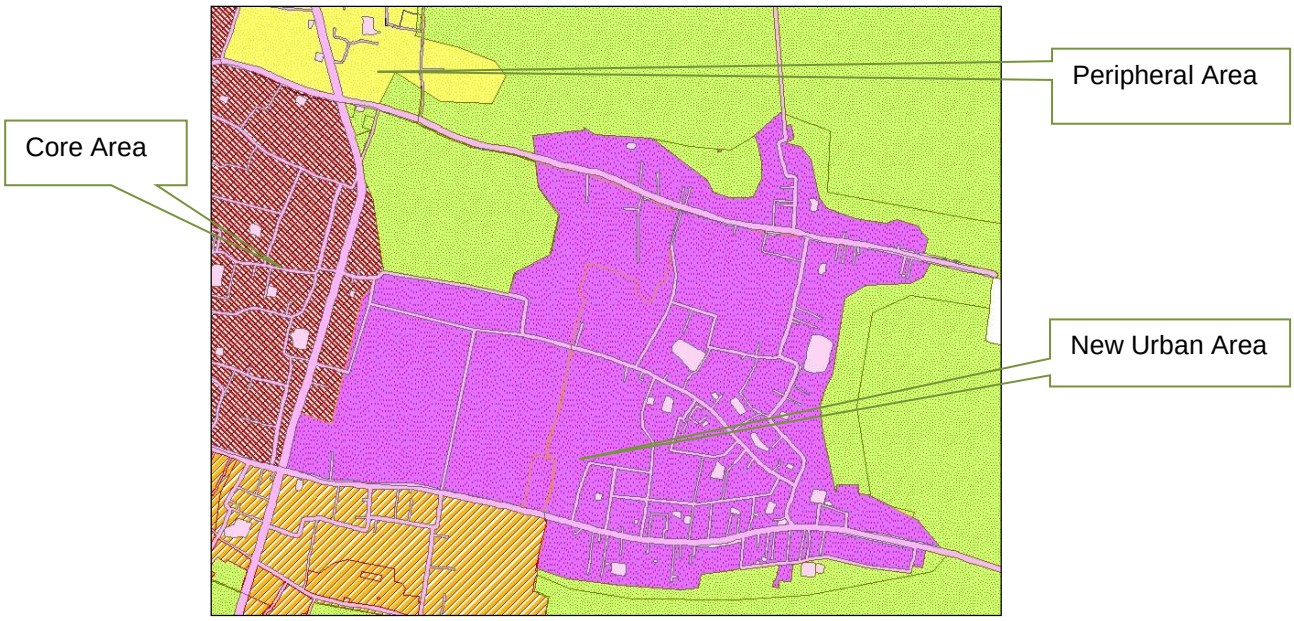


Figure 7-4: New Urban Area beside Paurashava Office, and Core Area

7.1.5 Agriculture

Total 2771.93 acres of land covering 55.17 % of Structure Plan area is declared as Agriculture Area (**Map 7-1** and **Fig 7-5**). Agriculture Area is quite spread all over the Paurashava.

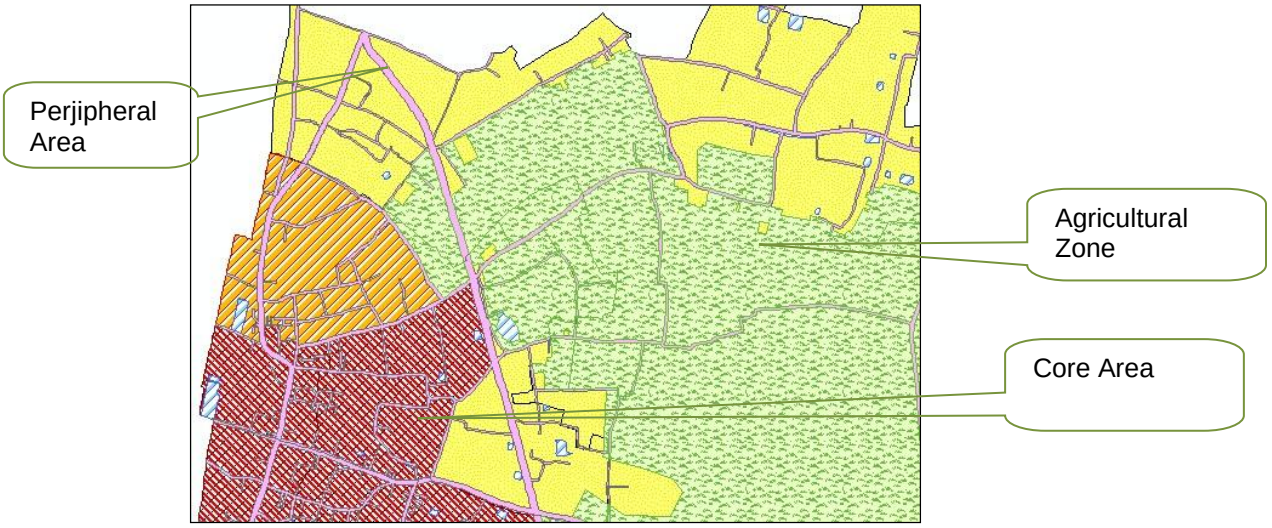


Figure 7-5: Agriculture Land spread all over of the Paurashava

7.1.6 Water body/Retention Area

Total 43.94 acres area, which covers 0.88 % of Structure Plan area, is declared as water body (**Map 7-1**). It includes pond, ditch and all the canals and river within the Paurashava. More detail information is provided in drainage and environmental plan.

7.1.7 Major Circulation Network

It contains major road network with Chapai Nawabganj and other neighbor urban center and also included the major road way network required for maintaining existing internal communication. Total 347.93 acres land which cover 6.92% of total structure plan area. **Map 7-1** shows major circulation network.

7.2 Strategies for optimum use of Urban Land Resources

7.2.1 Optimum use of Urban Land Resources

With a limited land mass, Bangladesh is the most densely populated country in the world. The land area of the country remains static amid continuously increasing population. Such a situation calls for strict regulation to utilize its scarce land resources for non-agricultural purposes. Increase in urban population means more demand for houses, roads, schools, hospitals, factories, bazars, shops, business centres, offices, other service facilities etc. Providing all these facilities require land and that is at the cost of valuable agricultural land, as the country has hardly any fallow land to accommodate all these land uses. Paurashava is surrounded by valuable fertile agricultural land. Any urban expansion will cost net deduction of agricultural land that will consequently affect local food and cash crop production. Practice of thriftiness on land utilization is, therefore, essentially needed in plans and development proposals. Such practice should start through adoption of conservative and rational standards of space use and their proper application in planning, designing and development. Table 7-2 shows the optimum use of urban land resources.

Table 7-2: Policy for optimum use of urban land resources

Policy	Justification	Means of Implementation	Implementing Agency
Policy UA/1: Optimization of Available Land Resources Growth within the established urban area is not compact in . 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.	- Paurashava; -Ministry of Land

Policy	Justification	Means of Implementation	Implementing Agency
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 particular development proposals.	- Paurashava -Ministry of Land -DC, Chapai Nawabganj

7.2.2 Plans for New Area Development

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

Table 7-3: Policy for new area development

Policy	Justification	Means of Implementation	Implementing Agency
POLICY UA/3: INITIATIVES 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.	- Paurashava - DPHE - Private sector

7.2.3 Areas for Conservation and Protection

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

Table 7-4: Area for conservation and protection

Type of Land	Means of Implementation	Implementing Agency
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.	- Paurashava - DOE

Type of Land	Means of Implementation	Implementing Agency
Low Land, Pond and Drainage Path: A total of 180 ponds with an area equal to or more than 0.25 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 Wetland Playfield, Open space, Park and Natural water reservoir 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.	- Paurashava - Water Development Board
Green Belt: The Bank of the Padma river is declared as green belt. This area will be used for aforestation and recreational purposes for conservation of environment and creation of opportunity for tourism development in this town.	This area is declared as green belt in the Master Plan.	- Paurashava

7.3 Policies for Development

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

7.3.1 Policies for Socio-economic Sector

Population

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

Strategy

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

Table 7-5: Policy for Population Sector

Policy	Executing Agency
Popu/1: Declaring population as one of the most critical sectors of national development	-Ministry of Planning -Ministry of Health and Family Planning
Justification: Per capita national growth is being eaten up by constantly growing population. By controlling population, national benefits earned from economic growth can be shared in a better way, raising the level of living standard of the people.	

Policy	Executing Agency
Popu/2: Putting more efforts and resources in raising the level of education.	-Ministry of Education -Ministry of Planning -Ministry of Health and Family Planning
Justification: Education would not only create awareness among the masses about the benefits of small family size, it will also help secure better job with higher pay that would reduce poverty.	
Popu/3: Creation of well paid and well trained grassroots 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 better way. To get good services theymust be efficient and well paid.	

Economic Development and Employment Generation

Economic development of any place is associated with generation of employment. The generation of employment depends on the rate of investment in various sectors of an economy. An urban economy of any town starts building up with investment in the basic sector that leads to the building up of the non-basic sector. Investment in basic sector is not very bright in as it is a very small town with a very small size of population. However, the Paurashava must ensure that any foreseeable opportunity in economic development is given due attention for its own growth and economic benefits.

Strategy:

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

Table 7-6: Policy for Economic Development and Employment Generation

Policy	Executing Agency
Econ/1: Provision of bank loans on easy terms to attract prospective investors in the SME	-Ministry of Industries -Ministry of Commerce
Justification: Easy loans would encourage and attract prospective investors for investment in small scale industries.	
Popu/2: Taking of 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 diverted to productive sectors to help create more employment.	
Popu/3: Arranging entrepreneurship training programmes for prospective investors.	-Ministry of Industries -Ministry of Commerce

Policy	Executing Agency
Justification: There are many potential investors who are ignorant of the ways and means of investment and operation of an enterprise. The training can help them get educated in these lines.	

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 at the moment is highly lacking.

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

Strategy:

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

Table 7-7: Housing and Slum Improvement

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

Social Amenities and Community Facilities

Social amenities and community facilities include, education facilities, health facilities, open space recreation facilities like, park and playground, amusement park and community centre. For comfortable and healthy urban living, these facilities are the fundamentals. Since these are social services, they must be provided by the public sector agencies as public good. For education and health facilities, the national governments have policies and there are separate ministries and their agencies to execute the policies through programmes and projects. There are also Upazila level offices of the concerned agencies to take care of the execution of national education and health

policies and programmes. For providing amenities like, park and playground and community centre, the responsibility lies with the Paurashava.

For park and playground, the Paurashava may secure local khas land. The open space recreation is difficult to provide as population expands and land price goes higher. Once time is lost, vacant lands are also lost. Amid soaring land price and absence of vacant land, it becomes extremely difficult to provide open space recreation. So, it is better to secure vacant lands for open space before density of population increases and land becomes scarce and pricier. For community center, intensive use of land should be made by making multiple use of the same space, for example, providing community center, ward councilor's office, clinic or any other use in the same building.

Strategy:

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

Table 7-8: Social Amenities and Community Facilities

Policy	Executing Agency
Policy-Amenity/1: Procurement of khas and other public land for park, playfield, community centre.	-Ministry of Land -DC Office, Chapai Nawabganj - Ministry of LGRD & C - Paurashava
Justification: Since above facilities are non-revenue earning, they should be procured at least cost.	
Policy-Amenity/2: Land should be procured for open space facilities as quickly as possible, because when land value will be higher, cost of providing the facilities will also be very higher. Besides, with the growth of population, vacant land will disappear gradually, so no land will be available at strategic locations for providing open space facilities.	-Ministry of Land -DC Office, Chapai Nawabganj - Ministry of LGRD & C - Paurashava

7.3.2 Physical Infrastructure Sector

Transport

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

Strategy:

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

Table 7-9: Policy for Transport Sector

Policy	Executing Agency
Policy-Transport/1: Development of efficient inter-city road network with standard road.	- Roads & 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 centers.	- Bangladesh Road Transport Authority (BRTA) - Chapai Nawabganj District
Justification: Not only that communication is needed between urban centers, but to attract investment, emphasis must be laid on quality of roads built.	
Policy-Transport/3: Development of local road network through participatory approach.	- 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	

Utility Services

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

Strategy:

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

Table 7-10: Policy for Utility Services

Policy	Executing Agency
Policy-Utility/1: Exploration of alternative sources of water to ensure sustainable supply.	- LGED - Paurashava
Justification: 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: Involvement of beneficiaries in solid waste management.	- Paurashava - NGOs and CBOs
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.	- Paurashava - NGOs and CBOs
Justification: Re-use and recycling of waste materials will produce resources and reduce cost of waste management.	

Policy	Executing Agency
Policy-Utility/4: Publicity on the benefits of hygienic sanitation to motivate people and enable people to have easy access to sanitary materials.	- LGED - Paurashava - NGOs and CBOs
Justification: Motivation will encourage people to adopt healthy sanitation and reduce health	
Policy-Utility/5: Protection of natural drainage system and preparation of hierarchical drainage network.	- LGED - Paurashava
Justification: Natural drainage systems are being grabbed and filled up, which increases the risk of water logging. Well planned hierarchical drainage network helps smooth drainage of storm and waste water.	

7.3.3 Environmental Issues

From environmental point of view 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, 227 number of ponds and natural drainage canals can be mentioned. Out of the total ponds 180 with an area equal to or more than 0.25 acres and the natural khals need to be protected and conserved to ensure sustainability in drainage and water supply of the Paurashava.

Strategy:

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

Table 7-11: Policy for Natural Resources

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

Chapter 8: Implementation Issues

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

8.1 Institutional Capacity Building of the Paurashava

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

- All urban local governments including Upazila level Paurashavas must be given More independence and autonomy to perform their responsibilities. At the same time, their accountability to the government and people regarding their performance has to be ensured. For this purpose the legal framework of the urban local governments has to be reviewed and updated. The legal provisions have to be consolidated and simplified and make them compatible to changing circumstances. Opportunities must be created in the Act allowing scope for privatization of service providing activities.
- To avoid duplication of development functions, there should be clear line of separation between central government and the urban local government.
- 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 Paurashava for implementation. Paurashava will not only be the custodian of the plan, it will also directly implement much of the development projects. Besides, it will also be responsible for monitoring and implementation of the development projects by other urban development and service giving agencies. This situation calls for strengthening of the existing capability of Paurashava.

8.1.1 Staffing and Training

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

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

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 Town Planning Capacity

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:

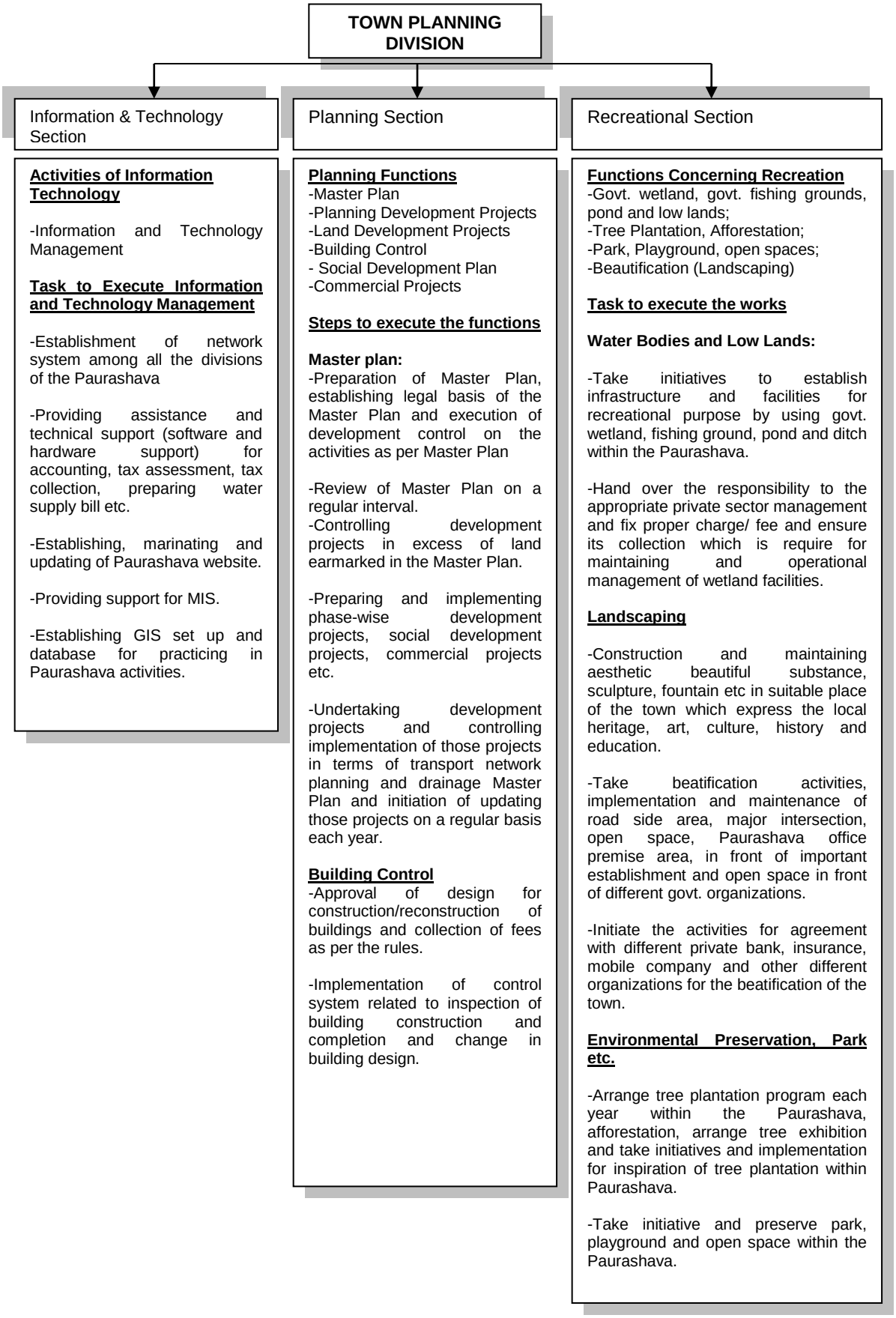


Figure 8-1: Scope of Work for Planning Division

8.1.3.2 Lack of Paurashava Town Planning Capacity

At present, the Paurashava has no town planning section or any appropriate manpower to prepare and implement the Master Plan. For proper implementation of the Master Plan for each Paurashava under UTIDP, establishment of a separate planning unit is indispensable. The Paurashava must strengthen its capacity to implement its Master Plan when it will be completed. It will otherwise be in trouble for implementation, monitoring and updating the Master Plan. For the 'A' class Paurashava Government approved an organogram/ manpower requirement. If we compare the existing manpower with the approved organogram we find that there is a huge gap between the two. Many positions have been vacant since the inception of Paurashava.

Out of total 75 numbers of allocated positions only 20 numbers are filled up. However, strengthening of the Town Planning Unit is a pre-requisite for successful implementation of the Structure Plan. Following organogram of the Town Planning Unit is proposed for staffing capacity building of this Unit.

8.1.4 Legal Aspects

The drive to establish strong urban local governance in the Paurashava is yet to be legalized. The governance programs 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 Paurashava

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

The Ministry of LGRD & C 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 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, 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 Paurashava is not equipped with qualified manpower to make such evaluation. Monitoring and evaluation of a plan is essentially, the responsibility of qualified and experienced planners. As there is no planner in the Paurashava, monitoring of plan implementation will be seriously affected. However, plan evaluation can be accomplished by means of out sourcing as and when it is required.

8.1.8 Periodic Review and Updating

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

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

8.2 Resource Mobilization

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

8.3 Concluding Remarks

From the past experience, it has been observed that plans are prepared for organized development, but development control has been subject to negligence. In most cases, execution has been 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 Paurashava. This planning means the scientific, aesthetic, and orderly disposition of land, resources, facilities and services with a view to securing the physical, economic and social well-being of urban communities.

9.1 Goals and Objectives of Urban Area Plan

Urban Area Plan is the first phase illustration of the Structure Plan intended to be implemented over a time span of 10 years that includes 1st phase (1st-5th year) and 2nd phase (6th-10th 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 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 (Chapter 3 of Survey Report). 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 (Chapter 4 of Survey Report). 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 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 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 (Detail was given in Chapter 2, Section 2.4 of Survey Report). As conversant with local conditions and the future trend of development, valuable advices were received from the Poura Mayor and its engineers and other staffs. Table 9-1 presents the detail about the mouzas, within the 9 wards of the Paurashava along with their areas in acre.

Table 9-1 List of Mouza Maps of Paurashava

Sl No	Paurashava	Mouza Name	J.L No	Sheet No	Mouza Type	Source
1	Shibgonj	Jot Binod	140	00	RS	DLRS
2	Shibgonj	Chelabot Khani	182	01	RS	DLRS
3	Shibgonj	Chelabot Khani	182	02	RS	DLRS
4	Shibgonj	Chelabot Khani	182	03	RS	DLRS
5	Shibgonj	Chelabot Khani	182	04	RS	DLRS
6	Shibgonj	Chelabot Khani	182	05	RS	DLRS
7	Shibgonj	Rasulpur	139	00	RS	DLRS
8	Shibgonj	Kashibati	141	00	RS	DLRS
9	Shibgonj	Taratipur	142	00	RS	DLRS
10	Shibgonj	Chaturpur	143	00	RS	DLRS
11	Shibgonj	Jagnnathpur	144	00	RS	DLRS
12	Shibgonj	Mohodipur	145	00	RS	DLRS
13	Shibgonj	Chak Daulatpur	146	00	RS	DLRS
14	Shibgonj	Shibganj	147	00	RS	DLRS
15	Shibgonj	Norottampur	149	00	RS	DLRS
16	Shibgonj	Rajnagar	150	00	RS	DLRS
17	Shibgonj	Salimabad	148	00	RS	DLRS
18	Shibgonj	Debi Nagar	152	01	RS	DLRS
19	Shibgonj	Debi Nagar	152	02	RS	DLRS

20	Shibgonj	Gopal Nagar	151	00	RS	DLRS

Source: DLRS, 2009

9.2.2 Content and Form of Urban Area Plan

The Urban Area Plan is presented in both map and textual format. The plan map is presented in 1:1980 or 1 inch to 165 feet scale, superimposed on latest cadastral/revenue map having plot boundaries within mouzas. The plan is accompanied by an explanatory report supported by necessary figures, maps and data. The report explains the various plan proposals and other components of the plan. At present, the Urban Area Plan covers the total area of Structure Plan area of 5024.48 acres with a present population of 42,693 of Paurashava.

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

i) Land Use Plan;
ii) Transportation and Traffic Management Plan;
iii) Drainage and Environmental Management Plan and
iv) Proposals for Urban Services.

Chapter 10: Landuse Plan

The Land Use Plan is the main part of the Urban Area Plan and is planned for the period of first 10 years. The proposals in the Land Use Plan will be implemented through the 1st and 2nd phase development programs of the Master Plan. The 1st phase development projects are identified as priority projects and are listed in the Ward Action Plan for implementation within the first five years of the Master Plan.

10.1 Existing and Projected land use

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 also 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.

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 (almost 82%) dominates the Paurashava area, followed by residential (12.22%); water bodies, circulation network and transport and communication, and government services and educational land use occupy same percentage of land.

Table 10-1: Existing Land use Classification of Paurashava

Land Use Category	Area in Acres	%
Agriculture	4157.80	82.76
Circulation Network	93.37	1.86
Commercial Activity	28.44	0.56
Community Service	8.94	0.18
Education and Research	14.71	0.29
Governmental Services	7.97	0.16
Industrial/Processing & Manufacturing	2.82	0.06
Miscellaneous	3.24	0.06
Mixed Use	4.46	0.09
Non-Government Services	1.15	0.02
Recreational Facility	7.00	0.14
Residential	614.00	12.22
Service Activity	7.50	0.15
Transport and Communication	0.82	0.02
Urban Green Space	10.18	0.20
Waterbody	62.08	1.24
Grand Total	5024.48	100.00

Source: Land Use Survey, 2011

Map 10-1: Existing Land Use Map of Paurashava

10.1.2 Land Requirement Estimation

This section proposes land use zoning plan for different land uses of the future town. The estimations have been made according to the Planning Standard approved by the client. The category wise land allocations are provided below.

Housing

Housing is the most significant segment of urban development scenario. The future housing area need to be based on a recommended planning standard of 100 persons per acre. With this standard, the estimation shows, the maximum land required to accommodate total projected population (60878) in the year 2031 will be 608.78 acres. Existing residential land of Shibganj Paurashava is 614 acres and net residential density of 69 persons per acre. Although there exists enough extra land in the Paurashava but after an extensive evaluation of future growth trend of the Paurashava the consultant, therefore, recommended almost 1100 acres of land for housing for the population of the Paurashava in 2031 (net density will be about 41 persons per acre). Table 10-2 shows the detail.

Table 10-2: Estimation of Housing Land Requirement

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
General Housing	150 persons/acre	405.78	614.00	Existing land is More than enough
	100 persons/acre	608.78		

Commerce and Shopping

Market facilities are usually provided privately on commercial basis depending on the trend of sale of goods. So it is not possible to fix a standard or project actual area for these services. The standard for commercial use can only be applied if ever these facilities are provided by the Paurashava. However, for the sake of current planning, we can earmark land as per standard at appropriate location, where commercial facilities may be developed privately or publicly. Including existing commercial activities, the total commercial land in 2031 has been fixed at 69.72 acres. Table 10-3 shows the detail.

Table 10-3: Estimation of Land Requirement for Commerce and Shopping

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Whosesale Market	1.00 acre/ 10000 population	6.09	3.50	2.59
Retail Sale Market	1.00 acre/1000 population	60.88	24.54	36.34
Neighborhood/Local Market	1.00 acre/per neighborhood Market	9.00	0.00	0.00
Super Market	1.50 – 2.50 acres/per super market	1.50	0.40	1.10
Total:		**77.47**	**28.44**	**49.03**

Industry

According to approved planning standard, the total land for industries is estimated to be 120.44 acres with 48.18 acres for small scale industries and 72.26 acres for cottage industries. Table 10-4 shows the details.

Table 10-4: Estimation of Land Requirement for Industries

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Small scale	1.50 acres /1000 population	48.18	0	47.33
Cottage/Agro-Based	1.00 acres /1000 population	72.26	2.82	69.44
Total		**120.44**	**2.82**	**117.62**

Education

Estimation of land according to standard indicates that there will be a land requirement of 88.27 acres to accommodate educational facilities by the year 2031. Existing land uses under various education facilities of Paurashava is 11.42. There will be need of additional 76.85 acres of land for education facilities. Details are shown in Table 10-5.

Table 10-5: Estimation of Land Requirement for Education Facilities

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Nursery	0.5 acre/10,000 population	3.04	0	3.04
Primary School/ kindergarten	2.00 acres/5000 population	24.35	7.97	16.38
Secondary/High School	5.00 acres/ 20,000 population	15.22	4.28	10.94
College	10.00 acres/20,000 population	30.44	2.46	27.98
Vocational Training Centre	5 – 10 acres / Upazila	5.00	0	5.00
Total:		**78.05**	**14.71**	**63.34**

Health

There already exists an upazila health complex in Shibganj Upazila. As Paurashava is under the Shibganj Upazila there should be no provision of another complex. In future, as the population and density increases, demand for local health facilities other than Health Complex will increase which currently use only 4.93 acre. So the Paurashava requires additional 17.25 acres of land for the Health center/Maternity clinics in future. Table 10-6 shows the detail.

Table 10-6: Estimation of Land Requirement for Health Facilities

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Upazila health complex/	10 -20 acres/Upazila HQ	10.00	4.53	5.47
Health center/ Maternity clinic	0.25 acre/Ward	2.25	0.40	1.85
Total:		**12.25**	**4.93**	**7.32**

Administration

Estimation of land according to standard indicates that there will be a land requirement of 18 acres to accommodate administrative facilities by the year 2031. If we deduct 8.55 acres of existing land under various administrative facilities, additional 9.45 acres of land for these facilities will be required. Table 10-7 shows the details.

Table 10-7: Estimation of Land Requirement for Administration

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Upazila complex	15.00 acres	10.00	4.53	5.47
Paurashava office	3 – 5 acres	3.00	1.01	1.99
Others			2.43	
Total:		**13.00**	**7.97**	**5.03**

Community Facilities

For various community facilities, the total land requirement has been fixed at 16.70 acres. About 1.52 acres have been earmarked for mosque, eidgah. 3.04 for Paurashava provided graveyard. No additional land is required for mosque, church and graveyard. Table 10-8 shows the details.

Table 10-8: Estimation of Land Requirement for Community Facilities

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Mosque/Church/ Temple	0.5 acre /20,000 population	1.52	3.83	NR
Eidgah	1.0 acre/20,000 population	1.52	1.81	NR
Graveyard	1.0 acre/20,000 population	3.04	2.33	0.71
Community Center	1.00 acre /20,000 population	3.04	0	3.04
Police Station	3 – 5 acres/Upazila HQ	3.00	0.09	2.91
Police Box/Outpost	1.00 acre/ 20,000 population	0.00	0	NR
Fire Station	3 – 5 acres/Upazila HQ	3.04	0.75	2.29
Post office	0.5 acre /20,000 population	1.52	0.13	1.40
Total:		**16.70**	**8.94**	**7.76**

Open Space

Field survey shows no public park or play field in the town, except play grounds in the premises of educational institutions. The total land required for various open space recreation facilities recommended by client stands at 130.89 acres. The facilities include, play field/ground, parks of various categories and stadium/sport complex. Table 10-9 shows the detail.

Table 10-9: Estimation of Land Requirement for Open Space

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Play field/Urban Green Space	3.00 acres/20,000 population	9.13	5.00	4.13
Park/ Neighborhood	1.00 acre /1000 population	60.88	4.21	56.67
Stadium/Sports complex	5 - 10 acres/Upazila HQ	5.00	0.97	4.03
Total:		**75.01**	**10.18**	**64.83**

Utilities

A number of utility establishments are required in a town to run services properly. The consultant, according to approved standard, has Estimated3.04 acres for water supply installations, like, pump stations and other establishments related to water supply; and 3.04 acres have been fixed for gas related facilities. The total land requirement for dumping site is 5 acres. Table 10-10 shows the details.

Table 10-10: Estimation of Land Requirement for Utilities

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Water supply	1.00 acre /20,000 population	3.04	0.00	3.04
Solid waste disposal site	1.00 acre /20,000 population	3.04	2.36	0.68
Waste transfer station	0.25 acre/Ward	2.25	0.00	2.25
Total		**5.33**	**2.36**	**2.97**

Transport and Communication

Estimation of land according to standard indicates that there will be a land requirement of 4.82 acres to accommodate transport and communication facilities by the year 2031and an additional 4.82 acres of land is also required for this category of land use. Table 10-11 shows the details.

Table 10-11: Estimation of Land Requirement for Transport and Communication

Use/Facility	Recommended Standard	Land in Acre		
		Estimation	Existing Land	Addl. Requirement
Bus terminal	1.00 acre /20,000 population	3.04	0.00	3.04
Truck terminal	0.50 acre /20,000 population	1.52	0.00	1.52
Rickshaw/Tempo stand	0.25 acre / Rickshaw/Tempo stand	2.25	0.82	1.43
Total:		**4.82**	**0.82**	**4.00**

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 centers, 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. 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

Designation of the future land uses in the Land use Plan is an important task of planning as it will ensure the compliance with the Structure Plan guidelines and provide the details of land use pattern along with transport and drainage network and utility lines. The existing uses and new proposals of land uses for future development have been identified and designated on the map for compliance by law. The land use categories with quantity of land required are based on the sectoral needs for now and in future. The implementation of the plan will require cooperation and collaboration of relevant authorities and agencies, and the Paurashava being the custodian of the Plan will safeguard the status of the Plan..

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.

i) The height of building/structure,
ii) The area of a land parcel that must be left vacant, and
iii) 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

After a detailed consultation between the client and the consultants of the project, the land use classification for the Paurashava Master Plan is finalized as shown in Table 10-12. Map 10-2 and Appendix-2 shows the Land Use Plan of Paurashava. .

Table 10-12: Proposed Land Use Categories for Urban Area Plan of Paurashava

Sl. #	Land Use Category	Remarks	Area (acre)	%
1.	Urban Residential Zone	Urban Residential area is a land use in which housing predominates. These include single family housing, multi-family residential, or mobile homes. Zoning for residential use may permit some services or work opportunities or may totally exclude business and industry. It may permit high density land use.	548.77	10.92

Sl. #	Land Use Category	Remarks	Area (acre)	%
2.	Rural Settlement	Rural settlement includes the low dense residential area which is scattered and rural in nature. It may permit only low density uses. Aiming to control the growth in this zone, less service and facilities will be provided.	542.37	10.84
3.	Commercial Zone	The land used for commercial activities is considered as commercial land use. These activities include the buying and selling of goods and services in retail businesses, wholesale buying and selling, financial establishments, and wide variety of services that are broadly classified as "business". Even though these commercial activities use only a small amount of land, they are extremely important to a community's economy. Commercial land includes established markets and areas earmarked for markets.	51.39	0.99
4.	Mixed Use Zone	Mixed land use refers to the area without a dominant land use (Residential, commercial, industrial etc.).	132.33	2.63
5.	General Industrial Zone	Green and Orange A categories as per The Environment Conservation Rules, 1997	67.83	1.35
6.	Heavy Industrial Zone	Other toxic and pollutions Industries (Orange B and Red categories as per The Environment Conservation Rules, 1997)	-	-
7.	Government Office	All Government Offices except large scale service based offices as Civil Surgeon Office, DC Office, Police Box, Police Fari, Police Station, LGED Office, Paurashava Office, Settlement Office, Union Parishad Office, Upazila Headquarter, BADC Office, Fisheries Office, Ansar/VDP Office, Agriculture Office, Zila Parishad Office, Post Office, Telephone Exchange Office and Other Government Offices.	7.51	0.14
8.	Education & Research Zone	All kinds of educational institutes like Primary/ secondary/other Schools/ Colleges etc are mentioned to calculate the land use for education and research purpose.	57.82	1.15
9.	Agricultural Zone	Agricultural land denotes the land suitable for agricultural production, both crops and livestock. It is one of the main resources in agriculture. It includes productive land (single, double and triple cropped), seed bed, fisheries,	2771.91	55.17
10.	Water body	Equal or More than 0.25 acre and justification by the consultant and wet land will merge with water body	43.43	0.86
11.	Open Space	Playground, Botanical Garden, Stadium, Zoo etc. (Facilities without or with minimum building structure)	68.65	1.36
12.	Recreational Facilities*	Facilities other than those mentioned to Open Space and indoor based facilities with designated building structure i.e. Cinema Hall, Theater Hall etc.	-	-
13.	Circulation Network	Road and Rail communication	347.94	6.92

Sl. #	Land Use Category	Remarks	Area (acre)	%
14.	Transportation Facilities	Under transport and communication land use both transport and communication services are considered. This category includes airport, bus terminal/ stand, ferry ghat, filling station, garage, launch terminal, post office, passenger shed, telephone exchange, ticket counter, transport office etc.	6.80	0.09
15.	Utility Services	Utility services include Overhead Tank ,Power Office/Control Room, Public Toilet, Sewerage Office, Waste Disposal ,Fire Service, Water Pump House, Water Reservoir, Water Treatment Plant etc.	6.39	0.12
16.	Health Services	This land will be used to provide health facility.	8.32	0.19
17.	Community Facilities	All community facilities including funeral places and other religious uses	14.23	0.28
18.	Historical and Heritage Site	The entire mentionable historical and heritage site.	0	0
19.	Restricted Area	A Restricted Area is an area where no one but certain people can enter. Here the areas which are not accessible for the general public except some high ranked personnel are considered as restricted area.	0	0
20.	Overlay Zone	If the consultant justify any area that should not be defined as other given definitions but the facility(s) may not be avoidable, they may use this category	Not applicable	
21.	Urban Deferred	Optional depending on the Paurashava and the Consultant's judgment	346.25	6.86
22.	Forest	Designated Forest Area	Not applicable	
23.	Beach	Sea Beach	Not applicable	
24.	Miscellaneous	Any other categories which are not related to above 23 categories.	1.86	0.03
Total:			**5024.48**	**100.00**

According to the proposed land use zoning categories shown in table 10.12, the amount of land for each land use category was calculated.

In the sections below, the general definition of the use and description of associated permitted and conditionally permitted uses under each land use zone have been provided. The uses that are not listed here in any of the categories shall be treated as Miscellaneous Use for the corresponding land use category and shall not be permitted unless unanimously decided otherwise by the appropriate authority. In such situations, the use shall get permission in the category of New Use. The following is a short description of recommended land use zones. Land use plan of Paurashava is given in Map 10-2 and Appendix-2.

Urban Residential Area

Urban residential zone refers to all categories of urban residential areas, including exiting ones and the residential land use proposed under the present Master Plan. In total, this zone covers 548.77 acres of land delineated up to the year 2031, considering standard provided by LGED. Table A.1, Annexure- A shows the permitted use of urban residential area and conditional permission will be given to a number of other land uses as specified in Table A.2, Annexure- A.

Rural Settlement

Most of the Paurashava has some rural characteristics. So in Urban Area Land use category for UTIDP Master Plan the residential settlements within the agricultural belt are categorized as rural settlements. These settlements have usually temporary type of structures. Paurashava is mostly rural in character. About 82% existing land use is in agriculture practice and most of the settlement situated surrounding or within this agricultural land. So in a manner to develop control of Paurashava some portion of land declare as rural settlement. This settlement occupies 542.37 acres of land, which comprises More than 16% of the total land. The areas of rural settlement have some restrictions for non-agricultural development. Table A7, Annexure-A shows the permitted land use of rural settlement and Table A8, Annexure-A conditionally permitted use in this zone.

Table 10-13: New Development Proposal for Low Income Housing and Resettlement Area

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
Low Income Housing	18.45	1	Debinagar 152_01	157-173	Land acquisition and developed basic infrastructure		
Resettlement Area	9.85	1	Gopalnagar 151_00	28-37			

General Industry

General Industrial Zone (Table 10-14) is intended to provide locations, where manufacturing and processing industries can be set up and function without creating hazards to surrounding land uses. There is scope to establish Green and Orange-A category industry as per mentioned in The Environmental Conservation Rule, 1997. As an urban center, it is likely that any major industrial development will take place here in the near future. This zone has an area of 67.83 acres (1.35%) designated up to 2031.

Table 10-14: New Development Proposal for General Industrial Area

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
General Industrial Area	65.01	1	Debinagar 152_01	36,37,63,64,60,62, 520,523,522,525,518, 519,52,53,54,56,57,5 8, 59	Land acquisition and developed basic infrastructure	Establish Industry	Ensure full functioning of industrial area
Existing	2.82						
Total	**67.83**						

Map 10-2: Land use Proposal for Paurashava

Again, since there is no industrial agglomeration within the town, the industrial zone will be meant for new industries. In this zone, a complex line of industrial and supporting non-industrial land uses will be permitted as per Table A.3, Annexure- A and conditional permission will be given to a number of other land uses as specified in Table A.4 and Annexure- A. Table 10-13 shows new land use proposals for this type of activity in Paurashava. This land will be provided in the general industrial area.

Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails and wholesale can be set up and function without creating hazards to surrounding land uses. This zone has an area of 51.39 acres (0.99%) designated up to 2031 and zone will allow commercial uses as listed in Table A.5, Annexure- A, and conditional uses as listed in Table A.6, Annexure- A.

Table 10-15: New Land Proposal for Commercial Zone

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
Cattle Hat	2.37	8	Chelabot Khani 182_02	1203-1211	Land acquisition and developed basic infrastructure		
Neighborhood Market	2.11	6	Rasulpur 139_00	159-163			
	1.23	8	Chelabot Khani 182_02	1298-1299			
	0.60	9	Chelabot Khani 182_05	5421			
	1.53	6	Kashibati 141_00	181			
	0.93	2	Salimbad 148_00	200-206			
Wholesale Market	1.40	3	Chak Daulatpur 146_00	159, 160			
Super Market	1.76	3	Chak Daulatpur 146_00	495, 545 (P)			
	1.15	4	Shibganj 147_00	618-622			
Slaughter House	0.55	5	Shibganj 147_00	285			
Extension of Existing Bazar Area	11.27						
Existing	28.44						
Total	**51.39**						

Mixed Use Area/Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. In a small town like, as the trend shows, an exclusive commercial land use is unlikely to function. This land use will allow flexibility of development, instead of restricting development. Total area for mixed uses has been put to 132.33 acres, including both, existing and proposed land uses. This zone will allow residential structures together with commercial uses as listed in Table A.11, Annexure-A, and conditional uses as listed in Table A.12, Annexure-A. Table 10.16 presents the proposed land uses and their phase-wise development proposals.

Table 10-16: New Land Proposal for Mixed Use Zone

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
Ward Center-1	0.46	1	Gopalnagar 151_00	110-113(P)	Land acquisition and establish		
Ward Center-2	1.60	2	Salimabad 148_00	184-186			
Ward Center-3	0.20	3	Chak Daulatpur 146_00	329			
Ward Center-4	0.33	4	Shibganj 147_00	15			
Ward Center-5	0.22	5	Shibganj 147_00	845			
Ward Center-6	0.12	6	Jot Binod 140_00	110(P)			
Ward Center-7	0.45	7	Mohodipur 145_00	108(P)			
Ward Center-8	0.47	8	Chelabot Khani 182_02	817(P)			
Ward Center-9	0.65	9	Chelabot Khani 182_05	5290(P)			

Governmental Services

Administrative zone covers all kinds of government and non-government offices in the town. The total area under this use has been estimated as it has now.

Education and Research Area

Institutional zone refers to mainly education, health and other social service facilities as listed in Table A.13, Annexure-A, and conditional uses as listed in Table A.14, Annexure-A. The total area under this use has been determined as 57.82 acres of land. Detail new land proposal for education and research is shown in Table 10-17. Total seven primary schools, one secondary school, one vocational training institute and one college will be established in this land.

Table 10-17: New Land Proposal for Education and Research

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
Primary School	5.04	8	Chelabot khani 182_2	1480,1481,1482	Land acquisition and establish	Continue the further development of the Primary school.	
Primary School	2.72	1	Debi Nagar 152_1	96,97,98,99,102,135			
High School	1.53	8	Chakdaulatpur 146_00	829(P)			
Extension of Existing Educational Area	29.36						
Existing	14.71						
Total	**57.82**						

Agriculture Area/ Agricultural Zone

The Paurashava has a vast area of agricultural land that demands formation of a separate zone of, agriculture. Agriculture zone is primarily meant for agriculture; land uses related to it and land uses that support it. Detail of land use is presented in Table A.17, Annexure- A and conditional uses as listed in Table A.18, Annexure- A. The total area under this use has been fixed as 2771.91 acres that include existing and proposed land uses.

Water Body

The plan suggests preserving most of these water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or More than 0.25 acres will be preserved as the water retention ponds. There will be permitted uses in this zone as stated in Table A.23, Annexure- A and some other uses may conditionally be permitted as stated in Table-A.24, Annexure- A. Annexure-D shows the planning schedule of Water Body Area in Paurashava.

Open Space

This zone has been provided to meet the active and passive recreational needs of the people and at the same time, conserve the natural resources. The details of permitted and conditional permits have been presented in Table A.19 Annexure- A, and conditional uses as listed in Table-A.20, Annexure- A. Table 10-18 shows the detail of new land proposal for open space proposal in Paurashava. There are 04 playgrounds, one central park and 05 local parks will be established in this proposed open space. There exists a central stadium ih this paurashava, there is no another proposal for this.

Table 10-18: New Land Proposal for Open Space

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
Playground	3.08	1	Debi Nagar 152_01	150,151,152,153,154,50	Land acquisition and establishment		Maintaining the playground and improve facilities
	3.22	4	Shibganj 147_00	663,664,665,666,667,669,671			
	4.96	8	Chelabot Khani 182_02	811,814,815,816,817, 820,821,822,826			
	3.74	6	Rasulpur 139_00	181,182,205,209,210, 211			
Central Park	21.77	3	Chak Daulatpur 146_00	360,361,362,336,335,259,516			
Neighborhood Park	4.40	1	Debi Nagar 152_01	319,327,328,329,330,331,225,227,229,226,233, 229,230,231,232			
	5.60	2	Salimabad 148_00	249,250,251,77,241,235			
	1.17	2	Salimabad 148_00	77,241,235			
	4.50	8	Chelabot Khani 182_02	1400,1408,1409,1410,1411,1403,1404,1407,1405,1406,1412,1421,1422,1423,1424			
	4.20	5	Jagnnathpur 144_00	80,81,82,83,84,85,76,78 ,77,53,54,55,56			
	5.45	9	Chelabot Khani 182_05	5302,5303,5305,5300,5306,5309,5310,5311,5312,5313,5381,5382,5383,5384,5385,5386,8387, 5388,5389,5301			
Existing	10.18						
Total	**68.65**						

Circulation Network

The road network is mainly considered as circulation network. National highway, pucca/ semi-pucca/ katcha road, footpath, flyover, over- bridge, underpass, bridge, culvert, railway, railway

bridge all are include in circulation network. Total 347.94 acre land of Paurashava. At present 93.37 acres of land uses for circulation network in this Paurashava.

Transportation Facilities

Ttransportation facilities incorporate transport and communication services. For an example airport, bus terminal/ stand, ferry ghat, filling station, and garage, launch terminal, post office, passenger shed, telephone exchange, ticket counter, transport office etc. Total 6.80 acres land will be used for this purpose. Table 10-19 shows the new transportation facilities for Paurashava.

Table 10-19: New Transportation Facilities

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
Truck Terminal	1.11	1	Gopal Nagar 151_00	159,160	Land acquisition and establishment	Maintaining and improve facilities	
	1.42	7	Chelabot Khani 182_01	520,521,528,532			
Bus Terminal	2.30	2	Norottampur 146_00	140, 144, 178			
Passenger Shed	0.35	2	Norottampur 146_00	179,180			
Tempo Stand	0.40	9	Chelabot Khani 182_05	5292,5294,5297,5295			
	0.05	2	Salimabad 148_00	204			
	0.05	4	Shibganj 147_00	742			
	0.06	4	Shibganj 147_00	748			
	0.04	4	Shibganj 147_00	842			
	0.17	8	Chelabot Khani 182_02	1400,1408			
	0.60	3	Chak Daulatpur 146_00	329,330,331			
	0.05	5	Chaturpur 143_00	26,27			
Existing	0.82						
Total	**6.80**						

Utility Services

It incorporated all utilities and service facilities except the health service. For an example water treatment plant, water reservoir, water pump house, public toilet, fire service, waste disposal, sewerage office, power office or control room and over head tank. In survey stage this type land use was define as service activity. Total 6.39 acres land which covers 0.12% total area of

Paurashava. Total one Waste Disposal Ground, one Water Pump House will be newly established to fulfill the desired need of Paurashava.

Table 10-20: New Utility Services

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
Waste Dumping Ground	4.15	1	Debinagar 152_02	1207-1214	Land acquisition and establishment	Maintaining and improve facilities	
Waste Transfer Station	0.04	2	Salimabad 148_00	518(P)			
	0.05	4	Shibganj 147_00	736(P)			
	0.05	5	Shibganj 147_00	119(P)			
	0.05	3	Chak Daulatpur 146_00	481(P)			
	0.02	6	Chelabot Khani 182_01	14(P)			
Water Pump House	0.90	2	Salimbad 148_00	429, 446-447			
	0.13	9	Chelabot Khani 182_05	5432(P)			
Public Toilet	0.04	6	Rasulpur 139_00	159(P)			
	0.06	6	Jot Binod 140_00	109(P)			
	0.20	1	Gopalnagar 15_00	110(P)			
	0.05	2	Salimabad 148_00	67(P)			
	0.01	4	Shibganj 147_00	19(P)			
	0.03	5	Shibganj 147_00	137(P)			
	0.03	5	Shibganj 147_00	362(P)			
	0.01	5	Shibganj 147_00	823(P)			
	0.15	8	Chelabot Khani 182_02	832(P)			

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
	0.16	9	Chelabot Khani 182_05	5432(P)			
Existing	2.36						
Total	**6.39**						

Health Services

This land will be used to provide health facility. Total 8.32 acre land 0.19% of total land will be used for this purpose. Along with this community based health facilities ill be provided at ward center. Ward center is given in mixed use category in land use plan proposal.

Table 10-21: New Health Services

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
Neighborhood Clinic	0.23	5	Shibganj 147_00	801, 820	Land acquisition and establishment	Maintaining and improve facilities	
	2.11	8	Chelabot Khani 182_02	899-917			
	0.20	6	Rasulpur 139_00	185			
	1.55	9	Chelabot Khani 182_05	5460-5464			
Extension of Upazilla Health Complex	1.38						
Existing	4.93						
Total	**8.32**						

Community Facilities

Community services include community centre, club house, fire service, health facilities, religious centres, other community services etc. In additionally all funeral places and other religious uses incorporated in this category. Total 14.23 acres land which covers 0.28% of total planning area will be used for this purpose.

Table 10-22: New Community Services

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.	Phase-wise development		
					First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
Community Center	2.90	3	Chak Daulatpur 146_00	190-195, 246	Land acquisition and establishment	Maintaining and improve facilities	
Extension of Existing Central Graveyard and Eidgah	2.39						
Existing	8.94						
Total	**14.23**						

Restricted Area

A Restricted Area is an area where no one but certain people can enter. Here the areas which are not accessible for the general public except some high ranked personnel are considered as restricted area. No land for restricted purposed in this plan for Paurashava.

Urban Deferred

The Urban Deferred refers to lands lying outside of the urban growth boundary and identified as Urban Reserve. The total area under this use has been proposed as 346.25 (6.86%) acres that include existing and proposed land uses. The following are permitted Uses within the Urban Reserve (UR) Zone:

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

10.2.3 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-A 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-A are officially adopted through incorporation in the Building Construction Rules under Section 18 of the East Bengal Building Construction Act 1952.

10.3 Plan Implementation Strategies

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 non-conforming 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 under Section 17 of the EBBC 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, BC 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, BC Rules, 1996 meant for commercial area should also be applied to the mixed areas under the current plan.

f. Rules for Realization of Betterment Fee

The Ordinance 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.

g. 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 Paurashava Ordinance 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 EBBC 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.

h. 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 BC 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 BC Rules, 1996 applicable to the secondary and small towns only.

i. 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 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 Wetland Playfield, Open space, Park and Natural water reservoir 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.

j. Security Areas - Cantonment, BDR, Police Stations

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

k. 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

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 the execution on 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 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 seriously affected. However, plan evaluation can be accomplished by means of out sourcing.

Updating of Plans

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 professional and fund that are highly lacking in Paurashava. There is no planner or planning section in the Paurashava. Updating would require service of senior level planners that Paurashava would not be able to provide. This service will have to be procured by out sourcing and the Paurashava is not even capable to accomplish this financially either. This will create problem when the plans or its components gets obsolete or need to be changed. Another problem would arise when the duration of plans ends. A new set of plans would 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 move for setting up a planning section with planner(s) 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.

Chapter 11: Traffic and Transportation Management Plan

11.1 Introduction

11.1.1 General

The transportation system directs the urban development pattern. The performance oftransportation system largely influences the economy and social progress of an area. It provides mobility to people, goods and services to their destination. It has linkages with other sectors ofdevelopment and for a sustainable development of any area, its traffic and transportation system should be adequately addressed. The current chapter of the report is about Transportation and Traffic Management Plan covering the scope of improvement of the existing network and systemand plan proposals for new development. The proposals on improvement and new developmentare made for the project area up to 2031. The report also provides the purpose and the role of Transportation and Traffic Management Plan and its relation with Structure Plan and Land UsePlan.

11.1.2 Approach and Methodology

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

Standard methodology was followed for traffic study in the project area. An introduction meeting was held at Paurashava and the Paurashava authority recommended Wednesday as local Hat day and others as regular day to conduct transport survey. With reference to their observations, survey time was set from 6:00 AM to 12:00 PM for those two days when traffic movements were frequent.

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

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

The volume counts were conducted at four points in a node. For this, Manual counting method was followed to conduct the traffic volume survey and data was recorded in prescribed formats (**Table 11-1**).

Table 11-1: Sample Size and Location Number According to Surveys

Types of Survey	Sample Size/Locations
Volume count	Four links and one node
O-D survey	415 Samples at three location for internal-external movement
Journey Speed/Delay	Bypass Link and C&B Road

Details methodology of the work is shown in a flow chart (**Fig 11-1**) below.

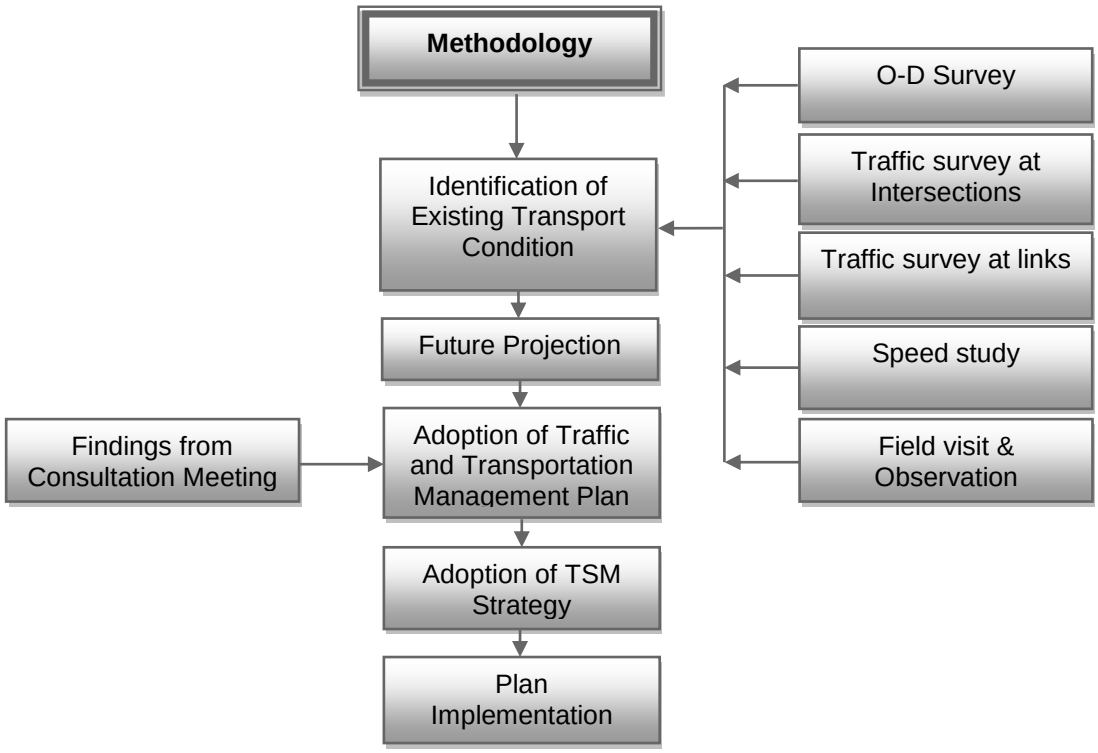


Fig 11-1: Flow Chart of the Methodology

11.2 Existing Conditions of Transportation Facilities

11.2.1 Roadway Characteristics and Functional Classification

The planning area covers 20.33 sq. km. (5023.86 acres) and road length is 115.36 km. There are only one important road intersections named Israil morr providing linkages with other secondary roads. Paurashava have direct transport communications with the Dhaka. The areas towards the Bypass Road road are predominantly rural with little commercial development along the road. The road network and hierarchy within the Paurashava boundary is poorly established.

The roads of the Paurashava belong to number of agencies. Local Government Engineering Department (LGED) responsible for construction and maintenance of Upazila and Union roads and Paurashava responsible for construction and maintenance of roads within the Paurashava area.

Existing transportation system is dominated by road network catering to the passenger service and freight transport (**Table 11-2**).

Table 11-2: Road Network in Shibganj Paurashava

	Length (Km)			
Ward No	**Pucca**	**Semi-Pucca**	**Katcha**	**Total**
1	5.62	3.82	8.83	18.27
2	5.63	2.96	4.22	12.80
3	4.08	2.71	1.84	8.63
4	2.43	4.42	1.50	8.35
5	7.76	4.30	3.92	15.98
6	4.58	3.10	3.84	11.51
7	5.14	3.31	5.90	14.35
8	3.40	3.61	1.22	8.22
9	7.52	4.60	5.14	17.25
Total	46.16	32.82	36.39	115.36

Source: Transportation Survey of Paurashava by AQUA, 2011.

The road network provides access to various places within the study area and connects various parts of the country following bus routes. Major trips of vehicles are generated from, within the Paurashava, Bazar Morr, Upazilla Road, and C&B Road. Existing transportation system is dominated by road network catering to the passenger service and freight transport.

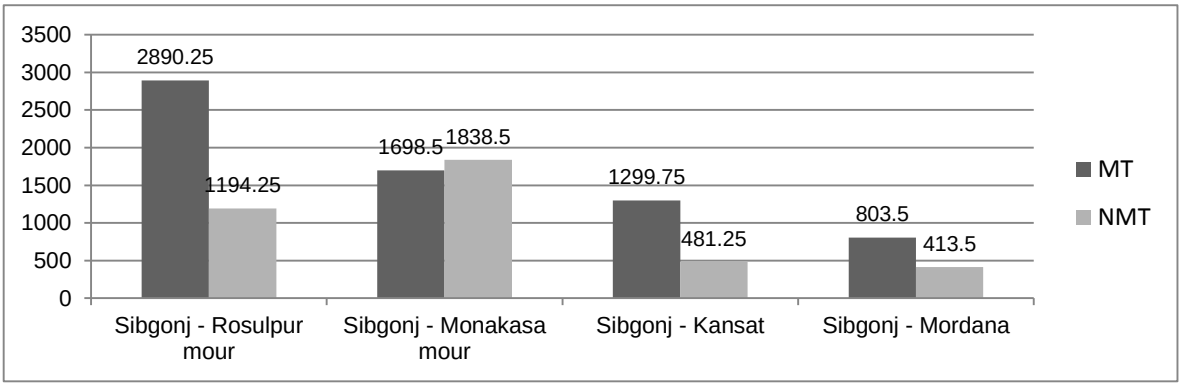
The major routes which connect Paurashava are:

- to Rajshahi
- to Kansat
- to Mondara

Apart from major roads, a large number of local roads having width varying from 10 ft. to 20ft width, provide access to individual houses and establishments and connect them to major roads.

11.2.2 Modal Share of Vehicular Traffic

Though Shibganj Paurashava is a small town, Motorized Transport (NMT) is currently dominating inthe town's internal traffic. The traffic volume survey at Shibganj bazar intersection presents that almost 60% traffic is MT. The highest number of MT moves through Israil more intersection to -Rosulpur road, the number of MT is 2890 which shares 50% of total traffic movementsthrough this direction. The detailed scenario was described in Chapter 5, Section 5.3.5 of Shibganj Survey Report. Figure 11.2 shows the directional vehicular composition of Upazilla Road intersection.



Source: Traffic Volume Survey, 2011.

Fig 11-2: Directional Composition of MT and NMT Composition at Upazilla Intersection

It is clearly evident from the survey that majority of the people choose motorized vehicle togo their desired destinations and hence NMT is the most widely used transport mode for Shibganjlike most of the other Paurashavas. Two types of NMT dominate whole status of the modalchoice namely, van and bicycle, covering 54% and 17% of the total transport moderespectively. The third favorite mode is Motor Cycle which covers 15% of total traffic volume. Figure 5.8 shows the details of modal choice of the poura people.

11.2.3 Intensity of Traffic Volume

In order to investigate the nature of traffic movement and assess the volume of traffic theconsultant has identified Israil More intersection as the only major roadintersection with in the Project Area for conducting the traffic volume survey. The consultant hasdesigned a standard format for traffic volume survey (approved by LGED). Traffic volume surveyshows more than 4000 traffic move through the intersection. Among these 1190 NMT and 2890are MT vehicles.

11.2.4 Level of Service: Degree of Traffic Congestion and Delay

11.2.4.1 Traffic Congestation

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 oftraffic movement is high, on street parking is made and on street loading or unloading of goodsare taken place. The consultant studied the traffic movement all over the town and has identifiedthree main points, where the traffic congestion is the highest. These are located at bazaar intersection on C & B Road, intersection of AraniIsrail More. At thesepoints, the slow moving vehicles like, byclicle and vans come in conflict with motor vehicles,creating traffic congestion. As the number of slow moving vehicles is higher, the conflicts areusually frequent.

11.2.4.2 Delay

The traffic delays in Shibganj town is caused by the interaction of various factors, such ascongestion, inadequacy of carriageway widths, mixed traffic conditions, parked vehicles andheavy pedestrian flow and such delays are called congestion delays or operational delays andare 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 ShibganjBazar intersection.

11.2.5 Facilities for Pedestrians

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

11.2.6 Analysis of Existing Deficiencies

Like any other town, Shibganj has also transportation deficiencies, which are identified from two different sources. Firstly, by reconnaissance survey of the town, field observation interview of passenger and operator and secondly, by means of household sample survey.

11.2.6.1 Roadway Capacity Deficiencies

Primary Road (Regional Road)

The Bypass Road is known as primary road as per Paurashava, length is 5.02 km and average width 6.02 meter. Road standard (ROW) recommended is 80 feet to 100 feet, proves that the ROW of the existing primary road in the Paurashava is lower than the standard (ROW) recommended. Moreover, in hat day and non-hat day, highest volume of traffic flows on the primary road and it is about 411 to 548 PCU/hours.

Secondary Road:

There are three major secondary roads are in the Paurashava named C& B Road road, length is 4.04 km and average width 4.56 meter, Mordana Road, length is 7.38 km and average width 4.11 meter and Pithalitala-Dhaingar Road, length is 1.25 km and average width 4.19 meter.

Road standard (ROW) recommended is 40 feet to 80 feet, proves that the ROW of the existing secondary roads in the Paurashava is lower than the standard (ROW) recommended. Moreover, in hat day and non-hat day, highest volume of traffic flows on those secondary roads is about 250 PCU/hour.

Tertiary Road:

In the Paurashava, two major tertiary roads have been identified and they are Madrasha Road, length is 0.96 km and average width 3.02 meter. Mohodipur Road, length is 0.42 km and average width 3.01 meter.

Road standard (ROW) recommended for tertiary road is 20 feet to 40 feet, proves that the ROW of existing tertiary roads in the Paurashava is lower than the standard (ROW) recommended. Moreover, in hat day and non-hat day, highest volume of traffic flows on those tertiary roads is about 450 PCU/hour.

Access road:

Road standard (ROW) recommended may be imposed on access road and it is 20 feet to 40 feet. In the Paurashava, all access roads are less than 12 feet and most of them are using as footway. Non-motorized vehicles named Van sometimes use those walkways.

Narrow Road Width

Narrow widths of roads and poor maintenance have marked by most respondents as major road problems in the town. From the survey, it has found that there are various problems in connection with transport such as problem of narrow road, and damaged during rainy season etc. This will cause traffic on the street will rise and will create serious traffic congestion on the narrow streets. The project area is served by 95.72kilometers of roads. When asked about the problem of roads, they pointed to narrow width of roads, flooding of roads during monsoon, poor condition of roads due to lack of maintenance, traffic congestion at particular points of the town.

When asked about the problem of roads, most households respondents answered affirmative (Household survey, 2011). Indicating to major road problems, they pointed to narrow road; broken roads due to poor maintenance, flooding of roads during monsoon, and traffic congestion.

Map 11-1: Width of some Major Roads in Shibganj Paurashava

Traffic Conflict

Traffic conflict is common and frequent in towns where there is admixture of transport vehicles – slow and fast – in the streets. Areas of conflict occur at point where the intensity of traffic movement is high. The consultant studied the traffic movement in all over the town and identified one main point where the traffic conflict is highest, which is Israilr Morr Intersection. At this point the slow moving vehicles, like, rickshaw and vans come in conflict with motor vehicles, creating traffic congestion. As the slow mobbing vehicles are higher, the conflict is usually frequent.

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

11.2.6.2 Operational, Safety, Signal and other Deficiencies

Traffic management system is absent in the Paurashava. No operational system yet being imposed on traffic movement.

Due to the minimum PCU/hr. both in hat and non-hat day, availability of non-motorized vehicles and absent of available built-up area, road safety exists naturally in the Paurashava.

Traffic signaling system is totally absent in the Paurashava. Generally, traffic signaling system will not be needed up to the limit of the planning period. On some specific point of primary and secondary roads, traffic signaling will be needed.

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

Within the Paurashava there exits no rail way. There is no air transport facility in, for air travelling the people of depending upon the Capital City Dhaka.

11.3 Future Projections

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

1. The Government may declare design standards for roads by publication in the Official Gazette.
2. The road design standards shall set out design requirements for roadways and road-related areas including structures located on roadways or road-related areas.
3. A road authority shall comply with the road standards when carrying out works on a roadway, road-related area or when installing, modifying or maintaining a structure on a roadway or road-related area.
4. Despite sub-section (3), a road authority is not required to comply with the road standards if:
    a. The road authority is carrying out maintenance and, in the view of the road authority; it would not be practicable to comply with the road design standards.
    b. The Government has, in writing, exempted the road authority from complying with the road design standards in relation to the works or structure.

c. The Government may revoke or amend road design standards in the same manner as a declaration.

The Urban Area Plan for Dhaka City has recommended road standards with the consideration of traffic volumes, which were not undertaken in conjunction with the Dhaka Integrated Transport Study (DITS). A wide range of standards was suggested for various classes of roads, ranging from 4 meters to 24 meters, as mentioned below. The required right of way (ROW) is also indicated:

- Main Road 24.0 meter (78 ft) ROW
- Arterial Road 14.5 meter (47.5 ft) ROW
- Collector Road 13.0 meter (42.6 ft) ROW
- Access Road 9.0 meter (29.5 ft) ROW
- Access Road 6.0 meter (19.7 ft) ROW
- Non-motorized Road 4.0 meter (13.4 ft) ROW
- Footpath 2.5 meter (8.2 ft) ROW

In order to promote development of all roads in a systematic manner, new road standards were recommended for both built up areas, as well as for less built-up areas. These will replace the old standards, which were included in the Dhaka Metropolitan Development Plan (DMDP). The standards, when adopted will facilitate earmarking the right of way (ROW) for all major roads. The details of these standards used in this plan are indicated in **Table 11-8** below.

Table 11-3: Recommended Planning Standard of Paurashava

Types of Road	Recommended width
Paurashava Primary Roads	150-100 feet
Paurashava Secondary Roads	100-60 feet
Local Roads	40-20 feet

Source: UTIDP Planning Standard, LGED

11.3.1 Travel Demand Forecasting for Next 20 Years

Existing road network is quite enough for accommodating present volume of traffic. The study area is rural in nature. Most of the roads are katcha and needs to be constructed as pucca or at least semi-pucca. Katcha roads become clayey in the rainy season and bring immense sufferings for the users. As a result, social, cultural and economic activities are disrupted significantly at that time. A very limited uses of small boats are found for transportation of goods within the short distance particularly on hat day. Rail service is absent. Due to the absence of effective alternatives, passengers and goods movement of the study area is largely dependent on road transportation. This dependency will be calculated according to the increase of accessibility, consideration of the missing links, volume of traffic movement, bulk density of the area and economic importance of the area. Growth direction is also a considerable component for the demand analysis of the road.

11.3.2 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 developmentplan proposals and management of the proposed project area up to the year 2031. The reportdescribes existing transportation facilities and consultant's proposal on the important facilitiessuch as, bus terminal, truck terminal, rickshaw/van stands, baby taxi/tempo stands andpassenger sheds for local bus users. Many of the proposals may now seem to be premature, butwill be necessary in future. If their executions are delayed, land may not be available in future forproviding such facilities. Appendix-3 shows the road network plan of Shibganj Paurashava.

11.4.1 Plans for Road Network Development

The standards are meant for use by UTIDP, LGED and other planning and developmentagencies. The standards have been adopted by the consultants to draw up the transportationdevelopment plan. Following are the suggested planning standards (Table 11.4) for road networkdevelopment. These road hierarchies are proposed based on the functional linkage of the road of Paurashava.

Table 11-4: Proposal for Road Standard in the Project area

Type	Proposal Standered
Paurashava primary roads	ROW 150ft
Paurashava secondary roads	ROW 40-80ft
Tertiary Road	ROW 30ft
Access Road/ Local Road	ROW 20ft

Source: *Upazila Towns Infrastructure Development Project and Proposed by Consulting Firm, InterimReport Shibganj Paurashava*

Neighborhood and Local Road

The right of way (RoW) of all neighborhoods (mahallah) roads may be in between 15 ft. to 30 ftwide depending on their functions.

Standard Road Design

All urban roads should have flexible pavements. The road intersection should be designed toallow easy movement of vehicles. At bridge, the road design should provide for an adequate sightdistance and a smooth riding**.**

Functions of Roads

Each category of road has its particular functions to perform. Access road carries traffic frombuildings to the collector road and collector road carries traffic to the major road and vice versa. Inreality, however, it is almost impossible to maintain this hierarchical use of roads except in anentirely planned area. However, functions will not be dependent on the road width, rather on

thelocation of the road, surrounding land use and the link it is providing or the volume of traffic it iscarrying. Thus a 40 feet wide secondary road can become a major road due to its strategiclocation and the purpose it is serving.

11.4.1.1 Road Network Plan

Planning standard is a fundamental tool for formulation of any planning perspective including transport plan. The suggested planning standards of road width for UTIDP are illustrated in **Table-11-4**. 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 current series of plans. An integrated road network plan has been prepared commensurating the planning standards and considering the convenient movement of all vehicular and pedestrian traffic. Three types of road, such as Paurashava Primary Road, Paurashava Secondary Road and Local Road are proposed designating a unique ID No. to each road for the purpose of identifying them in map. The road network plan along with transportation management plan is presented in **Map 11-2** below.

11.4.1.2 Proposal for improvement of the existing road networks

Most of the roads in Shibganj Paurashava are very narrow and it creates tremendous transportationproblem. To improve this situation about 127 km road is proposed for widening in the transportdevelopment plan. The highest 47.35 km (37.07%) road is proposed for widening up to 20 ft, which will function as local access. Then 36.74 (28.76%) km road is proposed forwidening up to 30 ft, which will function as local tertiary road. Again 17.75% (22.67 km) road up to 40 ft, 8.91 km (6.97%) up to 60ft and 6.75 km (5.28%) up to 80ft are proposed as secondary road. Total 5.32 km (4.16%) road is proposed up to 150 ft as a primary road. **Table 11.5** shows thesummary of road widening proposal

Table 11-5: Summary of Road widening proposal at Shibganj Paurashava

Road Width (in ft)	Length (in km)	Percentage	Road Type
20	47.35	37.07	Local Access
30	36.74	28.76	Tertiary Road
40	22.67	17.75	Secondary Road
60	8.91	6.97	
80	6.75	5.28	
150	5.32	4.16	Primary Road
Total	127.74	100.00	

Table 11-6: Road Widening Proposal in Shibganj Paurashava

Road ID		Width in ft		Length (in M)	Type of Road	Phase-wise development		
Proposed	Existing	PW[1] (Ex.)	RoW[2] (Pr.)			First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
WR642	11	12.88	150.00	1331.13	Primary Road	First Ph ase		
WR17	16	13.00	30.00	1321.11	Tertiary Road			Third Phase
WR18	17	9.67	30.00	558.54	Tertiary Road		Second Phase	Developm ent will continue
WR24	23	10.39	40.00	987.29	Secondary Road	First Ph ase	Development will continue	
WR26	25	10.70	40.00	879.43	Secondary Road		Second Phase	Developm ent will
WR28	27	10.75	30.00	516.78	Secondary Road			Third Phase
WR29	28	13.60	40.00	1253.01	Secondary Road	First Phase	Development will continue	
WR57	56	12.70	30.00	836.89	Tertiary Road		Second Phase	Developm ent will
WR73	72	9.75	30.00	977.86	Tertiary Road		Second Phase	Third Phase
WR76	75	10.25	40.00	1317.04	Secondary Road		Second Phase	
WR77	76	9.76	20.00	542.96	Local Access	First Phase		
WR78	77	13.00	30.00	574.88	Secondary Road		Second Phase	
WR81	80	10.37	30.00	1660.98	Tertiary Road			Third Phase
WR86	85	12.88	40.00	1331.13	Secondary Road		Second Phase	
WR91	90	13.00	30.00	935.02	Tertiary Road			Third Phase
WR92	91	9.75	30.00	691.30	Tertiary Road			Third Phase
WR96	95	10.91	40.00	1675.52	Secondary Road		Second Phase	
WR98	97	12.96	30.00	524.41	Tertiary Road			Third Phase
WR136	135	9.81	30.00	527.77	Tertiary Road			Third Phase
WR139	138	9.80	30.00	612.96	Tertiary Road			Third Phase
WR202	201	9.82	40.00	964.18	Secondary Road		Second Phase	
WR231	230	9.79	40.00	1572.86	Secondary Road		Second Phase	
WR243	242	9.77	30.00	516.36	Tertiary Road			Third Phase

Road ID		Width in ft		Length (in M)	Type of Road	Phase-wise development		
Proposed	Existing	PW[1] (Ex.)	RoW[2] (Pr.)			First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10th year
WR246	245	14.16	60.00	992.93	Secondary Road		Second Phase	
WR258	257	12.62	40.00	504.71	Secondary Road		Second Phase	
WR265	264	12.99	30.00	560.51	Tertiary Road			Third Phase
WR333	332	13.34	30.00	547.95	Tertiary Road			Third Phase
WR339	338	12.59	60.00	1968.23	Secondary Road		Second Phase	
WR438	437	9.75	30.00	539.99	Secondary Road		Second Phase	
WR463	462	11.02	20.00	739.70	Local Access			Third Phase
WR495	494	9.81	30.00	613.54	Tertiary Road			Third Phase
WR508	507	9.79	60.00	883.41	Secondary Road		Second Phase	
WR544	543	10.44	30.00	1156.52	Tertiary Road			Third Phase
WR550	549	9.81	40.00	619.32	Secondary Road		Second Phase	
WR554	553	13.01	30.00	905.70	Tertiary Road			Third Phase
WR559	558	9.83	20.00	579.58	Local Access			Third Phase
WR577	576	8.98	40.00	652.82	Secondary Road	First Phase		
WR588	587	9.80	30.00	620.83	Tertiary Road			Third Phase
WR590	589	13.19	40.00	705.99	Secondary Road		Second Phase	
WR599	598	11.40	40.00	640.58	Secondary Road		Second Phase	
WR620	619	13.04	30.00	545.29	Tertiary Road			Third Phase
WR625	624	9.84	40.00	1013.57	Secondary Road	First Phase	Second Phase	
WR638	637	10.84	30.00	559.44	Tertiary Road			Third Phase
WR642	641	19.79	80.00	4897.49	Primary Road	First Phase		
WR651	650	13.35	60.00	6053.31	Secondary Road		Second Phase	
WR654	653	14.82	80.00	4259.62	Secondary Road		Second Phase	
WR658	657	9.82	40.00	1245.25	Secondary Road		Second Phase	

** Road length≥ 500 meter incorporated here. Detail was given in Appendix and Ward Action Plan.

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

- *Detailed has been shown on Appindix*

Map 11-2: Proposed Road map of Shibganj Paurashava

11.4.1.3 List of Proposed new roads

To improve existing transportation system about 11.76 km new road is in the transportdevelopment plan. The highest 7.3 km (62.07%) new road is proposed with 30 ft right of way (RoW), which will function as secondaryroad. Then 2.5 km (21.26%) new road isproposed with 20 ft RoW, which will function as Local Access road. Again 15.31% (1.8 km) newroad is proposed as access road/local with 40 ft width. Table 11.6 shows the summary of road wideningproposal.

Table 11-7: Summary of New Roads in Shibganj Paurashava

RoW (in ft)	Length (in km)	Percentage	Road Type
20	2.5	21.26	Access/Local Road
30	7.3	62.07	Secondary Road
40	1.8	15.31	Secondary Road
Total	**11.76**	**100**	

Table 11-8: List of Proposed Roads in Shibganj Paurashava

Road ID	RoW in Ft	Road Type	Length in Meter	Phase-wise development		
				First Phase (1st to 5th yr)	Second Phase (6th to 10th yr)	Beyond 10 year
NR679	30.00	Tertiary Road	687.29			Third Phase
NR680	30.00	Tertiary Road	464.13			Third Phase
NR681	40.00	Local Access	919.12			Third Phase
NR682	30.00	Tertiary Road	484.39			Third Phase
NR683	30.00	Tertiary Road	513.41			Third Phase
NR686	30.00	Tertiary Road	616.32		Second Phase	Development will continue
NR687	30.00	Tertiary Road	520.80			Third Phase
	40.00	Tertiary Road	457.97	First Phase	Development will continue	
NR698	40.00	Tertiary Road	464.75		Second Phase	Developmentwill continue
NR739	30.00	Tertiary Road	589.23			

Road length≥ 400 meter incorporated here. Detail was given in Appendix

11.4.2 Plan for Transportation Facilities

11.4.2.1 Transportation Facilities Plan

Following are the suggested planning standards (**Table 11.9**) for transport facilities plan. 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 developmentplan.

Table 11-9: List of Proposed Transportation Facilities

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.
Truck Terminal	1.11	1	Gopal Nagar 151_00	159,160
	1.42	7	Chelabot Khani 182_01	520,521,528,532
Bus Terminal	2.30	2	Norottampur 146_00	140, 144, 178
Passenger Shed	0.35	2	Norottampur 146_00	179, 180
Tempo Stand	0.40	9	Chelabot Khani 182_05	5292,5294,5297,5295
	0.05	2	Salimabad 148_00	204
	0.05	4	Shibganj 147_00	742
	0.06	4	Shibganj 147_00	748
	0.04	4	Shibganj 147_00	842
	0.17	8	Chelabot Khani 182_02	1400,1408
	0.60	3	Chak Daulatpur 146_00	329,330,331
	0.05	5	Chaturpur 143_00	26,27
Existing	0.82			
Total	**6.80**			

11.4.2.2 Parking and Terminal Facilities

There is no parking facilities provided in Shibganj Paurashava. People are habituated for parking beside the roads. This parking practice occupied considerable spaces and reduces the effective road width. Particularly in bazaar 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 at the north side of Shibganj Paurashava (**Map11-2**). 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

Proposed facilities accommodate in the truck terminal complex:

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

11.4.2.3 Development of Facilities for Pedestrians, Bicycles and Rickshaws

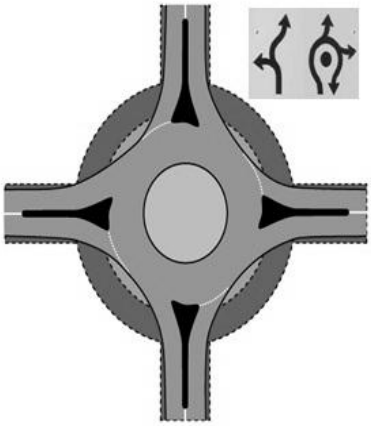
Footpath may refer to sidewalk, which runs along vehicular roads. It is a separate lane exclusively designed for the purpose of pedestrian movement. The footpath is quite safe and free from any accident. Unfortunately, there is no footpath besides any road of Paurashava.

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.

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

11.4.2.4 Other Transportation Facilities

Roundabout



A roundabout is a type of circular intersection. It 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.

Proposal for Roundabout

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 Shibganj Paurashava is as follows:

Table 11-10: List of Proposed Roundabout in Shibganj Paurashava

ID	Ward No.	Location
1	07	Israil Morr

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.

Table 11-11: Traffic Control Facilities in Shibganj Paurashava

Traffic Control System sub-division		Present	Remarks
Traffic Signs (Traffic signs are devices placed along, beside, or above a highway, roadway, pathway, or other route to guide, warn, and regulate the flow of traffic, including motor vehicles, bicycles, pedestrians and other travellers.)	Regulatory	None	Should be Installed
	Warning	None	Should be Installed
	Marker	None	Should be Installed
	Guide & Informational Signs	None	Should be Installed
	Others	None	Should be Installed
Traffic Signals (Traffic signals are electrically operated traffic control devices which alternately direct traffic to stop and to proceed.)		None	Should be Installed
Traffic Police control Hour (Under this system, a person or a group of persons according to law by local/national authorities facilitate the movement of traffic and to prevent and/or report any breach of road traffic regulations on roadway.)		None	Should be Installed

Source: Transportation Surveyof Paurashava by AQUA, 2011

11.4.3 Waterway Development/Improvement Options

There is no existing waterway network within the vicinity of the Shibganj Paurashava and there is no proposal for its establishment from higher authority. Thus, waterway development option is not applicable at Shibganj Paurashava.

11.4.4 Railway Development Option

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

11.5 Transportation System Management Strategy (TSM)

Traffic Management for Shibganj Paurashava is not just to consideration of vehicle movement rather considering the suitability to walk comfortably, to ride bicycle, distance consideration, easy access to market, parking facilities, etc. Traffic management context for a local Town can be reconsidered as the following Figure:

11.5.1 Strategies for Facility Operations

- **Creation of major linkage**

As the town grows and the traffic intensifies on the streets, an efficient network of roads has to be built based on major North-South link. This would ensure direct connection between different curial nodes of the network and help reduce both travel length and time. This is a nonstop process and will be closely in interaction with the spatial development policies for the Town.

- **Lane-based traffic management**

Determining number of lanes on every street and their individual capacity and rooting the traffic management and any future expansion on that capacity assessment. Lanes can be designated for different modes. Use of every segment of the road has to be pre-designed and clearly defined e.g. movement, parking, pedestrian crossing etc.

- **Promote use of FFT (Fuel Free Transport) and discourage FDT (Fuel Dependent Transport)**

Use of fossil fuel and harmful emissions are a major environmental issue all over the world. That's where FFT can play a vital role. Modes like walking, bicycling are in general called 'green transport' for their environmental friendliness. Promotion of these means of mobility can eliminate long-term negative impacts of fuel-based vehicles and enhance health and safety of the inhabitants.

- **Promote Plantation on the Walking way besides of the Roads**

Embankment cum Roads and other major roads have been proposed for promoting plantation with street furniture.

- **Providing Properly Designed Pedestrian Ways**

Paurashava has no provisions of pedestrian ways, which is one of the major crucial problems for the Town in Transport sector. All necessary facilities should be provided for the pedestrians. A designed pedestrian ways must be integrated closely with other transportation elements so that walking becomes a recognized mode and becomes a pleasure and a place for brief social gatherings for the Paurashava dwellers.

- **Road space allocation:**

Road space should be allocated among different mode and use based on the hierarchy of the road and its adjacent land-use. This is essential for safety and effectiveness of the road.

- **Development & availability of Public Transport (PT)**

This should form the major share of the motorized vehicle. PT has to be available within comfortable walking distance from any part of the Paurashava. Maintenance of an efficient public transport provides a cheap and accessible solution for mass movement.

- **Preserve and utilize natural network (adjacent River/ Khals) as Transport Corridors**

Establishing the network of Khals and River as vital corridors of transportation, especially for goods movement would create a viable alternative to road transport and also help preserve this traditional mode. Water transport is usually cheap and as goods delivery generally has a lead time, waterways can play crucial role in this sector. It can also serve recreational purposes for the city dwellers.

- **Minimizing Transfer Times**

The present deficiencies in the inter-modal integration of the transport system are economically unsustainable in the long run. The current systems are time consuming to travel by more than one mode for the Town of Shibganj Paurashava.

- **Integrating the Management of Land Use and Transportation in Paurashava**

The growth of the Town still concentrated to the core part of the area adjacent to the bazaar area which is just North Portion of the Municipality. To bring out a proper traffic and transport design core part of the town have to manage with high consideration and the semi core and fringe area should have to design for future projection basis.

11.5.2 Strategies for Traffic Flow and Safety

The following strategies have been identified for Traffic flow and safety

- **Avoid dispersed and scattered development patterns**

Dispersed and scattered type of development promotes ‘sprawl’ and increases for travel. It raises the need for more and more transport corridors inducing ever greater traffic.

- **Consider traffic impact of land use and occupancy of structure while giving building construction and land use permit**

Kind of use for the any structure has to be clearly defined. ‘Transportation Clearance’ should be given considering the structure size and proposed use and has to be a compulsory criterion for receiving building permit.

- **Effective road network design has to consider for the mixed land-use areas that provide both places to live and work**

Mixed land use provides the commercial base for supporting viable public transit. For providing effective road network design the study has been proposed the road cross section according to the road categories.

- **Widening the existing Roads**

All existing Roads have to be widening according to the Land use Importance.

- **Provide parallel service roads along the National Highway and Ensure less Use of this Highway from Local Purposes**

Direct connection of over access roads, cattle using, haphazard way passenger/ vehicle over-crossing, adjacent tea shops/vegetable markets etc should be avoided. For this purpose service roads have been proposed for the High way to save from over connection of local roads and other high way related services.

- **Separate lane for NMT**

Provisions of Separate lane for NMT will help to avoid traffic jam and conflicts.

- **Pedestrian First**

All the roads of the Paurashava necessary facilities should be provided for the pedestrians. A designed pedestrian ways must be integrated closely with other transportation elements so that walking becomes a recognized mode and becomes a pleasure and a place for brief social gatherings for the city dwellers.

- **Parking Provision**

Auto Rickshaw, Rickshaw stoppage will be provided on the suitable place for the present need and also for growing future demand. Set up Rickshaw or Auto Rickshaw stops on street corners and other suitable locations.

11.5.3 Strategies for Traffic Management

The following strategies have been identified for Traffic Management

- **Formulate a Local Area Traffic Management Unit (LATMU)**

Designing, modeling and at last managing traffic and Transport is not an easy task. It needs important decisions of policy makers from both Public and Administrative representatives. For the Upazila Towns Mayor is the principle for taking any decisions whereas traffic and Transport related decisions require a Coordination Board where high official's opinion is very much important. For this purpose a small Town Transport Planning and management unit is require to manage traffic and transport situations.

- **Integrating the Management of Land Use and Transportation in Paurashava**

As transport is basically a function of land use, any proposed development should be examined with respect to the traffic impact it has on the locality. Kind of use for the any structure has to be clearly defined. 'Transportation Clearance' should be given considering the structure size and proposed use and has to be a compulsory criterion for receiving building permit.

The growth of the Town still concentrated to the core part of the area adjacent to the bazaar area which is just North Portion of the Municipality. To bring out a proper traffic and transport design core part of the town have to manage with high consideration and the semi core and fringe area should have to design for future projection basis. Mixed land-use creates vibrant, lively neighborhoods/communities and reduces the need for longer distance travel and commuting. Short distances travel also encourages use of sustainable alternatives like walking and bicycling. Mixed land use provides the commercial base for supporting viable public transit. This would also imply restricting development of new strictly single-use zones (like residential, commercial etc.)

Dispersed and scattered type of development promotes 'sprawl' and increases for travel. It raises the need for more and more transport corridors inducing ever greater traffic. Therefore, avoiding and discouraging this kind of development by various policy measures would help reduce creating new trips.

- **Developing an Integrated Transportation System**

As there is no transport studies have conducted before for the Upazila Towns, no serious effort has been made for the functional integration of different modes of transport. However, it is well known that without effective integration of transportation systems, economic benefit, convenience and comfort from transportation services cannot be derived.

- **Avoid dispersed and scattered development patterns**

Dispersed and scattered type of development promotes 'sprawl' and increases for travel. It raises the need for more and more transport corridors inducing ever greater traffic. Therefore, avoiding and discouraging this kind of development by various policy measures would help reduce creating new trips.

- **Need for Integration between Modes**

The main challenge in the area is to identify and link together the most appropriate modes for any journey. Unfortunately the existing modes (BUS -Try Auto Rickshaw -NMT) are acting independently of each other. As a result the passengers suffer due to the lack of inter-connection and scheduling and freight traffic faces delays and increased costs particularly when it is carried by waterways from outstations for destinations inside of the Paurashava. There is an urgent need for integration between modes for economic reasons and for convenience and comfort of the passengers. Traffic management is the It encompasses traffic engineering, but also includes policy making, planning and consultation processes and that's why a traffic management unit has to be launched. One traffic management unit will launch which will be under the UpazilaParishad and must be merged with the Paurashava for regulation, organization, guidance and control of all kinds of stationary and moving road users, and vehicles, including pedestrians, cyclists, motorcyclists, truck and cars, respecting the needs of abutting land uses.

- **Aspects of Access Control**

Maximum use should be made of the existing infrastructure before new roads are contemplated. In moving towards areas of vehicle restrictions and the management of demand a number of measures will be necessary in order to reduce congestion and pollution in the core part of the Town.

- **Minimizing Transfer Times**

The present deficiencies in the inter-modal integration of the transport system are economically unsustainable in the long run. The current systems are time consuming to travel by more than one mode for the Town of Shibganj Paurashava.

11.6 Plan Implementation Strategies

11.6.1 Regulations to Iimplement the Transportation Plan

There is no specific policy provided for the local urban traffic and transport management for the small town of Bangladesh though there exists National Land Transport policy for Bangladesh. For

this purposes to implement the transport plan national land transport policy can be followed. Again a traffic transport management authority must have to provide merge with Paurashava urban planning sector to manage transport related development and implementation.

The roles of the municipality will be largely unchanged. Their functions will still be to provide essential services for the population including in the transport sector – public transport, traffic management signal systems, parking control and management and street lighting. The development of transport systems and infrastructure within the municipalities will be in accordance with the Structure Plan that will be provided under the Master Plan.

- **Effective co-ordination in transport**

Better coordination to be established between the UpazilaParishad and Departments under its control; & regulations will be formulated to achieve the goal of creating better working links between the Government and the public and private sectors. A committee has to develop to monitor the entire development project of the Paurashava to analysis about transport sector violation.

Government to promote clearer objectives and responsibilities for each sector in order to create more integrated working relationships.

- **Promoting the role of the transport users**

The Government will examine how best the interests of users can be represented within the existing national government and local authority system; The Government will establish a user role within its transport planning process.

- **Transport users should pay for the costs of services**

The Government makes arrangements to realize cost of transport operation and road maintenance from road users through new fiscal policies; to protect public interest, the Government will regulate tariffs for passenger and goods both in road and rail transport.

- **Subsidies for transport services**

The government should allow subsidy to the transport sector only on consideration of public interest.

11.6.2 Implementation, Monitoring, Evaluation and Coordination of the Plan

In Urban area planning the most significant role will be played by Paurashava planning section. The Planning Section will carry out the entire work of project initiation and plan formulation. These works are complicated and time consuming, and require multidisciplinary professionals. But there is no provision of Planning Section in Paurashava. It is not possibly by the existing Paurashava personnel to undertake UAP programme after discharging all its regular office functions. This would necessitate strengthening of the institutional capacity of the traffic and transport Planning Section. Under the reorganized organogram of the Planning Section, a Planning Unit can be created to deal with all affairs of area planning for the ‘A’ category Paurashava.

Under the current government policy regarding public sector agencies, it is unlikely that a major reshuffling can be achieved in improvement of existing manpower position of the Planning Section. As a result a large part of the planning process may have to be done through private consultancy.

According to the Local Government (Paurashava) Act, 2009, Paurashava will, in the prescribed manner, prepare and execute a Road Maintenance and Development Program. A Paurashava also maintain the measures on Street lighting, street watering, traffic control, and public vehicles. They will maintain such public streets and other means of public communication as may be necessary for the comfort and convenience of the inhabitants of the municipality and of the visitors thereto.

Chapter 12: Drainage and Environmental Management Plan

A. Drainage Plan

12.1 Introduction

The purpose of the Drainage Plan is to make an assessment of the present drainage facilities and the scope for future development within 5390.058 acres study area of the Shibganj Paurashava that consists of partially developed commercial, residential area and infrastructure. The purpose of the survey was to gather information available and use them at the time of the preparation of the drainage Plan that shall act as a guiding document for designing of drains in future. This Drainage Plan shall be a planning tool and shall be used as a guideline for Shibganj Paurashava that shall be responsible for the approval of drainage improvements. In the past, the term drainage included only the hydrologic and hydraulic aspects for discharge of storm runoff. Perhaps the most pressing challenge that now a days we face include the management of our water resources and flood hazard, maintain a continuous supply of water for industrial, agricultural, transportation, recreation, and potable water for present and future generations. The Drainage Plan aspects shall also include the flood and water resources management and pollution abatement. The Drainage Plan will propose improvements necessary to the major drainage systems to accommodate storm runoff of the Shibganj Paurashava. This planning process will consider both structural and nonstructural techniques to reduce the effect of the storm runoff which may be summarized as follows:

- Improvements to major drainage outfalls
- Improvement of the drainage network
- Management of available water resources
- Conservation of existing natural drainage channels

12.1.1 Goals and Objectives

Following are the overall objectives of the drainage plan of Shibganj 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.

Method Used

Storm and used water: The drains are designed to collect excess rainfall that comes as surface runoff from urban area, convey the runoff and finally discharge them to outfalls. The design of drains involves hydrological computations of rainfall intensity, its frequency of occurrence, duration etc., and the total run off of a particular area. The modified rational method shall be used for calculation of peak runoff for a definite frequency and duration from particular drainage basin. One limitation of this method is that it cannot be used for catchment area greater than 320 acres. The Natural Resources Conservation Service (NRCS) method formerly the US Soil Conservation Service (SCS) method shall be used.

In Modified Rational Method, the overall watershed is divided into zones that contribute to hydraulically significant points of concentration. The boundary of the zones is established based upon local topographic boundaries such as streets, existing drainage systems, etc., using good engineering practice. The design flow rate by Modified Rational Formula is –

Q = CsC r IA

Where:

Q	=	Design runoff flow rate (cfs)
I	=	Rainfall intensity (in/hr)
Cs	=	Storage coefficient
Cr	=	Runoff coefficient
A	=	Drainage area (acres)

Rainfall Intensity (I): The rainfall intensity is the average rainfall rate for a particular drainage basin or sub-basin. The intensity is selected on the basis of the design rainfall duration and return period. The return period is established by design standards as a design parameter. Rainfall intensity with 5 years return period is generally employed for design of primary drains and canal improvement. Rainfall intensity with 3 years return period is employed for design of secondary drains. The design duration is equal to the time of concentration for the drainage area under consideration. Time of concentration is a critical parameter both for the Modified Rational Equation and SCS method. Time of concentration is generally defined as the longest runoff travel time for contributing flow to reach the outlet or design point, or other point of interest. It is frequently calculated along the longest flow path physically.

Estimating the time of concentration involves identification of an appropriate flow path or paths and estimating runoff travel times along the flow paths. Where post-development conditions include significant pervious surfaces, the time of concentration for just impervious portions of the basin may be required to calculate and compare peak flow response for the basin as a whole against that of the more rapidly-draining impervious surfaces alone. The Time of Concentration composed of the Initial Time of Concentration, sometimes referred to as the Inlet Time or Time of Entry and the Travel Time. Initial Time of Concentration is that time required for runoff to travel from the most remote point in the drainage area to the first point of concentration. This can be determined using the Ki pitch equation. The Initial Time of Concentration must be five minutes or longer. In instances

where Initial Times of Concentration are estimated to be shorter than five minutes, five minutes shall be applied.

The second part of the Time of Concentration is the Travel Time that takes the flow to travel along the drain. Channel flow occurs in channels carrying integrated flows, pipes (flowing partially full), and streams. Where storage is not significant, Travel Times can be estimated by applying Manning's Equation, and using estimates of channel characteristics and appropriate roughness values for pipe, channel, or stream features as tabulated in **Table-12-1**.

Table 12-1: Storage Coefficients for flat land

Characteristicsofsurface	StorageCoefficient		
	Slope <1: 1000	Slope <1: 500	Slope <1: 500
Residential urban	0.70	0.80	0.90
Commercial	0.80	0.90	1.00
Industrial	0.70	0.80	0.90
Residential Rural nature	0.60	0.70	0.80
Agricultural	0.50	0.60	0.70
Forest/woodland	0.30	0.40	0.50
Aquatic land	0.30	0.40	0.50
Pavedarea/road	0.80	0.90	1.00

Source: Countywide Comprehensive Plan (Master Drainage Plan) Exhibit-VIII

V= [1.49/n] [R 2/3] [S 1/2]

Where

V = Velocity of flow, feet/second
N = Manning's roughness coefficient for channel flow
S = Slope, feet/foot
R = Hydraulic radius, feet

And

T t = V / (60L)

Where

T t = Travel time, minutes
V = Velocity, feet/second
L = Length, feet

Storage Coefficient (Cs): Due to very flat topography of Bangladesh, the runoff is significantly slow. The rainfall after evaporation and infiltration accumulates first in the depressions, until these have been reached their capacity and then runoff. To take these effects a storage coefficient is used. The value of the storage coefficient is based on average ground slope and the nature of the ground surface. Some of the storage coefficients are listed in **Table-12-2**.

Table 12-2: Modified Rational Method Runoff Coefficients

Landusedesignation	RunoffCoefficient C_r
Residential rural	0.30
Residential semi urban	0.40

Landusedesignation	RunoffCoefficient C_r
Residential urban	0.50~0.60
Apartment professional	0.70
Neighborhood Commercial	0.85
Community Commercial	0.85
Industrial	0.70~0.75
Slumarea	0.50~0.55
Agricultural exclusive	0.25
Forest and watershed	0.20~0.25
Public facilities	0.3~0.60
Forest/ woodland	0.25
Pavedarea/road	0.99

Source: Countywide Comprehensive Plan (Master Drainage Plan) Exhibit-VIII

Catchment Area:

The size and shape of the catchment or sub-catchment for each drain shall be determined by plan metering topographic maps and by field survey. In determining the total runoff of a catchment area the following assumptions to be made:

a. The peak rate of runoff at any point is a direct function of the average rainfall for the time of concentration to that point.

b. The recurrence interval of the peak discharge is same as the recurrence interval of the average rainfall intensity.

c. The Time of Concentration is the time required for the runoff to become established and flow from the most distant point of the drainage area to the point of discharge.

Projection

In implementing various infrastructures for development, drainage is generally given less priority and is normally considered to be the last or final steps for development. Such scenario is particularly true for Bangladesh; although different types of drainage infrastructures are among others by far the heaviest impact on physical infrastructure network. As a result, physical environment, health, hygiene and standard of living suffer seriously. In development projects, Government, Semi-government and Public sector allocated funds are mostly spent on buildings, roads and other more visible infrastructures and drainage comes as the last item of development. By the time, drainage development begins to start, there appears shortage of fund, consequently as a matter of policy-do little or do-nothing situation appears and as eyewash very little is done for drainage development. In case of urban development, if drainage is not given priority, sufferings of the inhabitants will continuously increase with the passage of time.

Drainage development for urbanization should start with drains. Drains can be classified as Plot drains, Block drains, Tertiary drains, Secondary drains and Primary drains. Other natural drainage infrastructure is lowland, outfall areas, khals and rivers. Man-made drains are Plot, Block, Tertiary, Secondary and Primary drains and others are natural drainage infrastructures. In planning for drainage network, care will be given on road network in terms of conflict of drainage and waterways with roads. In the following and subsequent sections major element, their principle, purpose and function of drainage infrastructures are discussed and presented in lower to higher order which will be considered as a method for drainage plan.

Plot Drains

Plot drains are provided around a building on a plot. In most cases, the drain is made of bricks and is rectangular in shape that can carry storm water generated in the plot and from the building. Plot drain is connected to the Block or Mohallah drain.

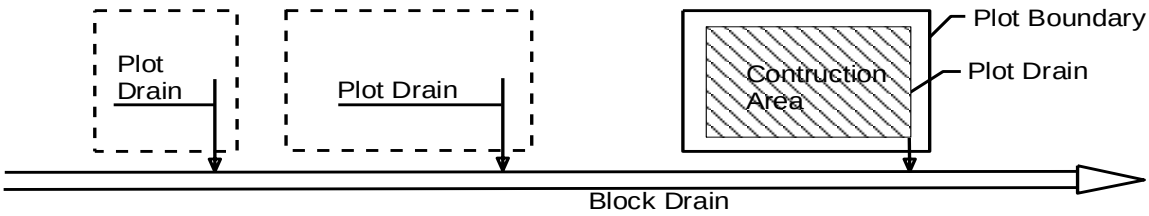


Fig 12-1: A sketch showing plot and block drain

Block Drain

Block drain is provided at the outside of a block that accommodates several buildings of the block. The block drains are made of bricks like plot drains but bigger in size so that it can serve the storm water generated within the block and the buildings and open areas within the block. Sometimes the block drain may serve few neighboring blocks or Mohallahs. Block drains carry storm water coming from the plot drains. Shape of the block drain is also rectangular, bigger than plot drains and its bottom is lower than plot drain. Sketch of the plot drain also shows the block or Mohallah drain under plot drain.

Other Drainage Related Infrastructures

In order to facilitate or mitigate drainage issues some infrastructures are provided or used, these are namely

i. Bridges, culverts, box culverts
ii. Drainage sluices, pipe sluices, siphons
iii. Flood protection embankments and flood walls
iv. Sluice gates, Regulators, Navigation lock
v. Flood protection and drainage structures.

i. Bridges, Culverts and Box Culverts

These structures are provided at places wherever roads cross the drainage network system. Such structures are built on the roads to free passage of drainage water and sometimes to provide navigation/ boat passages. Consequently the conflict between drainage and road networks is mitigated. Figures below show bridge and culverts in such system.

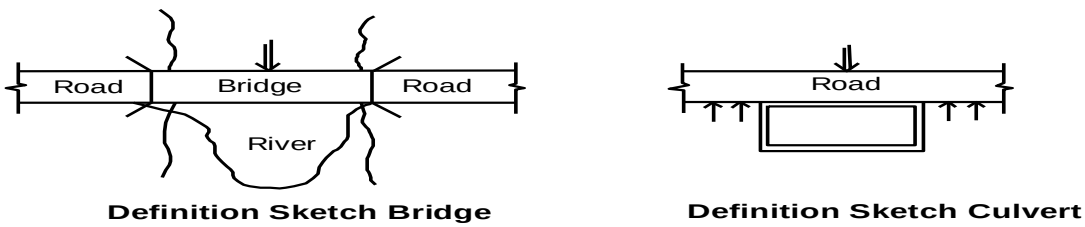


Fig 12-2: Bridge and culvert

ii. Drainage sluices, pipe sluices and siphons

Drainage sluices, pipe sluices and siphons are provided on the embankments. Embankments protect the area from floods coming from outside rivers and make the project area flood free. However storm water from rainfall-runoff within the area causes localized flood, drainage congestion and submergence. A sketch below shows a few of such structures.

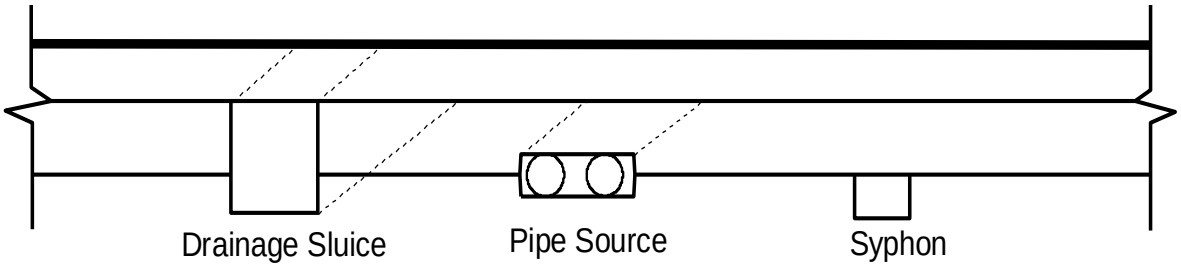


Fig 12-3: A schematic view of Drainage sluice, pipe sluice and siphon on embankment which relieve drainage congestion.

Aschematic view of Drainage sluice, pipe sluice and siphon on embankment which relieve drainage congestion.

Primary Drain

Primary drains are also called main drains. Primary drains cover larger storm drainage area than tertiary and secondary drains. Sometimes primary drain bears local name. In ascending order its position is third. Its cross-section is larger than other types; carrying capacity is high and is constructed of brick, cement concrete and sometimes reinforced concrete. Primary drains may be of earthen structure provided sufficient land is available and land value is low. Contributing drainage water comes from tertiary and secondary drains. Primary drains discharge its drainage water to outfall, natural khal, river or large lowland area / Beels.

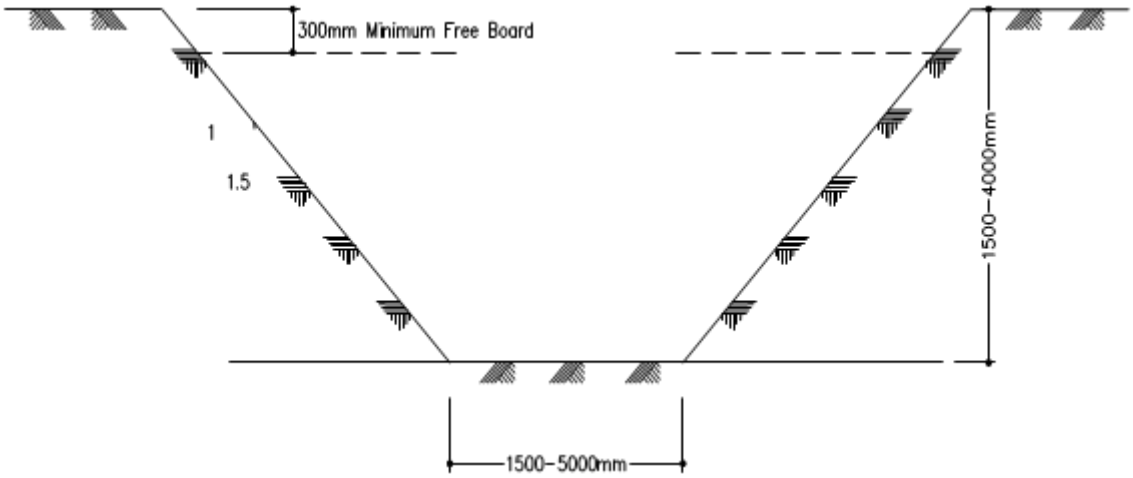


Fig 12-4: Typical Earthen drain

Secondary Drain

Secondary drains collect discharge from tertiary drains. One secondary drain may receive drainage discharges from several tertiary drains in its course. Size and capacity of secondary drain is much bigger than tertiary drains; its catchment area is much bigger than tertiary drain. Like tertiary drain, it may run parallel to bigger roads. Secondary drains may run along and through the middle of its storm water contributing area.

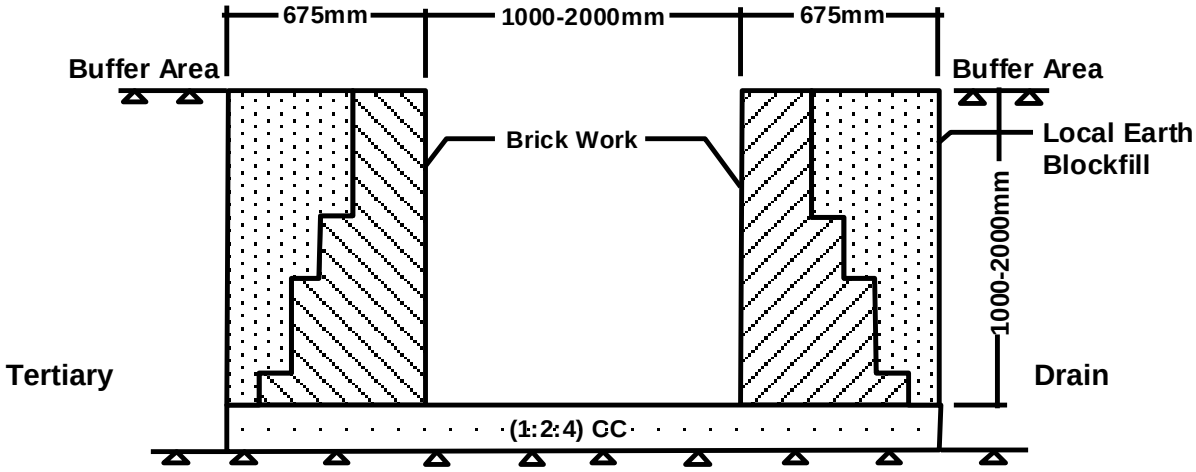


Fig 12-5: A Typical Secondary Drain

Tertiary drain carry run-off or storm water received from the above mentioned plot drains and block or Mohallah drains. Their catchment area or storm water contributing area is bigger than Mohallah drains. In most Paurashava areas it is difficult to find such naming or classifications. However, such classifications can be seen in references. Tertiary drains generally are the under jurisdiction of Paurashava. Those drains or drainage networks are constructed and maintained directly by the Paurashava.

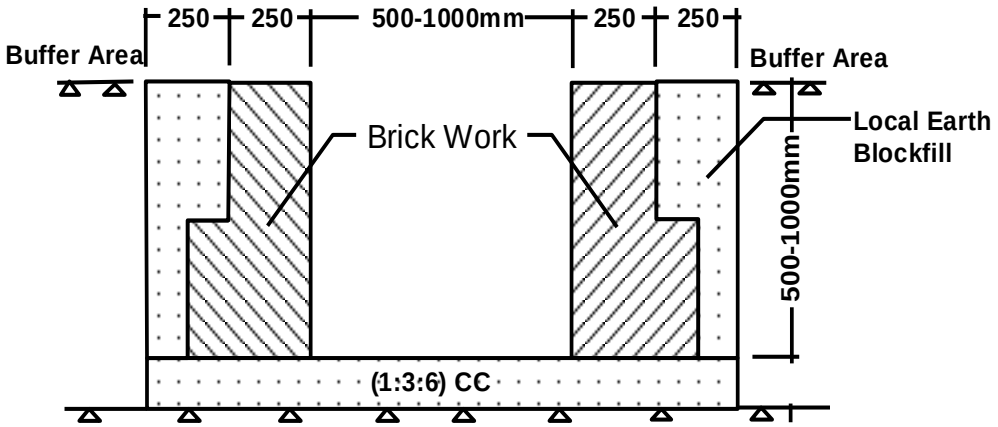


Fig 12-6: A Typical Tertiary Drain

Reservoirs

Large tanks, ponds, Dighis, lakes, etc. serve as immediate detention areas for storm water. Those structures are man-made and also natural; may be privately owned or government-owned or khas land. These structures function as drainage relief and source of water for emergency use, fisheries, duckeries, environment and nature preservation. For every mouza such reservoir is available. Physical feature survey maps and field survey maps (tank, pond and reservoir) show the existence of reservoirs and database shows their dimensions. Those structures should not be disturbed or removed by physical interventions by fillings or other means rather should be properly maintained and preserved.

Quaternary Drain

Quaternary Drains had to be introduced in this particular project due to the complexity of the existing system. These drains are the smallest parts of a large drainage system. It takes the discharge of a small area to a tertiary drain. These are the smallest drains considering the depth and width.

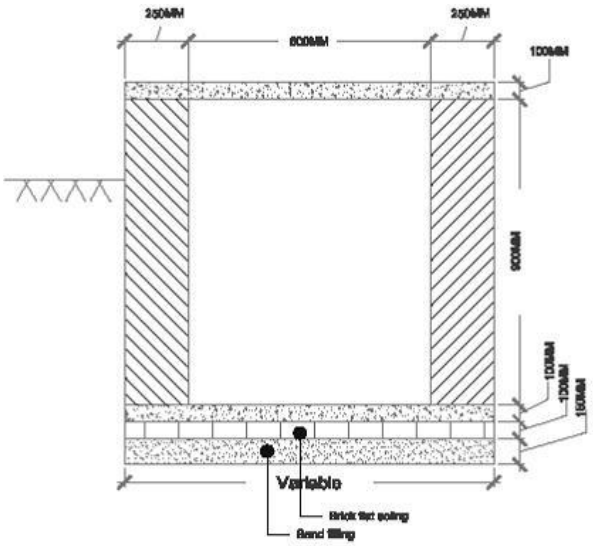


Fig 12-7: A Typical Quaternary Drain

Other kinds of drainage infrastructure are lowland, outfall areas, khals and rivers. Man made drains are Plot, Block, Tertiary, Secondary and Primary drains and others are natural drainage infrastructures. In planning for drainage network, care should be given for road network in terms of conflict of drainage and waterways with roads. In the following and subsequent sections major element, their principle, purpose and function are discussed and presented in lower to higher order.

Drainage Khals and Waterways

Khals and waterways are natural channels and act as drainage elements. In every mouza more or less such natural channel, khals and waterways carry the excess storm water to the connecting river lying further in the down stream. Sometimes old and silted-up khals are re-excavated to improve drainage efficiency. Most of the natural khals carry the local storm water particularly runoff from the Mouza / Mouzas those it passes through. Khals are narrow and deep in cross-sections;

on the other hand waterways are shallow and wider. Physical feature survey maps, field survey maps (river, khal / drainage) show the drainage khals and waterways and their database shows the dimensions.

12.2 Existing Drainage Network

12.2.1 Introduction

For the preparation of Drainage Plan, survey started through field reconnaissance and review of available document related to the study area. The Shibganj Paurashava and its adjacent area have been visited several times to identify the sources of flooding, existing drainage pattern, flood flow pattern and geographical position of the study area. Field trips have also been carried out to identify the infrastructures, rivers, canals, beels, ponds etc., those required to be surveyed for preparation of maps. It is investigated whether any Drainage Plan has been prepared by any other agency. The Mayor of Shibganj Paurashava informed that no such plan has been prepared earlier.

12.2.2 Existing Drainage System/Network

The drainage system of the Shibganj Paurashava has been surveyed and classified into three categories: (i) unlined natural canals and khals acting as primary drains, (ii) beels playing important role in acting as retention ponds and (iii) brick masonry secondary and tertiary drains and earthen shallow secondary drains. The natural primary drains of the Shibganj Paurashava have emerged as a natural process following the natural slope of the ground, for the flow of storm runoff without human intervention.

Natural Drainage System:

The natural drainage network is composed with 183 water bodies in Shibganj Paurashava out of which 73 are ponds and 94 are ditches and 15 khals. Total area devoted to water bodies in Shibganj Paurashava is around 62.09 acres. It can also be seen that the ward 9 possess highest area for water bodies. In this ward there are 10 ponds and 11 ditches.

There are natural drainage systems along roadside and the linkage between natural and man-made drainage system in somewhere. The existing two canals in north and south part of the Paurashava provide opportunity of natural drainage system.

There are linkages between natural and man-made drainage system. But how much effective and active the linkage is with the poorly maintained man-made drains is a question. Almost half of the depth of the man-made drain is filled with solid garbage's; as a result, the channel is not properly functioning (**Table 12-3**).

Table 12-3: Existing natural drainage network of Shibganj Paurashava

Ward No	Pond		Khal		Ditch		Lake		Total	
	Count	Area (Acre)	Count	Area (Acre)	Count	Area (Acre)	Count	Area (Acre)	Count	Area (Acre)
1	10	3.43	3	1.58	17	2.14	0	0	30	7.14
2	10	5.41	0	0	3	0.12	0	0	13	5.52
3	11	3.08	0	0	9	0.59	0	0	20	3.67
4	4	0.54	0	0	3	0.07	0	0	7	0.62
5	9	1.92	3	0.79	9	0.89	0	0	21	3.59
6	3	0.58	0	0	20	1.47	0	0	23	2.06

7	4	2.15	0	0	2	0.23	0	0	6	2.38
8	12	5.62	3	1.84	20	2.10	0	0	35	9.56
9	10	9.25	6	14.47	11	1.86	1	1.97	28	27.55
Total	**73**	**31.98**	**15**	**18.68**	**94**	**9.46**	**1**	**1.97**	**183**	**62.09**

Source: Physical Feature Survey, 2011.

Man-made Drains

The following table shows the ward-wise drainage coverage and type on the basis of construction pattern in Shibganj Paurashava. From the table it is seen there exists Pucca and Katcha drains in Shibganj Paurashava. The table also indicates that there is limited amount of drainage in Shibganj Paurashava. In this Paurashava there is 14.24 km drain. Uncovered drains are mostly in existence with poor condition. Detail statistics of existing man-made drainage network is shown in the **Table-12-4**.

Table 12-4: Type of drain in Shibganj Paurashava

Ward No	Length(km)		Total Length (km)
	Pucca	Katcha	
1	0.26	0.00	0.26
2	3.23	0.00	3.23
3	0.61	0.00	0.61
4	4.03	0.00	4.03
5	3.86	0.30	4.16
6	0.39	0.00	0.39
7	0.40	0.00	0.40
8	0.81	0.26	1.07
9	0.10	0.00	0.10
Total	13.69	0.56	14.24

Source: Drainage and Environmental Survey in Paurashava, 2011

In Shibganj there are no mentionable long drains with designated outfall. Only the following five drains can be considered as large drain compared to other drains (**Table 12-5**).

Table 12-5: Location, start and end of some drains in Shibganj Paurashava

Sl No	Location	Type	Ward No	Length (m)	Width (m)	Start	End (Outfall)
1	Along C&B Road	Pucca	5	272.28	0.3	Autorichshaw Owner Association	Another Drain
2	Along C&B Road	Pucca	4	256.494	0.3	Telephone Office	Another drain
3	In front of Upazilla Health & Family Planning Office	Pucca	2	169.134	0.4	Upazilla Animal Wealth Department	Al-Modina Islami Hospital Pvt. Ltd.
4	In front of Sonali Bank	Pucca	2	270.414	0.4	National life Insurance Company	Youth Depatrment
5	Along Madrasha Road	Pucca	8	270.986	0.6	Pond	Ditch

Source: Drainage and Environmental Survey in Shibganj Paurashava, 2011

In this Paurashava there is 5.62 km drain. These drains are constructed by the Paurashava.

12.2.3 Analysis on land level (Topography)

Land Levels/Spot Levels

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 approximately at 35 meter intervals.

Maximum level of Shibganj Paurashava is 28.29 m located at ward no 5 and lowest point is recorded as 17.62 m located at ward no 9. Average elevation of Shibganj Paurashava area is derived as 21.67 m. Average spot height gives the indication of relative of various wards. It seen that ward 1 and 2 are comparatively high land area with average spot levels of 23.81, 24.94 m respectively.

Details statistical summary of land levels survey are shown in **Table 12-6** and **Table 12-7** below.

Table 12-6: Summary of Spot Level Data of Shibganj Paurashava

No.	Spot Unit	Value (meter)
1	Total Spot Number	18478
2	Maximum Height	28.29 m
3	Minimum Height	17.62 m
4	Average Spot Height	21.67 m
5	Variance	1.53 m
6	Standard Deviation	18478

Source: Topographic Survey in Paurashava, 2011

Table 12-7: Characteristics of Land Levels of Shibganj Paurashava

Ward No	Land Level Characteristics
Ward no 01	High with small low part
Ward no 02	High
Ward no 03	High with small low part
Ward no 04	High
Ward no 05	High
Ward no 06	High with small low part
Ward no 07	Composition of high, low and medium
Ward no 08	Composition of high, low and medium
Ward no 09	Low

Source: Derived from Topographic Survey Data of Paurashava, 2011

General Contour Descriptions

Paurashava is situated in a high land area. More interpretation can be derived from a Surface Analysis. In the following there are two maps. The first **Map 12-1** shows the contour description and **Map 12-2** surface analysis of Paurashava. From the surface analysis map it can be found that the north-west part of the Paurashava is comparatively higher than other areas. This part comprises of parts of ward 1, and 2. From the surface analysis map it is found that ward 1 is higher

compared to other wards. From the surface analysis map it can be deduced that most of the area of ward 4, 5 and 2 are high.

Table 12-8: Land Use Category with Spot Heights (mPWD) in Shibganj Paurashava

Landuse	Min	Max	Mean
Agriculture	19.11	23.911	21.46
Circulation Network	19.941	23.749	22.84
Commercial Activity	20.331	23.968	23.06
Community Service	20.679	23.77	22.89
Education and Research	22.397	23.912	23.55
Governmental Services	23.401	23.779	23.57
Industrial/Processing & Manufacturing	22.882	23.785	23.55
Miscellaneous	20.109	23.751	22.02
Mixed Use	23.13	23.927	23.48
Non Government Services	23.402	23.624	23.53
Recreational Facility	23.416	23.762	23.47
Residential	19.376	24.009	22.80
Service Activity	23.403	24.001	23.52
Transport and Communication	22.515	23.607	23.24
Urban Green Space	19.26	23.792	22.42
Waterbody	17.615	23.646	20.06

Source: Topographic Survey in Shibganj Paurashava, 2011

Map 12-1: Contour Map of Shibganj Paurashava

Map 12-2: Surface Analysis of Shibganj Paurashava

12.2.4 Analysis of peak 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.

Regarding runoff discharge it has been observed that there are 2 number of khals passing through the Shibganj Paurashava. Those are the only natural drainage channels which receives part of the runoff volume from part of the town.

It has been observed from the drainage network survey that 1.57 km brick masonry drains have been constructed by the Paurashava and the DPHE during last few years. Some of the drains are working properly but most of them are temporarily connected to ditches or discharging to paddy field. These drains have been constructed in an unplanned way and without considering proper outfalls. The drains are constructed as piece meal, no proper size and gradient has been maintained. As a result, with the expansion of township some of them already have to abandon. The common run-off coefficients of different types of areas are listed in **Table 12-5** below.

Table 12-9: 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
	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

12.3 Plans 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. To solve the overall drainage problem of the Shibganj Paurashava a Drainage Plan has to prepare as integral part of Paurashava Master Plan. During preparation of land use plan special emphasis to be given to retain the existing water bodies. Special attention to be given to protect the khash lands of khals and beel from illegal encroachment and no circumstances it shall be allowed to change their nature. As part of the Drainage Plan the Paurashava to be divided into several drainage zones. Runoff from each drainage zones shall reach to the primary drains. The existing tertiary drains those will match with the proposed network will be rehabilitated, those not have to abandon.

12.3.1.1 Drain Network Plan

The activity for the relevant authority will be assisted by the preparation of the drainage master plan for the Paurashava which details the necessary corridors, plot sizes and generalized locations for:

- Primary canal / khal (new and improved).
- Secondary and tertiary canal / khal (new and improved).
- Storage ponds.
- Silt traps.
- River embankment.

Initially, the Paurashava will encourage implementation of the first phase recommendation of the drainage master plan. A brief summary of the proposals to be undertaken in Phase-1 is given below. Reference should be made to the Map for identification of the drainage areas referred in the text.

Phase-1 (Storm water drainage)

- Local improvements and the removal of obstacles from existing canals in drainage areas:
  - Redesign of hydraulically inefficient bends, entrances and exists.
  - Rising and / or widening of bridges and culverts to give unobstructed flows.
  - Returning the channels to a uniform cross-section by removal of encroachingproperties and structures.
  - Raising crossings over roadside channels to adjacent properties above the flood level of the waterway.
- Construction of silt traps in drainage areas. Minimum size of the plot required to house these silt traps in 20 meters by 20 meters.
- Improvements of primary canals in drainage areas.
- Improvements of secondary and tertiary canals in drainage areas.
- Construction of missing canals (new) in drainage areas.
- Construction of new secondary and tertiary canals in drainage.
- The provision of flood control regulators in drainage areas.

Phase-2 (Rain water and household drainage)

- Construction of surface drain linked with the residences, may be covered or uncovered.
- Provide linkages with secondary and tertiary drains.
- Out-fall of such drains may be nearby canals and low-lands.
- For discharging of rainwater from commercial areas, covered surface drain may be constructed and they will be linked with the secondary and tertiary canals.

12.3.1.2 Proposal for Improvement of the Existing Drainage Networks

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.
- Fencing off some of the channels to prevent dumping of refuse.
- Construction of new channels and rehabilitation of old ones with enough drainage head.
- Construct a new pump drainage network for the area towards Lula River.
- Remove all un-authorized structures, which developed on drainage structures.

In order to drain out the anticipated future peak runoff to be generated from rainfall due to increase in impervious land cover as well as built-up areas and to mitigate the vulnerability of rainfall induced flooding and water logging, some existing secondary drains have been identified for improvement.

Drainage corridors: If a drainage network has to be installed, the drainage originating throughout the Paurashava would be carried by means of surface drains and culverts. These should be accommodated within road reserves.

General location required: For sewerage treatment plant, large plot will be needed, preferably on outskirts of the Paurashava. For sewerage pumping station, small plots throughout the Paurashava will be needed and a system should be introduced.

Maintaining of land slope: Important component of the drainage network is land slope, which was not maintained during the construction of existing drains. The slope of the Paurashava is found towards east and southeast. Slope of all drains should maintain this direction.

12.3.1.3 List of Proposed New Drains

For effective functioning of existing drainage network, some new drains have been proposed in the project area which is listed in **Table 12-10**. 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. A complete drainage master plan of 148 Paurashavas is currently preparing by DPHE has fall under this project. So the detail drainage master plan should get prior consideration while implementing this plan.

The proposed drain of Shibganj Paurashava is about 81.78km where 6.76 is primary drain; 24.03 is secondary drain and 50.98 is Tertiary drain. This will designated up to 2031.

The proposed drains along with existing drains and other drainage infrastructures are shown in **Map 12-3**.

Table 12-10: Proposal of New Drains

Proposed ID	Type	Length (m)	Phase	Width(m)
PD-1	Primary	2249.96	First Phase	≥3m
PD-79	Primary	1666.84	Secondary Phase	≥3m
SD-2	Secondary	2190.29	Secondary Phase	1-3m
SD-4	Secondary	1572.97	Secondary Phase	1-3m
SD-5	Secondary	1701.11	Secondary Phase	1-3m
SD-6	Secondary	1324.29	Secondary Phase	1-3m
SD-33	Secondary	667.49	Secondary Phase	1-3m
SD-34	Secondary	535.85	Secondary Phase	1-3m
SD-40	Secondary	558.78	Secondary Phase	1-3m
SD-43	Secondary	1381.88	Secondary Phase	1-3m
SD-51	Secondary	652.45	Secondary Phase	1-3m
SD-59	Secondary	5416.33	First Phase	1-3m
SD-60	Secondary	575.73	Secondary Phase	1-3m
SD-61	Secondary	854.88	Secondary Phase	1-3m
SD-80	Secondary	786.61	Secondary Phase	1-3m
SD-81	Secondary	497.68	Secondary Phase	1-3m
SD-82	Secondary	3045.49	First Phase	1-3m
SD-91	Secondary	1773.01	First Phase	1-3m
SD-94	Secondary	2359.98	First Phase	1-3m
SD-129	Secondary	3701.52	First Phase	1-3m
SD-178	Secondary	975.49	Secondary Phase	1-3m
SD-179	Secondary	996.65	Secondary Phase	1-3m
TD-3	Tertiary	1324.29	Secondary Phase	≤1m
TD-7	Tertiary	667.49	Secondary Phase	≤1m
TD-8	Tertiary	535.85	Secondary Phase	≤1m
TD-9	Tertiary	558.78	Secondary Phase	≤1m
TD-10	Tertiary	1381.88	Secondary Phase	≤1m
TD-11	Tertiary	652.45	Secondary Phase	≤1m
TD-12	Tertiary	5416.33	First Phase	≤1m
TD-13	Tertiary	575.73	Secondary Phase	≤1m
TD-14	Tertiary	854.88	Secondary Phase	≤1m
TD-15	Tertiary	786.61	Secondary Phase	≤1m

Drains having length ≥ 250 meter are incorporated here. Detail was given in Appendix-C

Map 12-2: Drainage Plan Map of Shibganj Paurashava

12.4 Plan Implementation Strategies

Paurashava is affected frequently by rainfall run-off due to inability of the existing secondary and tertiary drains to drain out the run-off efficiently. There are inadequate no of secondary and tertiary drains in Shibganj Paurashava. Presently due to lack of adequate no of secondary and tertiary drains, most of the areas of the Paurashava are subjected to water logging during the intensive rainfall in the monsoon period. The existing secondary and tertiary drains may be improved and its different component needs to link with an overall integrated system. The existing borrow pit along the highway, secondary and tertiary drains are observed to suffer from continued negligence in respect of maintenance, clearing, removal of blocking etc.

The existing borrow pit/ drains will be incorporated into the proposed system to the extent to achieve available drainage system for the Paurashava. The drainage management plan of the Paurashava has been prepared for the peak monsoon period when the drainage system stands critical and drainage problem develops due to blocking, inadequate section of the khals and obstruction in the drainage path. Therefore, adequate numbers of new secondary and tertiary drains have to be constructed, following a systemic drainage network.

12.4.1 Regulations to implement the Drainage and Flood Plan

In preparing drainage management plan, the flowing design approach has been presented in this report. In the design approach, the Consultants have considered the practical aspects of desired results, cost efficiency, durability including ease of construction and maintenance. Visible social improvements for the urban population are considered to be the most important and mitigation of the annual flooding damage is considered to be the greatest tangible benefit. Reduction of diseases, infant Morrtality and increase of life span are considered to be the greatest intangible benefits.

In line with these considerations, the following broad approach has been adopted in preparing the drainage management plan for Paurashava.

Channel Improvement

Canal and channel improvement means the improvement and re-excavation of existing open channels. The existing all Khals need excavation and removal of all illegal structure along the path.

Land Acquisition

New land acquisition has to be kept to as absolute minimum due to the high cost and time required for acquisition. New land acquisition is negligible as most of the proposed drains passes through land owned by Paurashava or Khas land.

Storing and Detention Ponds

Existing borrow pits, ponds, low pockets within the urban areas and agricultural low lands within the fringe area, all ac as retention ponds and all these serve to delay the peak floods during heavy storms. The retention areas also recharge the aquifer water level. In the absence of internal storage areas within the Paurashava area, the existing ponds (>= 0.25 acre) , proposed retention area, low pockets etc. continue to serve as reservoir in the coming years and the Paurashava should endeavor to remain these low lands in the future.

Drainage System Capacity

The drainage systems (tertiary and secondary drain) has been designed to handle the average runoff for 1.1 year recurrence interval for tertiary drain and 2 years recurrence interval for secondary drain from peak storms without overflowing considering the estimated development level as up to the year 2031. This means that fully built-up areas will be designed for the present situation, while areas, which are not fully built-up, will have excess capacity to handle rainfall of greater intensity during the developing period.

Drainage Channel Sections

The drainage system has been designed to handle the average annual run-off from peak storms with 100mm freeboard for tertiary drain and 150mm freeboard for secondary drain overtopping.

Three standard open channel sections are proposed to be used for the works, as shown in the following table. The rectangular pucca Type-1 drain is suitable for collection of run-off from medium size catchments areas and is proposed to be used for tertiary roadside drains and secondary drains in congested areas. Type-1 drain may be constructed from brick or reinforced concrete, as most appropriate and economical one.

The trapezoidal section of drain Type-2 and 3 are suitable for collection of run- off from medium and large catchments areas, and are to be used for secondary and primary drains in unconstructed areas. Drain Type- 2 is proposed to be pucca drain using nominal reinforced concrete with cement plaster surface to improve its flow characteristics and durability, add to reduce the long term costs of cleaning and maintenance. Drain Type-1 is also proposed to be a pucca drain using brick work lining, but may initially be constructed as an earthen (Katcha) drain suitable for future upgrading depending on the availability of land, flow requirements and cost. The bottoms of drains Type-2 and 3 are to be redesigned with a transverse slope of 1:8 (V: H) to keep the flow velocity as high as possible during the dry season.

Construction criteria and locations to be used are shown in the following **Table 12-8**.

Table 12-11: List of Construction Criteria and Locations

Sl. No.	Type of Drain	Construction Criteria	Locations to be Used
1.	Type- 1	Lined, Brick work	Tertiary and secondary improvement on the existing
2.	Type- 2	Lined, Brick	Secondary and primary drains
3.	Type- 3	Lined, Katcha Drain	Primary katcha drains

Trash Rack and Sumps

Trash racks and sumps are normally used to prevent debris (silt/ solid wastes) from entering into the drainage systems where major problems could occur as a result of debris accumulation. Trash racks and sumps are considered appropriate for the Paurashava situation. In the drainage management plan, locations for trash racks and sumps along the major road network will identify during preparation of final plan.

Preventive Maintenance Program

For the proper functioning of the drainage system, it is essential to have an appropriate maintenance program. The program must include inspection, enforcement, cleaning and repair.

The frequency of inspection and cleaning will be dependent on the season of the year with More frequent inspection and cleaning at the start of the rainy season and on the importance of the drain. The maintenance programs are:

a) Inspection

- Open pucca drains - monthly in general; weekly in market areas
- Covered pucca drains - monthly with drains opened in February
- Kutcha drains - monthly
- All drains - following first heavy rainfall in year

b) Cleaning

- Open pucca drains - as required
- Covered pucca drains - in February when opened
- Kutcha drains and culverts - January to February prior to rains
- All drains - as revealed by inspection

The inspections will also show where repairs are required and where encroachment intothe drain and deliberate blocking of the drain is taking place. Appropriate action toenforce the regulations must be initiated immediately. The cleaning of permanently closed pucca drains and small culverts is difficult and time consuming. New drains should have removable covers to facilitate cleaning.

Responsibility of development and construction of khal/drains rests with Engineering Department. Whereas,the responsibility of cleaning and conservancy of drains is falls under the conservancy section under health department. Operation and maintenance of drains of the Paurashava involve the set vices in the following areas.

- Conservancy (Cleaning of drains)
- Mosquito killing
- Solid waste management
- Structural maintenance of drains

It is essential that the Paurashava should develop a routine preventive maintenance program for the drainage system. The structural improvements to be taken up under the project will provide a sustainable benefit. A failure to develop the capacity and methods related to preventative maintenance program will entirely eliminate the benefits of the program in the long run.

Though the needs and methods must ultimately be identified by the personnel responsible for the maintenance, it is suggested that the following guidelines should be followed for initial development of the staffing and equipment for a preventive maintenance program:

- drain should be cleaned once per month, but not less frequently than once per three month;
- task objective for I cleaner/sweeper should be 50m of primary / secondary drains, per day;
- supervisors should be provided at the rate of 1 Jamader for-each 10 sweepers, and I sanitary inspector for each 4 Jamaders;
- adequate equipment should be provided for efficient operations of cleaning crews, including wheel barrows and miscellaneous hand tools for each drain cleaner, 3 ton dump truck for waste transport and disposal.

Based on this, standard drain cleaning crews consisting of 51 cleaners, 5 Jamaders and 2 sanitary inspectors will be adequate to carry out the routine preventive maintenance operation required to keep the system in good operating condition.

12.4.2 Implementation, Monitoring, Evaluation & Coordination of the Plan

In some specific area of Shibganj Paurashava, there are some scattered low-lying areas which are subjected to water-logging during and after heavy rainfall in a year between July and August normally for 30-40 days. The depth of stagnant water varies between 0.25 m to 0.35m and usually lasts for 4.00 to 6.00 hours. The water—logging situation is likely to further aggravate in the years to come with increasing urbanization. The primary causes of this water-logging are as follows:

- Lack of cleaning and maintenance of the khals/drains
- Unplanned and under designed existing drainage system
- Obstruction and encroachments in the khals/ drains
- Lack of construction and integration of tertiary, secondary drains and primary khals
- Due to non-existence of drains in different places.

In order to address the above mentioned problem the following proposals have been made in the drainage master plan:

- The proposed drainage system for Shibganj Paurashava has been planned with a view to discharges most, of the storm run-off in Khals by gravity flow and no pumping is necessary.
- Under the provision of proposed drainage master plan, major khals constitute the storm water run-off delivery system and have been defined as the primary khals. Timely undertaking of the drainage master plan including study is considered a timely venture to know the drainage issues within Shibganj Paurashava and to formulate and investment project to reduce sufferings of the Paurashava residents.
- The proposed drainage management plan is justified technically, economically and socially. The priority program is recommended for implementation considering the present serious drainage problems faced by the Paurashava residents. The project after implementation will mitigate the major drainage problems in the core and semi-core area where the density of population varies from high to medium.
- The proposed drainage master plan is likely to be co-coordinated with other utility providing organizations to avoid over-lapping and duplication. As such, very close co-ordination with DPHE, BWDB and other utility organizations should be maintained during the project implementation so that, disruption does not take place in utility services.
- It is recommended that cadre cost of the first phase of the project priority program is funded as grant financing to Paurashava by ADB because the Paurashava is not in a position to implement this project from their own resources.
- The revenue collection of Shibganj Paurashava is moderate. The Shibganj Paurashava authority' is unable to make assessment of tax timely. Paurashava shall have to improve significantly in revenue collection and the efficient financial management so that the Shibganj Paurashava can properly maintain the drainage system including the control of environmental sanitation.
- Financial sustainability is possible by increasing revenue collection efficiency with activities like more arrear collection & re-assessment of taxes in regular intervals. Re-assessment in

every 5 years is recommended. Re-assessment process should commence sufficiently in advance so that appeal process could be completed prior to the effective date. Distress warrants against big-defaulters both in terms of amount due and years overdue may be executed in order to achieve good Governance & financial sustainability.

B. Environmental Management Plan

12.5 Introduction

Improvement of the environmental system has been identified as one of the highest priority needs of the Paurashava authority as well as the resident. This is an essential part for the future development of the urban areas. The main objectives of the environmental study are to assess the existing environmental condition in the Shibganj Paurashava and to identify the future requirements of the control over environmentally critical and vulnerable areas and living things.

12.5.1 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.

12.5.2 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 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. 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.

12.6 Existing Environmental Condition

12.6.1 Introduction

The urban environment of the Shibganj 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 centers concentrate services, infrastructure, labor, 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.

12.6.2 Geo-morphology

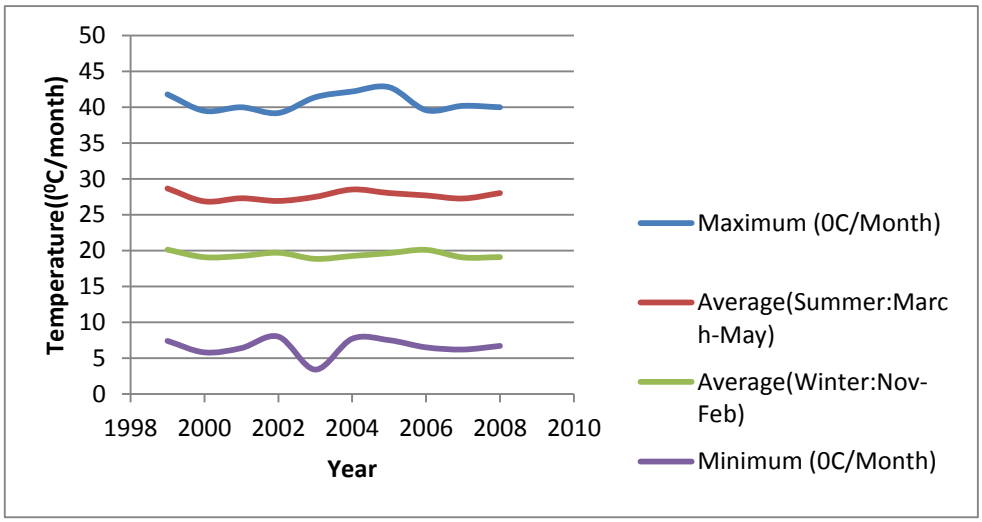
Geological condition

It is known from the agricultural officer of Upazila that there are several types of soils in this area. According to agricultural office at there is 2/3 of the soil is loomy soil. Besides, doash and sandy soil are also found there.

Morphological condition

Temperature

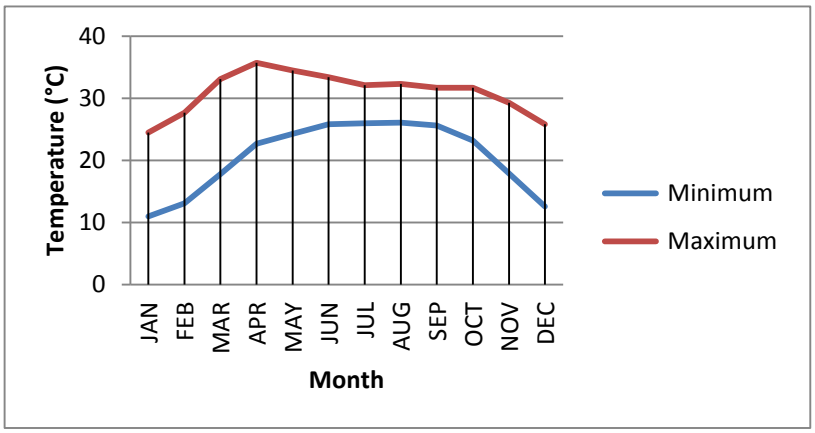
Temperature is a measurement of the average kinetic energy of the molecules in an object or system and can be measured with a thermometer or a calorimeter. It is a means of determining the internal energy contained within the system. The following figure shows the temperature characteristics of last 10 years in Paurashava. From the figure it is seen that maximum temperature has an increasing trend over the years.



Source: Based on Data from Bangladesh Meteorological Department, Dhaka, 2009

Fig 12-8: Temperature characteristics of last 10 years in Paurashava

The following figure shows the Normal Maximum and Minimum Temperature Characteristics across the year in Paurashava. From the figure it is seen that there exist maximum temperature in the month of April. It is also observed that in the mid-year (from April to October) the temperature is higher compared to other section of the year.

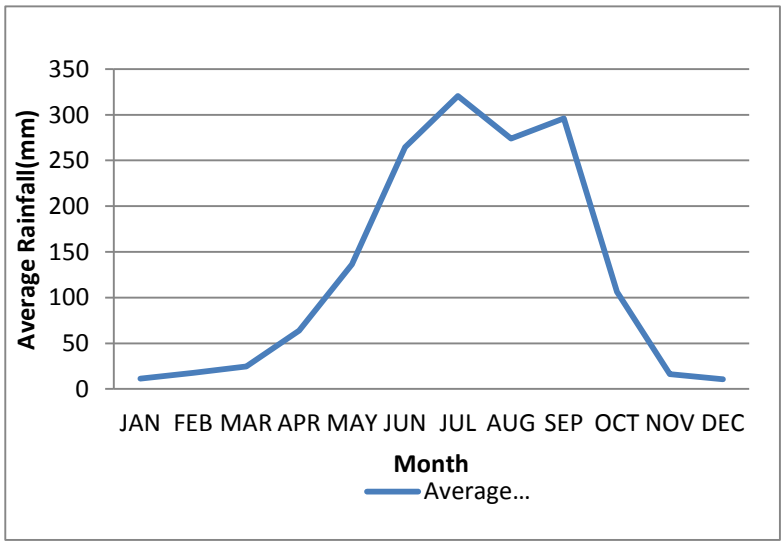


Source: Based on Data from Bangladesh Meteorological Department, Dhaka, 2009

Fig 12-9: Normal Maximum and Minimum Temperature Characteristics across the year in Paurashava

Rainfall

Rainfall is the amount of precipitation of any type, primarily liquid. It is usually the amount that is measured by a rain gauge. The following figure shows the Average Rainfall Characteristics across the year in Shibganj Paurashava. From the figure it is seen that the highest rainfall occurs mainly in the month of June, July and August.



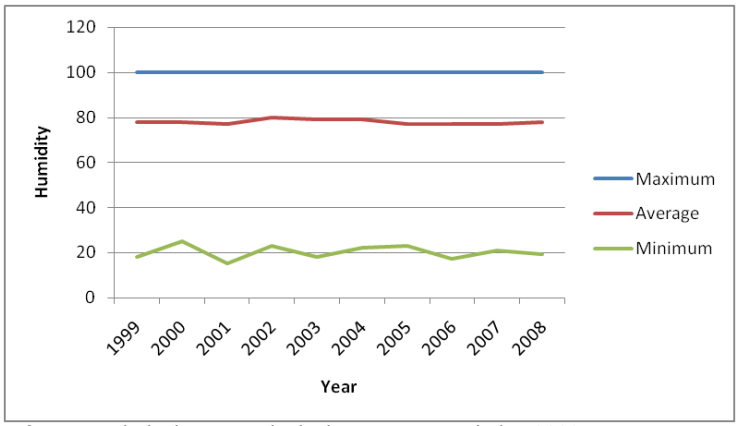
Source: Based on Data from Bangladesh Meteorological Department, Dhaka, 2009

Fig 12-10: Average Rainfall Characteristics across the year in Shibganj Paurashava

The following figure shows the rainfall characteristics of last 10 years in Shibganj Paurashava. From the figure it is seen that maximum rainfall has an increasing trend over the years and it becomes highest in the year 2007.

Humidity

The following figure shows the humidity characteristics of last 10 years in Shibganj Paurashava. From the figure it is seen that there is no much change in humidity in over the years.



Source: Based on Data from Bangladesh Meteorological Department, Dhaka, 2009

Fig 12-11: Humidity characteristics of last 10 years in Paurashava

12.6.3 Solid Waste and Garbage disposal

The solid waste and garbage disposal of Shibganj Paurashava includes house hold waste, industrial waste, kitchen market waste, clinic/hospital waste, latrine waste, brickfield waste and fertilizer/chemical related waste.

The production of solid waste in Shibganj Paurashava per person per day is around 250gm and the total Paurashava production is 7.044 ton/day. The household waste is thrown by the people to roadside drains or open spaces adjacent to their houses. The garbage from kitchen market and untreated hospital waste from UHC disposed to open space by the side of the road, drain or ditch and polluting living environment which is a great threat to human health.

12.6.4 Waste Management System

It has been observed that the solid waste management in the Shibganj Paurashava is not well managed. Solid waste is generated from kitchen markets, Upazila Health Complex (UHC), many schools, colleges, offices and, small and cottage industries within the Shibganj Paurashava. The Paurashava has no solid waste disposal system. The Paurashava has neither any dumping yard of its own nor any transfer station. The Paurashava has only one temporary cleaner engaged for cleaning the Paurashava office building only. It has no dump truck, no pull cart and no dust bin. The solid waste management coverage is only a part of the total area.

12.6.5 Pollutions

12.6.5.1 Water

Water pollution is the presence of pollutants, particles or contaminants in water beyond the level which is desirable for drinking. Saltwater encroachment associated with over drafting of aquifers or natural leaching deposits are natural sources of groundwater pollution. Most concern over

groundwater contamination has centered on pollution associated with human activities. Human groundwater contamination can be related to waste disposal (private sewage disposal systems, land disposal of solid waste, municipal wastewater, wastewater impoundments, land spreading of sludge, brine disposal from the petroleum industry, mine wastes, deep-well disposal of liquid wastes, animal feedlot wastes, and radioactive wastes).

In Shibganj Paurashava there is no significant level of ground water pollution. Here both groundwater and surface water are free from significant pollutant. One of the main reasons behind this is the absence of industrial effluents in this area and the presence of Padma River. Besides the generation of solid waste and municipal waste water is not a huge amount. It can be mentioned that several years ago a very little amount of arsenic was identified in ground water although which falls under acceptable level.

12.6.5.2 Air

Air pollution is the introduction of chemicals, particulate matter, or biological materials that cause harm or discomfort to humans or other living organisms, or damages the natural environment into the atmosphere. An air pollutant is known as a substance in the air that can cause harm to humans and the environment. Pollutants can be in the form of solid particles, liquid droplets, or gases. In addition, they may be natural or man-made. Sources for air pollution include stationary sources such as smoke stacks of power plants, manufacturing facilities and waste incinerators, as well as furnaces and other types of fuel-burning heating devices, mobile sources such as motor vehicles and other sources such as chemicals, dust and fumes from agricultural and industrial processing.

In Shibganj Paurashava some sorts of pollutant are found to be exposed in the air causing air pollution. For instance, emissions from vehicle exhausts of old and poorly maintained buses and trucks, loading, unloading, and carrying of sand and soil without any dust preventive measures are found within the Paurashava. But the amount of pollution is insignificant and within acceptable level. It can be mentioned that within this Paurashava area there is no brick field which is the vital source of air pollution. There are 06 saw mill and 08 rice mill which expose some amount of air pollutant.

12.6.5.3 Sound

Sound pollution is a type of energy pollution in which distracting, irritating, or damaging sounds are freely audible. It is displeasing human, animal or machine-created sound that disrupts the activity or balance of human or animal life. The source of most outdoor sound pollution is mainly construction and transportation systems, including motor vehicle noise, aircraft noise and rail noise. Indoor and outdoor sound pollution sources include car alarms, emergency service sirens, mechanical equipment, fireworks, compressed air horns, grounds keeping equipment, barking dogs, appliances, lighting hum, audio entertainment systems, electric megaphones, and loud people. In Shibganj Paurashava, the source of sound pollution is found to be little. In this Paurashava there is a little incident of much construction work. The movement of motorized vehicle is also less. So sound pollution in this Paurashava is not significant and disturbing.

12.6.5.4 Arsenic

Ground water pollution has been found to be a critical problem in Paurashava under SHIBGANJ upazilla and the surrounding areas. The main problems relate to the high iron

content, which is in the range 0.4-3.5 mg lõ¹ in the RCC area ad 0.23-7.12 mg lõ¹outside the RCC area, both of which exceed the national drinking water standards for iron of 0.3-1.0 mg lõ¹. The level of manganese was also found to be high, ranging from 0.1-1.52 mg lõ¹in the RCC area to 0.23-2.40 mg lõ¹outside the area, and exceeding the drinking water standard of 0.1 mg lõ¹. High levels of arsenic contamination were also reported in some areas.

Surface water quality is similarly poor because untreated urban effluent is discharged through various drains into the khals (canals) and beels (seasonal ponds), and ultimately to the agricultural fields to the north, which according to the RDA report, is affecting agriculture and human health (ibid). Tests have shown that the water in surface water bodies in the area, including the Padma and Mahananda rivers, some beels and ponds, exceeds the national standards for drinking water for Bangladesh of 50 or less total coli form number/100 (TCN/100), having fecal coli form bacteria counts of 70-400 number/100. Tests for iron, chloride and manganese showed that: the concentration of chloride is within limits; the Padma is within the drinking water limits for iron during the rainy season but not the summer, whist the Baraonai exceeds it in both seasons; manganese is within limits in samples collected from the Padma in the dry season but exceeded limits in almost all locations in the rainy season.

12.6.6 Natural Calamities and Localized Hazards

12.6.6.1 Cyclone

In Shibganj Cyclone is not a regular phenomenon. In fact till now no record is found regarding the occurrence of Cyclone passing through this Paurashava. It can be mentioned that in 1998 a Cyclone passed through the middle part of Upazila. The affected villages were Baoikhola and Doeal. Many houses, agricultural crops, trees were destroyed due to that Cyclone. Some animals were died. But no human death occurred in that Cyclone. In this Paurashava there is no Cyclone shelter because the incident of Cyclone is not regular.

12.6.6.2 River Erosion

Being one of the major floodplain areas of the country Town annually experiences riverbank erosion hazard due to sudden and rapid channel shifting. Consequently, valuable cultivable land is lost; also village settlements, markets and towns are destroyed.

In the local channels of the mighty Padma River have episodically and capriciously wandered across the landscape, eroding their banks, destroying everything in their paths and accreting land elsewhere.

It can be mentioned that the Shibganj Paurashava, being situated apart from the Padma River, till not destroyed by the River bank erosion. But if the River bank of the Padma River continues to erode then within a few years the River will reach at Shibganj Paurashava destroying the properties in this Paurashava. From the government, several years ago, a spare had been constructed at Meghai (a locality of Upazila) to protect river bank erosion. But the spare is not sufficient to protect completely the area from river bank erosion.

12.6.6.3 Flood

The Paurashava comparatively elevated with gentle slope from the south-east to north-west direction due to the influence of the Baral River basin. The town is protected by embankment along the Padma and not subject to annual flooding. Flooding in the area usually occurs due to the over

flow of the River Padma and Baral.The existing drains cannot discharge the huge volume of storm water efficiently to the defined out falls. Because of prevailing such situation, local flooding occurs in many places of the Paurashava.

It can be mentioned that some portion of the western part of the Paurashava falls outside the embankment. In this side the flood is annual phenomenon. The people in this area have to suffer a lot due to annual flood. Sometimes the flood water reaches into their houses.

12.6.6.4 Earth Quake

Like Cyclone, Earth Quake in this area is not a regular phenomenon. Although several Earth Quake were observed in this area over the past decades but the intensity was very low and damages occurred due to Earth Quake.

12.6.6.5 Water Logging

Inundation occurs in some parts of the Paurashava due to localized storm that is affecting the drainage system of the Paurashava and creating a worse environment for the residents living in those areas.

The depth of inundation and duration varies from place of place. However, it is ranged from 0.5m to 2.5m in depth and the duration of water logging varies from 6 hrs to 20 hrs and even it lasts for several days. The reasons for water logging are as follows:

a) Absence of planned drainage system.
b) Absence of integrated drainage network of tertiary and secondary drains with primary drainage system.
c) Existing drains with low discharge capacity.
d) Indiscriminate disposal of solid waste into the drainage system that reduces the flow capacity of the whole system.
e) Lack of proper initiative for cleaning and maintenance of existing drainage system.

It is known from the local people that the Paurashava authority did not take any substantial initiative to remove or to reduce the problem of water logging.

12.6.6.6 Fire Hazard

In this Paurashava no mentionable fire hazard occurred in the last decade.

12.7 Plans for Environmental Management and Pollution Control

12.7.1 Proposals for Environmental Issues

12.7.1.1 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.

Table 12-12: Proposal of Solid Waste Manegement

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.
Waste Dumping Ground	4.15	1	Debinagar 152_02	1207-1214
Waste Transfer Station	0.04	2	Salimabad 148_00	518(P)
	0.05	4	Shibganj 147_00	736(P)
	0.05	5	Shibganj 147_00	119(P)
	0.05	3	Chak Daulatpur 146_00	481(P)
	0.02	6	Chelabot Khani 182_01	14(P)

A waste disposal ground is proposed at North-East corner of Ward-1 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 finally they 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 **Fig 12-12**.

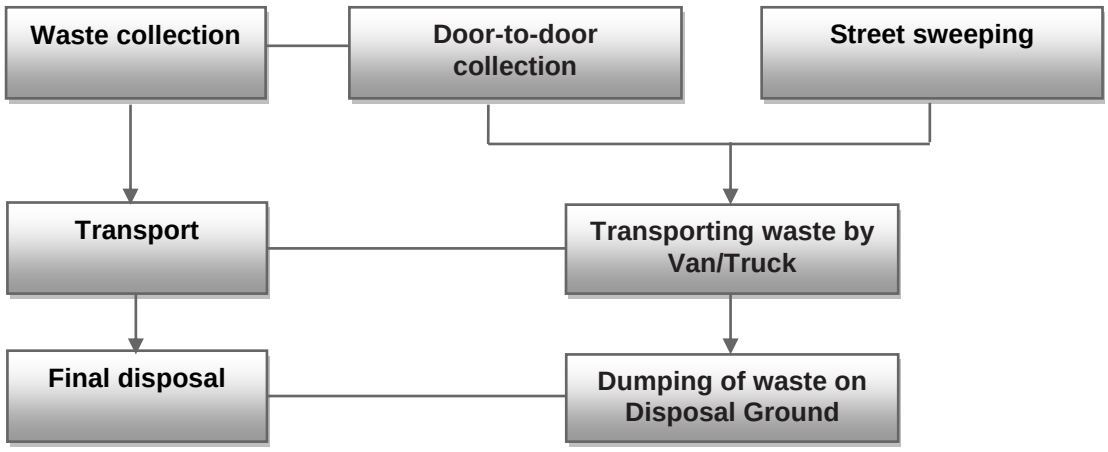


Fig 12-12: Overview of the Solid Waste Management Plan

12.7.1.2 Plan for Protecting Open Space, Wet-Land and Relevant Features

Parks and Recreational Places

A few play fields are the main recreational sites in the area. However, with implementation of this plan, new open space, playground, parks, lake, etc. will provide more leisure places for the people.

Enhancement Activities:

- Ensure new open space, playground, parks, increasing facilities to visit the river bank etc. to increase recreational facilities in the Paurashava area.
- Develop khal side as walking area with properly designed modern facilities to attract outside visitors also.

Responsible Organizations: Paurashava, Bangladesh Parjatan Corporation

Loss of Wetlands

Wetlands are mainly affected first by the urbanization process. Earth filling fills up the ponds, low land, khals. Waste water affects the aquatic ecosystem and makes the ponds, khals unproductive and as a result the aquatic plants, fishes and animals have to die or migrate to other places. Suitable urban facility attracts more residential development with the cost of filling of low cost wetland. There is no strict regulation on earth filling of ponds. However, Wetlands Conversation Act exists in Bangladesh, which is applicable only to natural beels and khals. Number of ponds in Shibganj Paurashava is reduced every year to accommodate housing and commercial structures. Wetlands play an important role as a reservoir of rain and flood water. They are also important to maintain the balance of ecosystems and for replenishing the ground water level through seepage.

Mitigation:

- Cutting of drainage outlets to the khals and ponds.
- Avoiding wetlands during road alignment fixation.
- Stopping housing estate, industries and other development works in wetlands through earth filling.
- Stopping earth filling of ponds in Paurashava area through creation of public awareness.
- Strict implementation of Wetland Playfield, Open space, Park and Natural water reservoir Conservation Act, 2000.

Responsible Organizations: Paurashava, DOE and NG

12.7.1.3 Proposals for Pollution Control

12.7.1.3.1 Industrial

Industrialization is not prominent economic sector in Shibganj Paurashava. With implementation of this project and establishment of Industrial Zone nearby with road, drainage, water, gas, electricity and telephone facilities will attract the promoter and NBRs to invest here and help in industrialization in the project area.

Enhancement Activities:

- Arrangement for gas pipe line in the industrial zone.
- Arrangement for water, electricity, telephone, fire-service and drainage facility in industrial zone.
- Arrangement for soft-loan for agro-industry, garments, electronics, IT etc.

- Strengthening the activities of Shilpa and Banik Samity (KSBS).
- Invite the national and foreign investors to visit and invest in industrial zone.
- Initiate the local entrepreneurs through incentives for industrialization.
- The existing brick fields can continue next 10 year and after that they have to relocate outside the Paurashava boundary. The existing brick field must follow Brick manufacturing (Control) Act, 1989.
- Any new brick field cannot permit in the Paurashava area.

Responsible Organizations: Board of Investment, Banks, Shilpa and Banik Samity

12.7.1.3.2 Air/Water/Land/Sound

Noise Pollution

Noise is unacceptable level of sound that creates annoyance, hampers mental and physical peace and may induce severe damage to the health. Along with the increasing degree of air and water pollution, noise pollution is also emerging as a new threat to the inhabitants of Paurashava. Motorized traffic is one of the major sources of noise pollution in urban areas. Although there are many sources of noise, which include industries, construction works and indiscriminate use of loud speakers, motorized traffic is the principal source of creating noise in urban areas. With the increase in the number of motorized vehicles in the city, the hazard of noise pollution has increased and exceeded the level of tolerance. The noisiest area in Paurashava is Alampur Chowrasta intersection

Exposure to high level of noise may cause severe stress on the auditory and nervous system of the city dwellers, particularly the children. Regular exposure to loud noise damages the hearing capability and has adverse effects on health, like increasing mental stress and blood pressure and sleeplessness, resulting in poor work performance. With expansion of urban area, the noise pollution will be increased for increasing motor vehicles, market places, industries etc.

Mitigation:

- Stop using hydraulic horn in buses, trucks and other motor vehicles.
- Declare some areas like hospitals, schools, parks, etc. as silent zone.
- Strict implementation of law.
- To control abnormally high noise from saw mill the old machines should be repaired or replaced.
- Foundation of machines should be specially prepared to reduce noise.
- Special type of silencer may be attached with the machines to reduce noise.
- Welding and blacksmith workshops can be fenced with classes to protect the passersby from possible pollution effects.
- People constantly working in welding and blacksmith workshops should wear earplugs and glasses. Regular medical checkups can be carried out to identify possible health problems.

Responsible Organizations: Paurashava, BRTA, Upazila Health Complex, Motor Owners Association and Labor Unions, etc.

Air Pollution

Almost all the project area has the same level of air quality. As from the standard of The Environment Conservation Rules, 1997 (ECR, 1997) the air quality of the category "Residential and rural" has the density of different air particles in the project area as follows:

- Suspended Particulate Maters (SPM) = 200 microgram per cusec meter,
- Sulpher-dioxide = 80 microgram per cusec meter,
- Carbon Monoxide = 2000 microgram per cusec meter and
- Oxides nitrogen = 80 microgram per cusec meter.

Mitigation:

- Use catalytic converter in buses, trucks, taxis and tempos.
- Use CNG instead of petrol.
- Set up 120 ft. high stack in brickfields and use filter to reduce the CO, SO2 and NO2 gases in atmosphere.
- Stop the operation of brick-fields which have grown near the homesteads, bazars and growth centers.
- Impose ban on movement of stone and sand carrying trucks using the tertiary and access roads.

Responsible Organizations: Paurashava, DOE, BRTA, DC office, Motor Owner and Labor Unions, etc.

Drainage Congestion

Drainage congestion may increase further with the present trend of development. Faulty design, slope problem in head and tail area, solid-waste and rubbish dumping, encroachment and un-authorized structures, siltation, lack of renovation and re-excavation are the main causes of drainage congestion. As a result discharge of new drainage network will create severe drainage problem in Paurashava area, particularly in monsoon period.

Mitigation:

- Excavation of the primary drainage networks specially the existing and the proposed khals.
- Re-excavate the water retention and detention area with link khals proposed in the master plan.
- Remove all un-authorized structures, developed on drainage structures.
- Make proper drainage network in new area considering the slope and local topographical condition.
- Strictly prohibit the people in dumping of rubbish and solid waste in drain.
- Regular cleaning and maintenance by the concerned authorities.

Responsible Organizations: Paurashava, LGED

Surface Water Pollution

The surface water quality of khals, ponds and ditches are polluted in respect of pH, turbidity and coliform bacteria with national standard. The present pollution level of these sites is found to be low except coliform bacteria. The main causes of surface water pollution are industrial wastewater, sanitary sewage, solid waste dumping. The present trend of development in the project area, the

surface water pollution level may further increase for high volume of discharge of wastewater, sanitary sewerage, over spilling of pit and septic tank, industrial effluents, surface run-off of katcha bazars, indiscriminate solid and medical waste dumping.

Mitigation:

- Stop katcha, hanging and pit latrines.
- Create underground sewerage system for Paurashava area.
- Use pucca latrine with septic tank and soak well.
- Prohibit indiscriminate dumping of medical and solid waste in drainage, khals and river.
- Improve sanitation condition of slaughter house, fish market and katcha bazars.
- Prohibit the direct discharge of Paurashava waste water to any chhoras, low lying areas and river.
- Establish waste water and sewerage treatment plant.

Responsible Organizations: Paurashava, LGED and DOE

Groundwater Depletion

Groundwater level of Paurashava has a considerable lowering over the last few decades. It has been calculated that in 2031 the lowering of ground water level might be 20m. Eventually fall of groundwater table is a common phenomenon in project area during dry period (Feb.-May). With expansion of urbanization and industrialization, the groundwater table may further fall if present tradition of using groundwater is continued.

Mitigation:

- Use khals water for pipeline supply to households and industries.
- Use of surface water treatment plant to purify the river water and use as drinking water.
- Introduce rainwater harvesting system and use in the project area.
- Stop land filling of ponds and water bodies (area more than 0.25 acre) to maintain the groundwater level through recharge and leaching process.

Responsible Organizations: Paurashava, DPHE, and NGOs

Groundwater Pollution

Groundwater pollution due to manganese, iron and hardness is a major problem in the project area. With expansion of urban area, more dependency on groundwater sources may increase the pollution level of sub-surface water.

Mitigation:

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

Responsible Organization: Paurashava, LGED, BWDB, DOE and NGOs

12.7.1.3.3 Other Pollution

Any pollution other than mentioned above is not yet identified at Shibganj Paurashava.

12.7.2 Natural Calamities and Hazard Mitigation Proposals

12.7.2.1 Plan for Addressing Natural Calamities (Structural and non structural measures)

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. Paurashava is located in the seismic zone 3 and so it is less vulnerable to earthquake. Earth quake of 4 to 5 magnitude has the probability of occurrence in the locality. Unplanned and unregulated urbanization and disregard to BNBC rules in building construction aggravate the situation more. With the implementation of master plan 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 storey's 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)". Similar measures are also suggested for Shibganj Paurashava.

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, Civil Surgeon, Civil Defense, Fire Service and DOE

Change in Topography

Topographically Shibganj Paurashava is flat and gentle sloping. The natural topography of Paurashava area has already been changed for urbanization. The present trend of development 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 and general slope will be diminished for earth cutting due to rapid urbanization. The current effort of master plan will ensure sustainable development.

Mitigation:

- Careful planning to minimize the change of topography.
- 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 city.
- Preserve the natural greenery, ponds, khals and large water bodies.

Responsible Organizations: Paurashava, DOE and Forest Department

Land Use Change

With the implementation of master plan, the Peripheral-urban and agricultural land use will be controlled and conserved using landuse control mechanism.

Mitigation:

- Careful planning to reduce change of agricultural land use and rural set up.
- Conserve water bodies and productive agricultural land free from haphazard urban development.
- Economical use of land.

Responsible Organizations: Paurashava and Ministry of Agriculture& Livestock, DOE

12.7.2.2 Plan for Addressing Hazards

Traffic Congestion

Traffic congestion is space-based problem. It occurs at particular junction and or at a particular land use area. Urbanization and growth of population will increase movement of vehicles in and around the Paurashava. Number of rickshaws will also increase to meet the people's demand. Rickshaws will be the main cause of traffic congestion in Shibganj Paurashava in future.

Mitigation:

- Phase wise implementation of proposed road network.
- Strict implementation of traffic rules to improve traffic management.

Responsible Organization: Paurashava, LGED, RHD

Fire Hazard

In future the probability of fire may increase for more offices, institutions, markets, growth centers and industries. Electric short-circuit is mainly responsible for fire hazards in urban area. However, human error may also cause for fire sometimes. Slums and some industries like garments and plastic products are more susceptible to fire hazards. The present fire station facility is not enough to cope with future fire hazards.

Mitigation:

- Set up one new fire station at proposed location
- Collect modern fire prevention devices.
- Refrain people from using low quality electrical wire in buildings and industries.
- Ensure periodical checking of electric lines.
- Create awareness of people about fire hazards.
- Ensure fire-fighting devices in new industries, high-rise buildings and markets.
- Strict implementation of BC rule.
- Large and medium scale water bodies should be conserved for quick and huge supply of water at the time of emergency.

Responsible Organizations: Paurashava, PDB, DOE and Fire Service and Civil Defense

Loss of Habitat

The habitat for fauna and wildlife has been losing day by day in the Paurashava area. For urbanization and industrialization, agricultural land will be disappear, water bodies will be filled up, rivers and khals will be polluted and trees will be cut down for new settlement. Birds, fishes and other animals will permanently lose their habitat and food in the urban area.

Mitigation:

- Careful planning to avoid the sensitive ecosystem.
- Minimum use of land for urbanization.
- Preservation of water bodies and khals.
- Initiate people to avoid tree cutting and vegetation clearing.

Responsible Organizations: Paurashava, DoE and NGOs

Loss of Biodiversity

Continuous expansion of the urban area will enhance the urban development in this area. Urban elements like roads, infrastructure development, housing, commercial places, industrialization etc. will replace the existing green natural environment to manmade environment. Trees will be cut down, water bodies will be filled up and polluted; garden and bush will disappear for urban expansion in new area. Wild animals, birds and fishes will lose their habitats and as a result a big loss of biodiversity will happen for urban expansion in the Paurashava area.

Mitigation:

- Avoid critical ecological area and refugee sites from development works.
- Aware people for keeping some trees and bushes around the homesteads.
- Increase tree plantation in roadsides along the river and khals and homesteads.
- Preserve the lakes for aquatic birds and fishes and some bush areas as wildlife refuge sites.
- Ban on hunting of birds and wildlife.

Responsible Organizations: Paurashava, Forest Department, Fisheries Department and NGO's

Loss of Capture Fisheries

The project area is mainly high and medium high land. Khals and low lands are very limited. Therefore, open water fisheries resources are low in the project area. Only 15-20% fish demand is met by the capture fisheries. Ponds and khals support the capture fisheries in the project area. Lowering of water level in the river also there is no water in the khals in dry season is a major reason of the damage of aquatic environment.

With the continuing urbanization, the capture fisheries will be remarkably reduced for loss of habitat due to water pollution of sewerage and drainage discharge, industrial effluent, solid waste dumping, earth filling and less flushing. Area of khals, beels and other water bodies will be reduced for land development and urbanization.

Mitigation:

- Stop direct drainage outfall to river, khals and beels.
- Set up sewerage and wastewater treatment plant.
- At the early monsoon, keep open the gates of sluices and regulators during spawning period of fish.
- Excavation of khals and natural water bodies
- Strict regulation on land filling of water body.

Responsible Organizations: Paurashava, and DOE

Loss of Ponds and Culture Fisheries

With urbanization and industrialization through this project, many ponds will be lost for land filling by the owners for increasing land value due to human pressure, settlement and development accordingly loss of fishes. There is no strict regulation on earth filling of ponds in the area.

Mitigation:

- Designate all ponds in Master Plan Map and protect the large ones according to the ecological importance and public interest.
- Protect the ponds having area more than 0.25 acre as per regulatory framework of Master Plan.
- Create public awareness about the importance of ponds and its role in culture fisheries, bathing and water reservoir for surface run-off during monsoon.

Responsible Organizations: Paurashava, DOE and DC (Land)

Loss of Productive Agricultural Land

The Master plan Project has included a vast area of agricultural land in the project area. Both highlands and lowlands fall into this project. After implementation of MP project, agricultural environment will be converted into un-productive urban and semi-urban area.

Mitigation:

The DOE EIA Guidelines emphasized on the avoidance of productive agricultural land during any development project. Therefore, it will be wise to consider more economical use of land to avoid some fertile lands. The land acquisition should be based on the growth rate of population. The designated agricultural land in the master plan must conserve from any type development or land use change. Strict rules and regulation must be imposed to control the agricultural land.

Responsible Organizations: Paurashava and DOE

12.8 Plan Implementation Strategies

12.8.1 Regulations to Implement the Environmental Management Plan

Drainage and Environmental Management plan should be performed under the clauses in the Local Government (Paurashava) Act, 2009 and other national rules existed in Bangladesh.

According to the second part of section 50-71 of Paurashava Ordinance:

Removal, collection and disposal of refuse

1) A Paurashava shall make adequate arrangements for the removal of refuse from all public streets, public latrines, urinals, drains, and all buildings and land vested in the Paurashava and for the collection and proper disposal of such refuse.
2) The occupiers of all other buildings and lands within the municipality shall be responsible for the removal of refuse from such buildings and lands subject to the general control and supervision of the Paurashava.
3) The Paurashava may cause public dust-bins or other suitable receptacles to be provided at suitable places and where such dust-bins or receptacles are provided, the Paurashava

may, by public notice, require that all refuse accumulating in any premises or land shall be deposited by the owner or occupier of such premises or land in such dust-bins or receptacles.

4) All refuse removed and collected by the staff of the Paurashava or under their control and supervision and all refuse deposited in the dust-bins and other receptacles provided by the Paurashava shall be the property of the Paurashava."

Latrines and urinals

1) "A Paurashava may, and if so required by the Government shall, provide and maintain, in sufficient number and in proper situation, public latrines and urinals for the separate use of each sex, and shall cause the same to be kept in proper order, and to be properly cleaned.
2) The occupier of any premises to which any latrine or urinal pertains shall keep such latrine or urinal in a proper state to the satisfaction of the Paurashava and shall employ such staff for the purpose as may be necessary, or as may be specified by the Paurashava.
3) Where any premises are without privy or urinal accommodation, or without adequate privy or urinal accommodation, or the privy or urinal is on any ground objectionable, the Paurashava notice require the owner of such premises.

The privy or urinal disposed in the Paurashava's dustbin or disposal ground is the property of Paurashava."

12.8.2 Implementation, Monitoring, Evaluation and Coordination of the Plan

Resettlement

Resettlement is a burning question for any urban development project. For Master Plan Project land will be required for roads, markets & bazars, educational organizations, housing & industrial estates, open spaces, play grounds, parks, lakes, etc. Therefore, land acquisition is required from people in the project area. People have been living in their homesteads for many years in ancestral way and reluctant to leave their croplands and homesteads. The project authority should take proper care during land acquisition. Requisition of sensitive and conflict land area should be done in consultation with the landowners, local ward commissioners/ members/ chairmen and political persons. Without appropriate rehabilitation and compensation, no one should be evacuated from his homesteads. Slum people do not have the land right, they should be rehabilitated in new places with full compensation of housing and occupation.

Compensation

Land acquisition should be discussed with individuals affected and through participation of local people. The compensation of each affected landowner should be paid in the shortest possible time. If anyone loses his/her occupation/business/income source for land acquisition, it should be incorporated in compensation package. This would necessitate amendment of compensation rules. Persons losing their homesteads for housing project may be rehabilitated with due compensation and sanction of one plot in housing estate.

Section 12 of the Environment Conservation Act (ECA) 1995 stipulates that "no industrial unit or project shall be established or undertaken without obtaining environmental clearance from the Director General, Department of Environment, in the manner prescribed by the rules."

The Environment Conservation Rules (ECR) 1997 have been prepared under the clause (2) (f) of the section 20 of Environment Conservation Act (ECA) 1995. The requirements of EIA for new

development projects came into enforcement under the ECR 1997. These are the first set of rules promulgated under the Environment Conservation Act 1995. Among other things, these rules set out the requirements for and procedures to obtain environmental clearance. This also explains the requirements for IEE/EIA according to different categories (green, orange/amber or red) of industrial and development interventions.

During the implementation of Master plan, environmental clearance procedure will be guided by the Environment Conservation Rules 1997 of the Department of Environment. Paurashava will have the authority to approve the plan as per agreed principles in the Master plan but the owner of the plot will be obliged to get clearance from the DOE before actual implementation.

For implementation of the mitigation plan emphasis has to be laid on implementing the mitigation measures. Appropriate institutional set up will be required to implement the measures. Government must allocate sufficient budget for this purpose.

Duration, Revision and Updating

The proposed Structure Plan along with a set of policy guidelines has been provided for a period of 20 years, 2011 through 2031. However, to suit in time and space, revision and updating of the Structure Plan will be necessary at a regular interval.Structure Plan should be regularly reviewed and updated during the end of every fifth year of the five-year term. In this way, four revisions will be carried out during its twenty years lifetime.

Chapter 13: Plan for Urban Services

This chapter describes the urban basic services development proposals for future development of the Paurashava. The proposals have been made at the town level, that is, the area under the urban area plan. The local level development proposals will be addressed in the Ward Action Plan. The development proposals deal with the basic urban services, like, water supply, drainage, sanitation, solid waste, telecommunication, electricity and gas, community facilities, education and health.

13.1 Water Supply

The Paurashava is yet to develop its own network based water supply system. The entire water supply system of the Paurashava is based on household tube well and pond. As per the census 2001, about 90% household depend on tube well for their drinking water. However, many of the tube wells provide arsenic free drinking water. As a result lots of hand tube wells water is mostly used for washing purpose. Water from ponds is mainly used for washing.

Developing a network based supply system will depend on availability of fresh water aquifer. Detailed geological Investigation is required to find out fresh water aquifers. But here problem lies here to use of ground water. Safiuddin (2001) observed the serious arsenic contamination of groundwater in Bangladesh has come out recently as the biggest natural calamity in the world. The people in 59 out of 64 districts comprising 126,134 sq km of Bangladesh are suffering due to the arsenic contamination in drinking water (arsenic contamination is also found in the ground water of Paurashava). So in case of water supply for Shibganj Paurashava, special emphasis will be given to use surface water rather than use of ground water. Paurashava should take a programme to preserve and maintain all major ponds at the Paurashava for the greater interest of the people at large. The consultant, according to approved standard, has considered about 0.80 acres for water supply installations, like, pump stations and other establishments related to water supply. Total 6.26 acres land will be used for utility services.

The town dwellers use ponds, khals and river water for their daily necessities other than drinking and cooking purpose. So it will require much less amount of water supply for the Paurashava town than city consumption. According to the estimation the total population in 2011 of Shibganj Paurashava is 16569 and at the end of the project i.e. in 2031 this will be around 22805. Assuming that per day per capita water consumption of 100 liters, Technical loss 20% and Industrial/Commercial demand 20%.

By considering the above assumption, the total demand of water consumption of Shibganj Paurashava will be 2884cubic meter by 2031. This consideration has been taken by avoiding excess industrial and commercial demand so that there are no mentionable industrial establishments in this Paurashava.

As an alternative to drinking water supply harvesting of rain water may be explored. The idea of rainwater harvesting is unknown to the local people. NGOs working in rain water harvesting training and motivation may be engaged for this purpose. Paurashava may take initiative to prepare a programme for popularizing rain water harvesting among the Paurashava people.

13.2 Solid Waste Management

There will be 5 waste transfer stations with an area of 0.10 acres each for collection of solid waste located at suitable locations. A dumping site will be developed over an area of 1.78 acres for final disposal of the solid waste. The waste dumping site is located in Ward-01 at the north-east corner boundary of the Paurashava.

Table 13-1: Proposal of Solid Waste Management

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.
Waste Dumping Ground	4.15	1	Debinagar 152_02	1207-1214
Waste Transfer Station	0.04	2	Salimabad 148_00	518(P)
	0.05	4	Shibganj 147_00	736(P)
	0.05	5	Shibganj 147_00	119(P)
	0.05	3	Chak Daulatpur 146_00	481(P)
	0.02	6	Chelabot Khani 182_01	14(P)

13.3 Sanitation

As the field survey shows, the present sanitation system of the Paurashava is composed of a variety of types, like, hanging latrine, pit latrines of different types, water sealed latrines and septic tank based sanitary latrine.

The record of sanitation condition is also not perfectly available. However, the Paurashava authority told that about 70% Households covered Pucca sanitary latrine and there is no open latrine in this Paurashava.

Due to prohibitive expenditure one should not expect establishing network and treatment plant based sewerage system in the town by the Paurashava. So, for long the sanitary system of the Paurashava will remain on site. To promote healthy sanitation, Paurashava should promote low cost sanitary latrines in the town together with awareness building for healthy sanitation. It is proposed to set up public toilets in public gathering areas, like, existing and proposed bus stand, bazar and the main town center. This will cause to set up 01 number of public toilets in the town.

13.4 Electricity and Gas

Power Development Board (PDB) is mainly responsible for electricity supply in the Paurashava, supported by the Rural Electrification Board (REB). 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.

Area for gas related facilities is not proposed in the plan, because there is no scope for installation gas facilities in this Paurashava within the planning period. 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. A recent policy of the government forbids supply of gas for domestic purpose.

13.5 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.

The proposed basic urban services of Shibganj Paurashava are shown in **Map 13-1**.

Map 13-1: Proposed Basic Urban Services of Shibganj Paurashava

Chapter 14: Ward Action Plan

14.1 Introduction

This chapter presents Part-C of the report which contains Ward Action Plan of each individual Ward. First, the issues prevailing in different Wards have been briefly described followed by description of Development Proposals in first ward action plan (1st to 5th year of planning period) for each Ward.

14.1.1 Background

The Ward Action Plans 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 therein 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.

Ward Action Plan is a vital part of the current plan package as far as spatial development and development control is concerned. Absence of Ward Action Plan not only hampers undertaking of development projects by planning authority, but also leads to uncontrolled and unwanted spatial development in the private sector. Land use zoning is also provided in the Ward Action Plan to enable detailed view of proposed land use and development.

14.1.2 Content and Form of Ward Action Plan

The Ward Action Plan is detailed area plan based on the policy framework, guideline indication of Structure Plan and more detailed guideline of Urban Area Plan. The provision of Ward Action Plan is inherent in the Structure Plan with some specific purposes. The Ward Action Plan is to:

a) Provide basic micro level infrastructure and services in the study area through systematic planning, under the framework of Structure Plan and proposals of the Urban Area Plan;
b) Create congenial environment to promote economic activities;
c) Improve drainage system and protect natural water channels from encroachment; and
d) Create service centers to promote urban growth.

14.1.3 Linkage with 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 sectorial policies. The Urban Area Plan and the Ward Action Plan detail out development proposals under the framework of Structure Plan.

14.1.4 Approach & Methodology

The methodology could be illustrated through tri-step process for the assessment of Ward Action Plan. The first step of the methodology of Ward Action Plan is to 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.

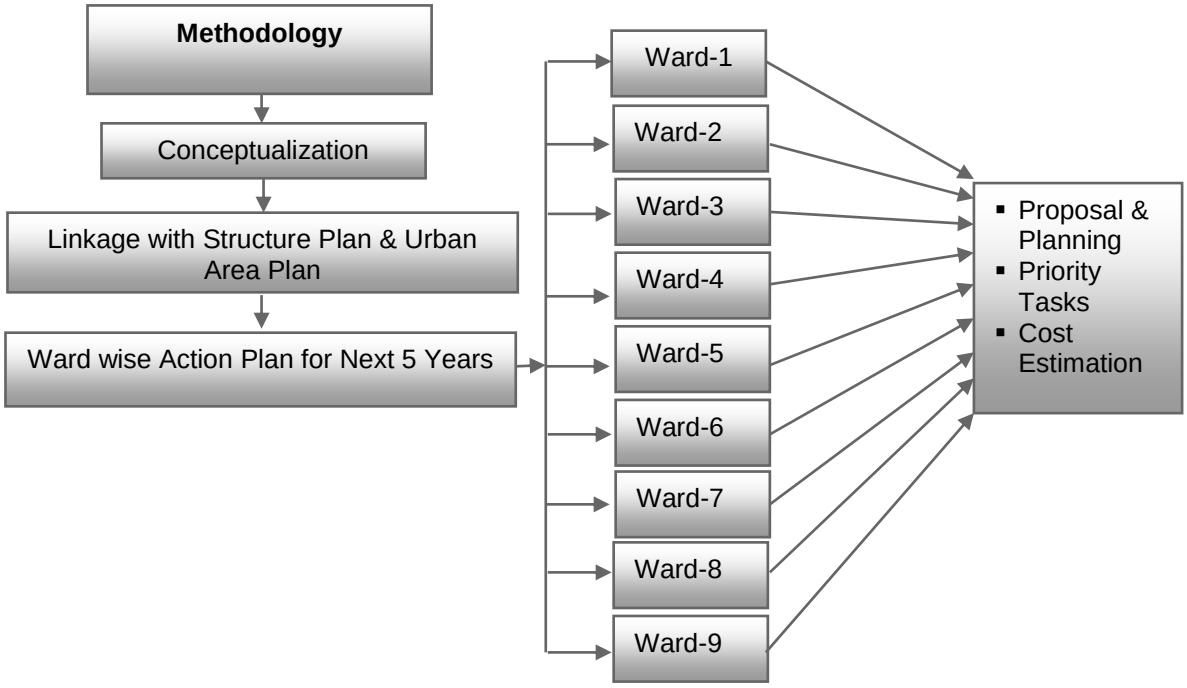


Fig 14-1: Flow Chart of Methodology

14.2 Derivation of the 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 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 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 for Next Five Years

The Ward Action Plan is prepared for each of the nine Wards and is presented in order of their serial number. The Ward Action Plans are a series of detailed spatial development plans of different use and facilities. The plans comprise maps of appropriate scale supported by explanatory report. The Ward Action Plans have been formulated for execution within a period of 5 years. They do not initially cover the entire Structure Plan area. While all sub-areas will eventually require Ward Action Plan, only priority areas are to be dealt with initially. The aim of a Ward Action Plan is to prevent haphazard urban development and 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.

Public involvement is a key issue. To this end, the Paurashava has adopted a "Planning for Real" based approach which allows hands-on participation by all the residents of each local community. They help by identifying local issues and problems which the Plan can tackle; expressing their views on the Paurashavas policies; and suggesting how these could be improved. Ward Action Plan must be topical and relevant. The Paurashavas target is to ensure that they are reviewed on a 5 yearly cycle. A comprehensive Map of Ward Action Plan is shown in**Map 14-1**.

Map 14-1: Ward Action Plan of Shibganj Paurashava

Ward Action Plan for Ward-01

14.3 Proposals and Plans for Ward-01

Ward No. 01 is located at the North-west corner part of Shibganj Paurashava. The area of the Ward is 642.795 acres. After reviewing and commensuration the policies and proposals of Structure Plan and Urban Area Plan the following proposals are made in the Action Plan of Ward 01 for implementation within next 5 (five) years up to 2016.

Table 14-1: Population Statistics for Ward-01

Item	Year	
	2011	2031
Area (acre)	642.79	642.79
Population	4031	5748
Density of Population (per acre)	6	7

14.3.1 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 39.42 acres of land delineated up to the year 2031 in Ward No. 01, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 1.88 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 9.69 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 7.42 acres of land designated up to 2031.

v) Government Office

Administrative zone covers all kinds of government and non-government offices in the town. The total area under this use has been proposed as 0.41 acres of land designated up to 2031.

vi) Rural Settlement

The total area under this use has been proposed as 67.50 acres which is most portion of this land use.

vii) Agricultural Zone

The Paurashava including Ward No. 01 has a vast area of agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been estimated as 419.80 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. The proposed retention area covers 7.64 acres.

ix) Health Services

Proposed plan suggests a community clinic in ward center for this ward.

x) Circulation Network

Existing and proposed roads cover a total of 33.63 acres of land of the whole ward.

xi) Open Space

In this ward there is no outdoor recreational space like park, playground etc. So the consultants accommodate 6.11 acres of land for open space.

14.3.2 Road Network Development Plan

The existing road network of ward no.1 is 6.11 km where 3.64 km road is pucca, 0.65 is semi-pucca and 1.81 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. Another problem of roads is that they are meandering in their layout. In road network development plan there is 6.13 km new road and about 19.71 acres of land is allotted for ward no 01. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered the entire existing road. Proposals of Roads for ward no-01 are shown in **Table 14-2** and **Map 14-2 & Map 14-3.**

Table 14-2: Proposal of Roadsfor Ward-01

Road Type	ID	Length (m)	Proposed Width (ft)	Proposal Type
Secondary Road	NR681	919.12	40	Pucca
Secondary Road	WR202	1.50	40	Pucca
Secondary Road	WR339	1736.71	60	Pucca
Local Access	WR463	736.54	20	Pucca
Tertiary Road	WR544	955.05	30	Pucca
Tertiary Road	WR554	905.70	30	Pucca
Local Access	WR559	64.76	20	Pucca
Secondary Road	WR577	36.60	40	Pucca
Tertiary Road	WR588	620.83	30	Pucca
Secondary Road	WR590	705.99	40	Pucca
Secondary Road	WR599	510.61	40	Pucca
Tertiary Road	WR620	545.29	30	Pucca

Road Type	ID	Length (m)	Proposed Width (ft)	Proposal Type
Secondary Road	WR625	1013.57	40	Pucca
Tertiary Road	WR638	559.44	30	Pucca
Primary Road	WR642	803.60	150	Pucca
Secondary Road	WR654	479.88	80	Pucca
Secondary Road	WR658	791.77	40	Pucca

14.3.3 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 3.13 km of new drains forward no. 01 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-3: Proposal of Drain for Ward-01

Type	ID	Construction Type	Length (m)	Average Width (m)
Primary	PD-1	Pucca	519.18	>3m
Secondary	SD-4	Pucca	802.05	1-3 m
Secondary	SD-5	Pucca	6163.13	1-3 m
Secondary	SD-40	Pucca	474.81	1-3 m
Tertiary	TD-8	Pucca	182.82	<1m
Tertiary	TD-9	Pucca	489.44	<1m
Tertiary	TD-10	Pucca	210.81	<1m
Tertiary	TD-11	Pucca	87.59	<1m
Tertiary	TD-12	Pucca	458.06	<1m
Tertiary	TD-13	Pucca	264.56	<1m
Tertiary	TD-14	Pucca	79.40	<1m
Tertiary	TD-15	Pucca	1192.42	<1m
Tertiary	TD-41	Pucca	787.50	<1m

14.3.4 Urban Services Development Plan of Ward No-01

The urban services are the pre-condition of any potential development. The development is not same in the entire ward. Ward no 01 has much more. Primary school, High school, Neighborhood Park, Playground, and Rickshaw stand is proposed here. The proposal for service facilities of ward no 01 is shown in (**Table 14-4**) together with mouza name and plot number

Table 14-4: Proposal for Other Facilities of Ward-01

Use	Plot No.	Area (Acres)	Mouza Name
Ward Center-1	110-113(P)	0.45	Gopalnagar 151_00
Waste Disposal Ground	1207-1214	4.15	Debi Nagar_152_02
General Industrial Area	36,37,63,64,60,62, 520,523,522,525,518,519,52, 53,54,56,57,58, 59	66.06	Debinagar 152_01

Use	Plot No.	Area (Acres)	Mouza Name
Truck Terminal	161,159	1.10	Gopal Nagar_151_00
Neighbourhood park	319,327,328,329,330,331,225,227,229, 226,233,229,230,231,232	4.40	Debi Nagar_152_01
Primary School	93, 95-98	2.72	Debi Nagar_152_01
Playground	50, 51, 150-154	3.08	Debi Nagar_152_01
Public Toilet	110(P)	0.20	Gopalnagar 15_00
Low Income Housing	157-173	18.45	Debinagar 152_01
Resettlement Area	28-37	9.85	Gopalnagar 151_00

Map 14-2: Landuse Plan Map of Ward-01

Map 14-3: Service and Drainage Plan Map of Ward-01

Ward Action Plan for Ward-02

14.4 Proposals and Plans for Ward-02

Ward No. 02 is located at the Northern west of Shibganj Paurashava. The area of the Ward is 1188.932acres. After reviewing and commensuration the policies and proposals of Structure Plan and Urban Area Plan the following proposals are made in the Action Plan of Ward-02 for implementation within next 5(five) years up to 2016.

Table 14-5: Population Statistics for Ward-02

Item	Year	
	2011	2031
Area (acre)	1188.93	1188.93
Population	4510	6431
Density of Population (per acre)	7	12

14.4.1 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 115.78 acres of land delineated up to the year 2031 in Ward No. 02, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 2.12 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 31.71 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 20.70 acres of land designated up to 2031.

v) Government Office

Administrative zone covers all kinds of government and non-government offices in the town. The total area under this use has been proposed as 4.09 acres of land designated up to 2031.

vi) Rural Settlement

There is 46.70 acre of proposed land for this landuse in this ward.

vii) Agricultural Zone

The Paurashava including Ward No. 02 has a vast area of agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been estimated as 372.80 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. The proposed retention area covers 15.90 acres.

ix) Health Services

Proposed plan suggests a community clinic in ward center for this ward.

x) Circulation Network

Existing and proposed roads cover a total of 34.98 acres of land of the whole ward.

xi) Open Space

In this ward there is no outdoor recreational space like park, playground etc. So the consultants accommodate 8.70 acres of land for open space.

14.4.2 Road Network Development Plan

The existing road network of ward no.2 is 7.83 km where 1.45 km road is pucca, 2.27 is semi-pucca and 4.10 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. Another problem of roads is that they are meandering in their layout. In road network development plan there is 9.26 km new road and about 34.98 acres of land is allotted for ward no 02. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered the entire existing road. Proposals of Roads for ward no-02 are shown in **Table 14-6** and **Map 14-4 & Map 14-5**

Table 14-6: Proposal of Roadsfor Ward-02

Road Type	ID	Length (m)	Proposed Width (ft)	Proposal Type
Secondary Road	WR339	231.53	60	Pucca
Local Access	WR463	3.16	20	Pucca
Tertiary Road	WR495	613.54	30	Pucca
Secondary Road	WR508	357.85	60	Pucca
Tertiary Road	WR544	201.48	30	Pucca
Secondary Road	WR550	619.32	40	Pucca
Local Access	WR559	514.82	20	Pucca
Secondary Road	WR577	616.22	40	Pucca
Secondary Road	WR599	129.97	40	Pucca
Primary Road	WR642	879.64	150	Pucca

Secondary Road	WR654	996.06	80	Pucca
Secondary Road	WR658	453.47	80	Pucca

14.4.3 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 2.52 km of new drains forward no. 02 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-7: Proposal of Drain for Ward-02

Type	ID	Length (m)	Construction Type	Average Width (m)
Primary	PD-1	448.85	Pucca	>3m
Secondary	SD-2	369.00	Pucca	1-3m
Secondary	SD-4	173.65	Pucca	1-3m
Secondary	SD-5	372.79	Pucca	1-3m
Secondary	SD-6	80.23	Pucca	1-3m
Tertiary	TD-7	310.37	Pucca	<1m
Tertiary	TD-12	173.44	Pucca	<1m
Tertiary	TD-15	4.69	Pucca	<1m
Tertiary	TD-16	543.61	Pucca	<1m
Tertiary	TD-17	173.44	Pucca	<1m

14.4.4 Urban Services Development Plan of Ward No-02

The urban services are the pre-condition of any potential development. The development is not same in the entire ward. Ward no 02 has much more potentiality. Primary school, High school, Neighborhood Park, Playground, and Rickshaw stand is proposed here. The proposal for service facilities of ward no 02 is shown in (**Table 14-8**) together with mouza name and plot number.

Table 14-8: Proposal for Other Facilities of Ward-02

Use	Plot No.	Area (Acres)	Mouza Name
Ward Center-2	184-186	1.60	Salimabad 148_00
Neighbourhood Park	77,235,241,249-251	5.60	Salimabad_148_00
	77,241,235	1.17	Salimabad148_00
Tempo Stand	198,204	0.04	Salimabad_148_00
Water Pump House	475-477,426-431,4.6, 424	0.90	Salimabad_148_00
Public Toilet	67	0.05	Salimabad_148_00
Neighbourhood Market	198,200-205,	0.94	Salimabad_148_00
Waste Transfer Station	518(P)	0.04	Salimabad 148_00

Use	Plot No.	Area (Acres)	Mouza Name
Bus Terminal	140, 144, 178	2.30	Norottampur 146_00
Passenger Shed	179,180	0.35	Norottampur 146_00

Map 14-4: Landuse Plan Map of Ward-02

Map 14-5: Service and Drainage Plan Map of Ward-02

Ward Action Plan for Ward-03

14.5 Proposals and Plans for Ward-03

Ward No. 03 is located at the North-West of Shibganj Paurashava. The area of the Ward is 190.926 acres. After reviewing and commensuration the policies and proposals of Structure Plan and Urban Area Plan the following proposals are made in the Action Plan of Ward-03for implementationwithin next 5(five) years up to 2016.

Table 14-9: Population Statistics for Ward-03

Item	Year	
	2011	2031
Area (acre)	190.92	190.92
Population	5569	7941
Density of Population (per acre)	17	18

14.5.1 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 71.40 acres of land delineated up to the year 2031 in Ward No. 03, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 8.68 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 25.79 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 4.51 acres of land designated up to 2031.

v) Government Office

Administrative zone covers all kinds of government and non-government offices in the town. The total area under this use has been proposed as 0.88 acres of land designated up to 2031.

vi) Rural Settlement

There is no proposed land for this landuse in this ward.

vii) Agricultural Zone

The Paurashava including Ward No. 03 has not a vast area of agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been estimated as 25.26 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. The proposed retention area covers 20.16 acres.

ix) Health Services

Proposed plan suggests a community clinic in ward center for this ward.

x) Circulation Network

Existing and proposed roads cover a total of 45.74 acres of land of the whole ward.

xi) Open Space

In this ward there is no outdoor recreational space like park, playground etc. So the consultants accommodate 3.38 acres of land for open space.

14.5.2 Road Network Development Plan

The existing road network of ward no.3 is 12.40 km where 4.27 km road is pucca, 5.11 is semi-pucca and 3.01 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. Another problem of roads is that they are meandering in their layout. In road network development plan there is 16.65 km new road and about 45.74 acres of land is allotted for ward no 03. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered the entire existing road. Proposals of Roads for ward no-03 are shown in **Table 14-10** and **Map 14-6 & Map 14-7**

Table 14-10: Proposal of Roads for Ward-03

Road Type	ID	Length (m)	Proposed Width (ft)	Proposal Type
Tertiary Road	NR686	613.67	30	Pucca
Tertiary Road	NR687	520.80	30	Pucca
Secondary Road	WR231	797.05	40	Pucca
Tertiary Road	WR243	512.62	30	Pucca
Secondary Road	WR258	194.28	40	Pucca
Secondary Road	WR508	43.81	60	Pucca
Primary Road	WR642	1097.88	150	Pucca
Secondary Road	WR651	30.59	60	Pucca

14.5.3 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 7.37 km of new drains forward no. 03 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-11: Proposal of Drain for Ward-03

Drain Type	ID	Construction Type	Length (m)	Average Width (m)
Primary	PD-1	Pucca	2179.199	>3m
Secondary	SD-59	Pucca	379.474	1-3m
Secondary	SD-61	Pucca	194.137	1-3m
Tertiary	TD-62	Pucca	520.674	<1m
Tertiary	TD-63	Pucca	379.474	<1m
Tertiary	TD-64	Pucca	194.137	<1m
Tertiary	TD-75	Pucca	520.674	<1m
Primary	PD-79	Pucca	379.474	>3m
Secondary	SD-81	Pucca	194.137	1-3m
Tertiary	TD-124	Pucca	520.674	<1m
Secondary	SD-129	Pucca	379.474	1-3m

14.5.4 Urban Services Development Plan of Ward No-03

The urban services are the pre-condition of any potential development. The development is not same in the entire ward. Ward no 03 has much more. Primary school, High school, Neighborhood Park, Playground, and Rickshaw stand is proposed here. The proposal for service facilities of ward no 03 is shown in (**Table 14-12**) together with mouza name and plot number.

Table 14-12: Proposal for Other Facilities of Ward-03

Use	Plot No.	Area (Acres)	Mouza Name
Ward Center-3	329	0.20	Chak Daulatpur 146_00
Super Market	Plot-492,495,497,498,545	1.75	Chak Daulatpur_146_00
Tempo Stand	329-331	0.60	Chak Daulatpur_146_00
Community Center	191,193-197, 245-247	2.90	Chak Daulatpur_146_00
Central Park	335,336,360-364, 509,510,516	21.77	Chak Daulatpur_146_00
Waste Transfer Station	481(P)	0.05	Chak Daulatpur 146_00
Wholesale Market	159, 160	1.40	Chak Daulatpur 146_00

Map 14-6: Landuse Plan Map of Ward-03

Map 14-7: Service and Drainage Plan Map of Ward-03

Ward Action Plan for Ward-04

14.6 Proposals and Plans for Ward-04

Ward No. 04 is located at the centre of Shibganj Paurashava. The area of the Ward is 427.985 acres. After reviewing and commensuration the policies and proposals of Structure Plan and Urban Area Plan the following proposals are made in the Action Plan of Ward-04 for implementation within next 5 (five) years up to 2016.

Table 14-2: Population Statistics for Ward-04

Item	Year	
	2011	2031
Area (acre)	427.98	427.98
Population	4130	5889
Density of Population (per acre)	4	7

14.6.1 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 56.55 acres of land delineated up to the year 2031 in Ward No. 04, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 10.32 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 3.57 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 4.52 acres of land designated up to 2031.

v) Government Office

Administrative zone covers all kinds of government and non-government offices in the town. The total area under this use has been proposed as 0.29 acres of land designated up to 2031.

vi) Rural Settlement

The total area under this use has been proposed as 12.54 acres which is most portion of this land use.

vii) Agricultural Zone

The Paurashava including Ward No. 04 has a vast area of agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been estimated as 346.52 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. The proposed retention area covers 56.27 acres.

ix) Health Services

Proposed plan suggests a community clinic in ward center for this ward.

x) Circulation Network

Existing and proposed roads cover a total of 55.70 acres of land of the whole ward.

xi) Open Space

In this ward there is no outdoor recreational space like park, playground etc. So the consultants accommodate 3.26 acres of land for open space.

14.6.2 Road Network Development Plan

The existing road network of ward no.4 is 9.44 km where 2.03 km road is pucca, 3.14 is semi-pucca and 4.27 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. Another problem of roads is that they are meandering in their layout. In road network development plan there is 14.45 km new road and about 55.70 acres of land is allotted for ward no 04. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered the entire existing road. Proposals of Roads for ward no-04 are shown in **Table 14-14** and **Map 14-8 & Map 14-9.**

Table 14-3: Proposal of Roads for Ward-04

Road Type	ID	Length (m)	Proposed Width (ft)	Proposal Type
Tertiary Road	WR438	539.99	30	Pucca
Secondary Road	WR508	481.74	60	Pucca
Secondary Road	WR654	610.69	60	Pucca

14.6.3 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 4.32 km of new drains forward no. 04 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-4: Proposal of Drain for Ward-04

Drain Type	ID	Construction Type	Length (m)	Average Width (m)
Secondary	SD-4	Pucca	211.49	1-3m
Tertiary	TD-30	Pucca	169.23	<1m
Tertiary	TD-31	Pucca	242.56	<1m
Tertiary	TD-32	Pucca	163.79	<1m
Secondary	SD-129	Pucca	2.72	1-3m
Tertiary	TD-136	Pucca	351.73	<1m
Tertiary	TD-145	Pucca	181.83	<1m

14.6.4 Urban Services Development Plan of Ward No-04

The urban services are the pre-condition of any potential development. The development is not same in the entire ward. Ward no 04 has much more potentiality. Primary school, High school, Neighborhood Park, Playground, and Rickshaw stand is proposed here. The proposal for service facilities of ward no 04 is shown in (**Table 14-16**) together with mouza name and plot number.

Table 14-5: Proposal for Other Facilities of Ward-04

Use	Plot No.	Area (Acres)	Mouza Name
Ward Center-4	15	0.33	Shibganj 147_00
Tempo Stand	453, 456, 457	0.06	Shibganj_147_00
	P-1833,1839	0.05	Shibganj_147_00
	742	0.04	Shibganj_147_00
Public Toilet	19	0.01	Shibganj_147_00
Super Market	618-622	1.15	Shibganj_147_00
Playground	663,664,665,666,667,669, 671	3.22	Shibganj_147_00
Waste Transfer Station	736(P)	0.05	Shibganj 147_00

Map 14-8: Landuse Plan Map of Ward-04

Map 14-9: Service and Drainage Plan Map of Ward-04

Ward Action Plan for Ward-05

14.7 Proposals and Plans for Ward-05

Ward No. 05 is located at the Northern part of Paurashava. The area of the Ward is 486.679 acres. After reviewing and commensuration the policies and proposals of Structure Plan and Urban Area Plan the following proposals are made in the Action Plan of Ward-05 for implementationwithin next 5 (five) years up to 2016.

Table 14-6: Population Statistics for Ward-05

Item	Year	
	2011	2031
Area (acre)	486.67	486.67
Population	2661	3735
Density of Population (per acre)	19	27

14.7.1 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 0.84 acres of land delineated up to the year 2031 in Ward No. 05, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 10.32 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 1.23 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 5.05 acres of land designated up to 2031.

v) Government Office

Administrative zone covers all kinds of government and non-government offices in the town.

vi) Rural Settlement

The total area under this use has been proposed as 25.35 acres which is most portion of this land use.

vii) Agricultural Zone

The Paurashava including Ward No. 05 has a vast area of agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been estimated as 197.98 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. The proposed retention area covers 28.39 acres.

ix) Health Services

Proposed plan suggests a community clinic in ward center for this ward.

x) Circulation Network

Existing and proposed roads cover a total of 16.60 acres of land of the whole ward.

xi) Open Space

In this ward there is no outdoor recreational space like park, playground etc. So the consultants accommodate 3.04 acres of land for open space.

14.7.2 Road Network Development Plan

The existing road network of ward no.5 is 5.97 km where 1.32 km road is pucca, 3.40 is semi-pucca and 1.24 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. Another problem of roads is that they are meandering in their layout. In road network development plan there is 7.07 km new road and about 16.60 acres of land is allotted for ward no 05. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered the entire existing road. Proposals of Roads for ward no-05 are shown in **Table 14-18** and **Map 14-10 & Map 14-11**

Table 14-7: Proposal of Roads for Ward-05

Road Type	ID	Length (k.m)	Proposed Width (ft)	Proposal Type
Tertiary Road	NR683	167.03	30	Pucca
Secondary Road	WR246	551.09	60	Pucca
Secondary Road	WR258	310.43	40	Pucca
Tertiary Road	WR265	560.51	30	Pucca
Tertiary Road	WR333	547.95	30	Pucca
Secondary Road	WR654	2172.98	80	Pucca
Secondary Road	WR76	166.83	40	Pucca
Secondary Road	WR96	999.68	40	Pucca

14.7.3 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 4.17 km of new drains forward no. 05 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-8: Proposal of Drain for Ward-05

Drain Type	ID	Construction Type	Length (m)	Average Width (m)
Secondary	SD-4	Pucca	2416.41	1-3m
Secondary	SD-33	Pucca	184.28	1-3m
Secondary	SD-34	Pucca	192.99	1-3m
Tertiary	TD-35	Pucca	187.89	<1m
Tertiary	TD-36	Pucca	217.65	<1m
Tertiary	TD-37	Pucca	397.43	<1m
Tertiary	TD-38	Pucca	201.42	<1m
Secondary	SD-80	Pucca	439.62	1-3m
Secondary	SD-81	Pucca	108.03	1-3m
Secondary	SD-94	Pucca	731.55	1-3m

14.7.4 Urban Services Development Plan of Ward No-05

The urban services are the pre-condition of any potential development. The development is not same in the entire ward. Ward no 05 has much more. Primary school, High school, Neighborhood Park, Playground, and Rickshaw stand is proposed here. The proposal for service facilities of ward no 05 is shown in (**Table 14-20**) together with mouza name and plot number.

Table 14-20: Proposal for Other Facilities of Ward-05

Use	Plot No.	Area (Acres)	Mouza Name
Ward Center-5	845	0.22	Shibganj 147_00
Tempo Stand	25-27	0.04	Chaturputr_143_00
Neighborhood Clinic	820	0.23	Shibganj_147_00
Neighbourhood Park	123	4.20	Jagnnathpur_144_00
Waste Transfer Station	119(P)	0.05	Shibganj 147_00
Slaughter House	285	0.55	Shibganj 147_00
Public Toilet	137(P)	0.03	Shibganj 147_00
	362(P)	0.03	Shibganj 147_00
	823(P)	0.01	Shibganj 147_00

Map 14-10: Landuse Plan Map of Ward-05

Map 14-11: Service and Drainage Plan Map of Ward-05

Ward Action Plan for Ward-06

14.8 Proposals and Plans for Ward-06

Ward No. 06 is located more or less at the Southern part of Shibganj Paurashava. The area of the Ward is 190.399 acres. After reviewing & commensuration the policies and proposals of Structure Plan and Urban Area Plan the following proposals are made in the Action Plan of Ward-06 for implementationwithin next 5 (five) years up to 2016.

Table 14-21: Population Statistics for Ward-06

Item	Year	
	2011	2031
Area (acre)	190.33	190.33
Population	3717	5427
Density of Population (per acre)	12	26

14.8.1 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 44.48 acres of land delineated up to the year 2031 in Ward No. 06, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 13.99 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 4.59 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 2.12 acres of land designated up to 2031.

v) Government Office

Administrative zone covers all kinds of government and non-government offices in the town.

vi) Rural Settlement

The total area under this use has been proposed as 19.22 acres which is most portion of this land use.

vii) Agricultural Zone

The Paurashava including Ward No. 06 has a vast area of agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been estimated as 130.36 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. The proposed retention area covers 15.67 acres.

ix) Health Services

Proposed plan suggests a community clinic in ward center for this ward.

x) Circulation Network

Existing and proposed roads cover a total of 23.11 acres of land of the whole ward.

xi) Open Space

In this ward there is no outdoor recreational space like park, playground etc. So the consultants accommodate 3.43 acres of land for open space.

14.8.2 Road Network Development Plan

The existing road network of ward no.6 is 7.84 km where 2.72 km road is pucca, 3.74 is semi-pucca and 1.37 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. Another problem of roads is that they are meandering in their layout. In road network development plan there is 9.07 km new road and about 23.11 acres of land is allotted for ward no 06. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered the entire existing road. Proposals of Roads for ward no-06 are shown in **Table 14-22** and **Map 14-12 & Map 14-13**.

Table 14-22: Proposal of Roads for Ward-06

Road Type	ID	Length (k.m)	Proposed Width (ft)	Proposal Type
Tertiary Road	NR683	346.39	30	Pucca
Tertiary Road	WR139	5.12	30	Pucca
Primary Road	WR642	1346.92	150	Pucca
Secondary Road	WR76	1150.21	40	Pucca
Secondary Road	WR86	851.41	40	Pucca
Secondary Road	WR96	675.84	40	Pucca
Tertiary Road	WR98	524.41	30	Pucca

14.8.3 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 3.53 km of new drains forward no. 06 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-23: Proposal of Drain for Ward-06

Drain Type	ID	Construction Type	Length (m)	Average Width (m)
Secondary	SD-4	Pucca	96.21	1-3m
Primary	PD-79	Pucca	1173.76	≥3m
Tertiary	TD-89	Pucca	897.68	<1m
Tertiary	TD-90	Pucca	1106.14	<1m
Secondary	SD-94	Pucca	68.36	1-3m
Tertiary	TD-95	Pucca	211.13	<1m
Tertiary	TD-96	Pucca	2.58	<1m
Tertiary	TD-97	Pucca	680.02	<1m
Tertiary	TD-98	Pucca	150.50	<1m

14.8.4 Urban Services Development Plan of Ward No-06

The urban services are the pre-condition of any potential development. The development is not same in the entire ward. Ward no 06 has much more potentiality. Primary school, High school, Neighborhood Park, Playground, and Rickshaw stand is proposed here. The proposal for service facilities of ward no 06 is shown in (**Table 14-24**) together with mouza name and plot number

Table 14-24: Proposal for Other Facilities of Ward-06

Use	Plot No.	Area (Acres)	Mouza Name
Ward Center-6	110(P)	0.12	Jot Binod 140_00
Neighbourhood Market	159-163	2.10	Rasulpur_139_00
	101-105	1.53	Rasulpur_139_00
Public Toilet	159(P)	0.04	Rasulpur 139_00
	109(P)	0.06	Jot Binod 140_00
Playground	212	3.74	Rasulpur_139_00
Neighborhood Clinic	185	0.20	Rasulpur 139_00
Waste Transfer Station	14(P)	0.02	Chelabot Khani 182_01

Map 14-12: Landuse Plan Map of Ward-06

Map 14-13: Service and Drainage Plan Map of Ward-06

Ward Action Plan for Ward-07

14.9 Proposals and Plans for Ward-07

Ward No. 07 is located at the North part of Shibganj Paurashava. The area of the Ward is 764.446 acres. After reviewing and commensuration the policies and proposals of Structure Plan and Urban Area Plan the following proposals are made in the Action Plan of Ward-07 for implementation within next 5 (five) years up to 2016.

Table 14-25: Population Statistics for Ward-07

Item	Year	
	2011	2031
Area (acre)	746.44	746.44
Population	2906	3551
Density of Population (per acre)	6	7

14.9.1 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 83.70 acres of land delineated up to the year 2031 in Ward No. 07, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 4.26 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 9.87 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 4.90 acres of land designated up to 2031.

v) Government Office

Administrative zone covers all kinds of government and non-government offices in the town. The total area under this use has been proposed as 3.64 acres of land designated up to 2031.

vi) Rural Settlement

The total area under this use has been proposed as 1.28 acres which is most portion of this land use.

vii) Agricultural Zone

The Paurashava including Ward No. 07 has a vast area of agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been estimated as 33.80 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. The proposed retention area covers 7.84 acres.

ix) Health Services

Proposed plan suggests a community clinic in ward center for this ward.

x) Circulation Network

Existing and proposed roads cover a total of 29.81 acres of land of the whole ward.

xi) Open Space

In this ward there is no outdoor recreational space like park, playground etc. So the consultants accommodate 2.83 acres of land for open space.

14.9.2 Road Network Development Plan

The existing road network of ward no.7 is 9.48 km where 3.56 km road is pucca, 4.62 is semi-pucca and 1.30 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. Another problem of roads is that they are meandering in their layout. In road network development plan there is 12.18 km new road and about 29.81 acres of land is allotted for ward no 07. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered the entire existing road. Proposals of Roads for ward no-07 are shown in **Table 14-26** and **Map 14-14 & Map 14-15**.

Table 14-26: Proposal of Roads for Ward-07

Road Type	ID	Length (m)	Proposed Width (ft)	Proposal Type
Tertiary Road	NR679	687.29	30	Pucca
Tertiary Road	NR686	2.65	30	Pucca
Tertiary Road	WR136	527.77	30	Pucca
Tertiary Road	WR139	607.85	30	Pucca
Tertiary Road	WR243	3.73	30	Pucca
Secondary Road	WR246	441.84	60	Pucca
Primary Road	WR642	769.45	150	Pucca
Secondary Road	WR651	743.55	60	Pucca
Local Access	WR77	542.96	20	Pucca
Tertiary Road	WR78	574.88	30	Pucca
Secondary Road	WR86	479.72	40	Pucca

Tertiary Road	WR91	935.02	30	Pucca
Tertiary Road	WR92	691.30	30	Pucca

14.9.3 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 4.27 km of new drains forward no. 07 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-9: Proposal of Drain for Ward-07

Drain Type	ID	Construction Type	Length (m)	Average Width (m)
Primary	PD-1	Pucca	188.62	≥3m
Primary	PD-79	Pucca	61.55	≥3m
Secondary	SD-81	Pucca	1170.30	1-3m
Secondary	SD-82	Pucca	38.98	1-3m
Tertiary	TD-84	Pucca	524.51	<1m
Tertiary	TD-85	Pucca	543.45	<1m
Tertiary	TD-86	Pucca	373.67	<1m
Tertiary	TD-87	Pucca	263.30	<1m
Tertiary	TD-88	Pucca	335.73	<1m

14.9.4 Urban Services Development Plan of Ward No-07

The urban services are the pre-condition of any potential development. The development is not same in the entire ward. Ward no 07 has much more potentiality. Primary school, High school, Neighborhood Park, Playground, and Rickshaw stand is proposed here. The proposal for service facilities of ward no 07 is shown in (**Table 14-28**) together with mouza name and plot number.

Table 14-10: Proposal for Other Facilities of Ward-07

Use	Plot No.	Area (Acres)	Mouza Name
Ward Center-7	108(P)	0.45	Mohodipur 145_00
Truck Terminal	520,521,528532	1.42	Chelabot Khani_182_01

Map 14-14: Landuse Plan Map of Ward-07

Map 14-15: Service and Drainage Plan Map of Ward-07

Ward Action Plan for Ward-08

14.10 Proposals and Plans for Ward-08

Ward No. 08 is located at the extreme Southern part of Shibganj Paurashava. The area of the Ward is 648.349 acres. After reviewing and commensuration the policies and proposals of Structure Plan and Urban Area Plan the following proposals are made in the Action Plan of Ward-08 for implementation within next 5 (five) years up to 2016.

Table 14-11: Population Statistics for Ward-08

Item	Year	
	2011	2031
Area (acre)	648.34	648.34
Population	2203	3071
Density of Population (per acre)	6	7

14.10.1 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 36.47 acres of land delineated up to the year 2031 in Ward No. 08, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 1.97 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 2.43 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 11.81 acres of land designated up to 2031.

v) Government Office

Administrative zone covers all kinds of government and non-government offices in the town. The total area under this use has been proposed as 6.52 acres of land designated up to 2031.

vi) Rural Settlement

The total area under this use has been proposed as 5.80 acres which is most portion of this land use.

vii) Agricultural Zone

The Paurashava including Ward No. 08 has a vast area of agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been estimated as 201.45 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. The proposed retention area covers 7.64 acres.

ix) Health Services

Proposed plan suggests a community clinic in ward center for this ward.

x) Circulation Network

Existing and proposed roads cover a total of 48.65 acres of land of the whole ward.

xi) Open Space

In this ward there is no outdoor recreational space like park, playground etc. So the consultants accommodate 1.81 acres of land for open space.

14.10.2 Road Network Development Plan

The existing road network of ward no.8 is 14.56 km where 5.57 km road is pucca, 3.75 is semi-pucca and 5.23 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. Another problem of roads is that they are meandering in their layout. In road network development plan there is 16.22 km new road and about 48.65 acres of land is allotted for ward no 08. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered the entire existing road. Proposals of Roads for ward no-08 are shown in **Table 14-30** and **Map 14-16 & Map 14-17**.

Table 14-30: Proposal of Roads for Ward-08

Road Type	ID	Length (m)	Proposed Width (ft)	Proposal Type
Tertiary Road	NR739	589.23	30	Pucca
Secondary Road	WR202	962.67	40	Pucca
Secondary Road	WR231	775.82	40	Pucca
Secondary Road	WR651	1554.54	60	Pucca

14.10.3 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 8.89 km of new drains forward no. 08 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-31: Proposal of Drain for Ward-08

Drain Type	ID	Construction Type	Length (m)	Average Width (m)
Secondary	SD-59	Pucca	1.92	1-3m
Secondary	SD-60	Pucca	3.00	1-3m
Tertiary	TD-65	Pucca	2.25	<1m
Tertiary	TD-66	Pucca	0.58	<1m
Tertiary	TD-67	Pucca	0.40	<1m
Tertiary	TD-68	Pucca	0.90	<1m
Tertiary	TD-69	Pucca	2.47	<1m
Tertiary	TD-70	Pucca	0.74	<1m

14.10.4 Urban Services Development Plan of Ward No-08

The urban services are the pre-condition of any potential development. The development is not same in the entire ward. Ward no 08 has much more potentiality. Primary school, High school, Neighborhood Park, Playground, and Rickshaw stand is proposed here. The proposal for service facilities of ward no 08 is shown in (**Table 14-32**) together with mouza name and plot number.

Table 14-32: Proposal for Other Facilities of Ward-08

Use	Plot No.	Area (Acres)	Mouza Name
Ward Center-8	817(P)	0.48	Chelabot Khani 182_02
Neighbourhood Market	1292,1294,1298,1299,1302	1.23	Chelabot Khani_182_02
High School	829	1.53	Chelabot Khani_182_02
Public Toilet	831-833	0.14	Chelabot Khani_182_02
Neighborhood Clinic	900,910-914,917,918,927	2.11	Chelabot Khani_182_02
Primary School	1482	5.05	Chelabot Khani_182_02
Neighbourhood Park	1400-1412,1421-1424	4.50	Chelabot Khani_182_02
Tempo Stand	852	0.17	Chelabot Khani_182_02
Cattle Hat	1203-1211	2.38	Chelabot Khani_182_02
Playground	814-817, 820,822,826	4.95	Chelabot Khani_182_02

Map 14-16: Landuse Plan Map of Ward-08

Map 14-17: Service and Drainage Plan Map of Ward-08

Ward Action Plan for Ward-09

14.11 Proposals and Plans for Ward-09

Ward No. 09 is located at the extreme South part of Shibganj Paurashava. The area of the Ward is 849.547 acres. After reviewing and commensuration the policies and proposals of Structure Plan and Urban Area Plan the following proposals are made in the Action Plan of Ward-09for implementation within next 5 (five) years up to 2016.

Table 14-33: Population Statistics for Ward-09

Item	Year	
	2011	2031
Area (acre)	849.54	849.54
Population	3302	8823
Density of Population (per acre)	8	17

14.11.1 Proposed Land Use Zoning

i) Urban Residential Zone

Urban residential zone refers to all categories of urban residential areas, including existing ones and the residential land use proposed under the present master plan. In total this zone covers 46.60 acres of land delineated up to the year 2031 in Ward No. 09, considering standard provided by LGED.

ii) Commercial Zone

The commercial zone is intended to provide locations, where commercial activities including retails can be set up and function, without creating hazards to surrounding land uses. This zone has an area of 0.83 acres designated up to 2031.

iii) Mixed Use Zone

Mixed use zones have been recommended to allow some flexibility in development. Mixture of land uses will allow flexibility of development, instead of restricting development. This zone has an area of 33.80 acres designated up to 2031.

iv) Education & Research Zone

The total area under this use has been determined as 6.37 acres of land designated up to 2031.

v) Government Office

Administrative zone covers all kinds of government and non-government offices in the town.

vi) Rural Settlement

The total area under this use has been proposed as 25.02 acres which is most portion of this land use.

vii) Agricultural Zone

The Paurashava including Ward No. 09 has a vast area of agricultural land that demands formation of a separate zone like, agriculture zone. The total area under this use has been estimated as 121.74 acres that include existing and proposed land uses.

viii) Waterbody

The plan suggests preserving most of the water bodies for two purposes, first, to serve as source of water, second to serve as water retention area during monsoon. The ponds with an area equal to or more than 0.25 acres will be preserved as the water retention ponds. The proposed retention area covers 45.32 acres.

ix) Health Services

Proposed plan suggests a community clinic in ward center for this ward.

x) Circulation Network

Existing and proposed roads cover a total of 34.63 acres of land of the whole ward.

xi) Open Space

In this ward there is no outdoor recreational space like park, playground etc. So the consultants accommodate 3.40 acres of land for open space.

14.11.2 Road Network Development Plan

The existing road network of ward no.9 is 8.82 km where 2.95 km road is pucca, 1.87 is semi-pucca and 3.98 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. Another problem of roads is that they are meandering in their layout. In road network development plan there is 10.12 km new road and about 34.63 acres of land is allotted for ward no 09. All of the roads of this Paurashava will be constructed as a pucca road in different phases of plan. Road widening is considered the entire existing road. Proposals of Roads for ward no-09 are shown in **Table 14-34** and **Map 14-18 & Map 14-19**.

Table 14-34: Proposal of Roads for Ward-09

Road Type	ID	Length (m)	Proposed Width (ft)	Proposal Type
Tertiary Road	WR17	1321.11	30	Pucca
Tertiary Road	WR18	558.54	30	Pucca
Secondary Road	WR24	987.29	40	Pucca
Secondary Road	WR26	879.43	40	Pucca
Tertiary Road	WR28	516.78	30	Pucca
Secondary Road	WR29	1253.01	40	Pucca
Tertiary Road	WR57	836.89	30	Pucca
Secondary Road	WR651	3724.63	60	Pucca
Tertiary Road	WR73	977.86	30	Pucca
Tertiary Road	WR81	1660.98	30	Pucca

14.11.3 Drainage Development Plan

Drain is necessary for discharge all its waste water and storm water. The plan proposes 3.80 km of new drains forward no. 09 which will be developed during the different phase. The natural sources of drainage are playing the critical roles in drainage plan.

Table 14-35: Proposal of Drain for Ward-09

Drain Type	ID	Construction Type	Length (m)	Average Width (m)
Secondary	SD-82	Pucca	2584.06	1-3m
Tertiary	TD-83	Pucca	6163.13	<1m
Secondary	SD-178	Pucca	522.48	1-3m

14.11.4 Urban Services Development Plan of Ward No-09

The urban services are the pre-condition of any potential development. The development is not same in the entire ward. Ward no 09 has much more potentiality. Primary school, High school, Neighbourhood Park, Playground, and Rickshaw stand is proposed here. The proposal for service facilities of ward no 09 is shown in (**Table 14-36**) together with mouza name and plot number.

Table 14-36: Proposal for Other Facilities of Ward-09

Use	Plot No.	Area (Acres)	Mouza Name
Ward Center-9	5290	0.65	Chelabot Khani 182_05
Neighbourhood Market	5420, 5421,5424	0.60	Chelabot Khani_182_05
Neighbourhood Park	5301-5313,8380-5390	5.45	Chelabot Khani_182_05
Tempo Stand	5292-5297	0.40	Chelabot Khani_182_05
Public Toilet	5417,5418,5420,5824	0.16	Chelabot Khani_182_05
Neighborhood Clinic	5759-5765	1.55	Chelabot Khani_182_05
Water Pump House	5432(P)	0.13	Chelabot Khani_182_05

Map 14-18: Landuse Plan Map of Ward-09

Map 14-19: Service and Draiange Plan Map of Ward-09

14.12 Implementation Guidelines

14.12.1 Tasks of Paurashava Authority

As a planning and development authority Paurashava shoulders the responsibilities of undertaking and implementing Ward wise Action Plans. Discussion meetings and negotiations with local leaders will have to be carried out relentlessly for successful execution of any detailed area plan through their active participation. The Paurashava must have the Planning Unit.

14.12.2 Institutional Strengthening

In Ward wise planning the most significant role will be played by Paurashava Authority. The Planning Section must have to launch in the Paurashava which will carry out the entire work of project initiation and plan formulation. These works are complicated and time consuming, and require multidisciplinary professionals.

14.12.3 Role of Municipal Authority

According to the section 35 of Paurashava Law-2010, Paurashava may, and if so required by the prescribed authority shall, draw up a Master Plan for the municipality within five years of its establishment. The Paurashava should have to ply an important role by implementing all the priority tasks without any delaying other wise the plan proposals will be inactive for implementation in wrong periods.

14.12.4 Publicity and Circulation of the Plans and Documents

In order to enable greater access of the Paurashava inhabitants, the plan documents must have wide circulation. This is necessary to create awareness among people about city planning and development. The plan document should be sent to every public office. Copies of plans and reports should be made available for purchase by people in general. This will be a step forward in promoting good governance through enabling beneficiary participating in planning and development activities.

14.13 Concluding Remarks

This master plan is developed a comprehensive vision for in context with its location, natural resources, and visions of the community. Master Plan will describe a strategy to address the need for facility improvements and for capital investments to support current and future development of the Paurashava. The community will be involved every step of the way. It wills guild the future development of the Paurashava.

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 Paurashava has been prepared. It will shape and guide the growth of city in order to meet its social, cultural, environmental, economical, and recreational and many other needs of city dwellers.

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.

Annexure

Annexure-A: Land Use Permission

Annexure- A: Land use Permission

a. Urban Residential Land Use

Land Use Permitted

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

Table A.1: Land Use Permitted

Permitted Urban Residential Uses
Artisan's Shop
Assisted Living or Elderly Home
Confectionery Shop
Barber Shop
Child Daycare \ Preschool
Cleaning \ Laundry Shop
Communication Service Facilities
CommunicationTower Within Permitted Height
Condominium or Apartment
Cottage
Cyber Café
Daycare Center (Commercial or Nonprofit)
Drug Store or Pharmacy
Employee Housing (Guards \ Drivers) \ Ancillary Use
General Store
Grocery Store
High School
Household Appliance and Furniture Repair Service (No Outside Storage)
Housing For Seasonal Firm Labor
Landscape and Horticultural Services
Mosque, Place Of Worship
Newspaper Stand
Nursery School
Orphanage
Eidgah
Photocopying and Duplicating Services (No Outside Storage)
Pipelines and Utility Lines
Playing Field
Primary School
Private Garages (Ancillary Use)
Project Identification Signs
Property Management Signs
Public Transport Facility
Satellite Dish Antenna
Shelter (Passers By)
Shoe Repair or Shoeshine Shop (Small)
CBO Office
Special Dwelling
Temporary Tent
Temporary tent for Permitted Function
Newspaper Stand
Specialized School: Dance, Art, Music, Physically Challenged & Others

Permitted Urban Residential Uses
Transmission Lines
Urban-Nature Reserve
Utility Lines
Woodlot
Children's Park (Must Have Parking)
ATM Booth
Water Pump \ Reservoir
Monument (Neighborhood Scale)
Bill Payment Booth
Boarding and Rooming House
Dormitory
Memorial Structure (Ancillary)
NeighborhoodCenter* (WhereNeighborhoodCenter exists)
Permitted
Community Center
Doctor \ Dentist Chamber
Cultural Exhibits and Libraries
Fast Food Establishment \ Food Kiosk
Flowers, Nursery Stock and Florist Supplies
Fitness Centre
Gaming Clubs
Departmental Stores
Retail Shops \ Facilities

Source: Compiled by the Consultants

*Permission of Neighborhood Center Facilities in absence of formal neighborhood should be subject to Landuse Permit Committee

Land Use Conditionally Permitted

The following uses may be permitted or disallowed in this zone after review and approval by the authority/committee following appropriate procedure while the application meets the criteria mentioned in the requirement.

Table A.2: Land Use Conditionally Permitted

Conditionally Permitted Urban Residential Uses
AddictionTreatmentCenter
Amusement and Recreation (Indoors)
Funeral Services
Art Gallery, Art Studio \ Workshop
Automobile Driving Academy
Beauty and Body Service
Billiard Parlor \ Pool Hall
Book or Stationery Store or Newsstand
Building Maintenance \ Cleaning Services, No Outside Storage
Bus Passenger Shelter
Graveyard \ Cemetery
Coffee Shop \ Tea Stall
Correctional Institution

Conditionally Permitted Urban Residential Uses
Courier Service
Crematorium
Plantation (Except Narcotic Plant)
Furniture & Variety Stores
Emergency Shelter
Energy Installation
Garages
GardenCenter or Retail Nursery
Fire Brigade Station
Police Station
Temporary Rescue Shed
Guest House
Slaughter House
Static Transformer Stations
Tourist Home or Resort
Market (Bazar)

Permitted General Industrial Activities
Confectionery Shop
Bank & Financial Institution
Bicycle Assembly, Parts and Accessories
Blacksmith
Bus Passenger Shelter
CommunicationTower Within Permitted Height
Freight Transport Facility
Police Box \ Barrack
Fire \ Rescue Station
Grocery Store
Household Appliance and Furniture Repair Service
Machine Sheds
Meat and Poultry (Packing & Processing)
Mosque, Place Of Worship
Newspaper Stand
Photocopying and Duplicating Services

Public Transport Facility

Optical Goods Sales
Outdoor Fruit and Vegetable Markets

Pipelines and Utility Lines
Printing, Publishing and Distributing

Outdoor Café

Community Hall
Neighborhood Co-Operative Office
Overhead Water Storage Tanks
Row House
Paints and Varnishes Store
Parking Lot
Patio Homes
Photofinishing Laboratory
Post Office
Postal Facilities
Sports and Recreation Club
Tennis Club
Flood Management Structure
Telephone Sub Station
Electrical Sub Station

Restaurant
Retail Shops \ Facilities
Salvage Processing
Salvage Yards
Satellite Dish Antenna
Sawmill, Chipping and Pallet Mill
Shelter (Passers By)
Television, Radio or Electronics Repair (No Outside Storage)
Transmission Lines
Truck Stop & Washing or Freight Terminal
Utility Lines
Wood Products
Woodlot
ATM Booth
Water Pump \ Reservoir
Effluent Treatment Plant
Social Forestry

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

b. General Industry

Land use Permitted

General Industry land use category approve only Green and Orange-A category industry mentioned in The Environmental Conservation Rule, 1997.The following uses in the tables are proposed to be applicable for this zone only.

Table A.3: Land Use Permitted

Permitted General Industrial Activities

Source: Compiled by the Consultants

Land Use Conditionally Permitted

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

Table A.4: Land Use Conditionally Permitted

Conditionally Permitted GeneralIndustrialLand Uses

Conditionally Permitted GeneralIndustrialLand Uses
Amusement and Recreation (Indoors)
Appliance Store
Plantation (Except Narcotic Plant)
Cyber Café
Daycare Center (Commercial or Nonprofit)
Doctor \ Dentist Chamber
Electrical and Electronic Equipment and Instruments Sales
Employee Housing
Energy Installation
Fast Food Establishment \ Food Kiosk
Garages
Grain & Feed Mills
Incineration Facility
Super Store
Lithographic or Print Shop
Motor Vehicle Fuelling Station \ Gas Station
Motorcycle Sales Outlet
Outdoor Fruit and Vegetable Markets
Outside Bulk Storage
Overhead Water Storage Tanks
Painting and Wallpaper Sales
Paints and Varnishes
Parking Lot
Parking Lot (Commercial)
Private Garages
Retail Shops Ancillary To Studio \ Workshop
Jute Mill

Source: Compiled by the Consultants

Restricted Uses

All other uses; except the permitted and conditionally permitted uses.

c. Commercial Zone

Land Use Permitted

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

Table A.5: Land Use Permitted

Permitted Commercial Activity
Accounting, Auditing or Bookkeeping Services
Billboards, Advertisements & Advertising Structure
Agri-Business
Agricultural Sales and Services
Ambulance Service
Antique Shop
Appliance Store
Auction Market
Auditorium, Coliseum, Meeting Halls, and

Permitted Commercial Activity
Conference Facilities, Convention
Auto Leasing or Rental Office
Auto Paint Shop
Auto Parts and Accessory Sales (Indoors)
Auto Repair Shop (With Garage)
Automobile Wash
Automobile Sales
Confectionery Shop
Bakery or Confectionery Retail
Bank & Financial Institution
Bar (Licensed)
Barber Shop
Beauty and Body Service
Bicycle Shop
Billiard Parlor \ Pool Hall
Book or Stationery Store or Newsstand
Building Material Sales or Storage (Indoors)
Bulk Mail and Packaging
Bus Passenger Shelter
Cinema Hall
Communication Service Facilities
CommunicationTower Within Permitted Height
Computer Maintenance and Repair
Computer Sales & Services
ConferenceCenter
Construction Company
Courier Service
Cyber Café
Daycare Center (Commercial or Nonprofit)
Department Stores, Furniture & Variety Stores
Doctor \ Dentist Chamber
Drug Store or Pharmacy
Electrical and Electronic Equipment and Instruments Sales
Fast Food Establishment \ Food Kiosk
Freight Handling, Storage & Distribution
Freight Transport Facility
Freight Yard
General Store
Grocery Store
Guest House
Hotel or Motel
Inter-City Bus Terminal
Jewelry and Silverware Sales
Junk \ Salvage Yard
Super Store
Market (Bazar)
Mosque, Place Of Worship
Motorcycle Sales Outlet
Multi-Storey Car Park
Newspaper Stand
Outdoor Fruit and Vegetable Markets
Outdoor Recreation, Commercial

Permitted Commercial Activity
Parking Lot (Commercial)
Pet Store
Photocopying and Duplicating Services
Photofinishing Laboratory & Studio
Pipelines and Utility Lines
Post Office
Preserved Fruits and Vegetables Facility \ Cold Storage
Printing, Publishing and Distributing
Project Identification Signs
Property Management Signs
Public Transport Facility
Refrigerator or Large Appliance Repair
Resort
Restaurant
Retail Shops \ Facilities
Salvage Processing
Salvage Yards
Satellite Dish Antenna
Sawmill, Chipping and Pallet Mill
Shelter (Passers By)
Shopping Mall \ Plaza
Slaughter House
Software Development
Sporting Goods and Toys Sales
Taxi Stand
Telephone Exchanges
Television, Radio or Electronics Repair (No Outside Storage)
Theater (Indoor)
Transmission Lines
Utility Lines
Vehicle Sales & Service, Leasing or Rental
Veterinarian Clinics, AnimalHospitals, Kennels and Boarding Facilities
Warehousing
Wood Products
Woodlot
ATM Booth
Water Pump \ Reservoir
Agro-Based Industry (Rice Mill, Saw Mill, Cold Storage)
Social Forestry

Source: Compiled by the Consultants

Land Use Conditionally Permitted

Some functions are permitted with some condition in this zone.

Table A.6: Land Use Conditionally Permitted

Conditionally permitted commercial activities
Amusement and Recreation (Indoors)
Bicycle Assembly, Parts and Accessories
Broadcast Studio \ Recording Studio (No Audience)
Coffee Shop \ Tea Stall
Concert Hall, Stage Shows
Construction, Survey, Soil Testing Firms
Trade Shows
Craft Workshop
Plantation (Except Narcotic Plant)
Energy Installation
Firm Equipment Sales & Service
Agricultural Chemicals, Pesticides or Fertilizers Shop
Fitness Centre
Flowers, Nursery Stock and Florist Supplies
Forest Products Sales
Fuel and Ice Dealers
Garages
GardenCenter or Retail Nursery
Police Box \ Barrack
Fire \ Rescue Station
Grain & Feed Mills
Household Appliance and Furniture Repair Service
Incineration Facility
Indoor Amusement Centers, Game Arcades
Indoor Theatre
Lithographic or Print Shop
Motor Vehicle Fuelling Station \ Gas Station
Musical Instrument Sales or Repair
Optical Goods Sales
Painting and Wallpaper Sales
Paints and Varnishes
Parking Lot
Patio Homes
Postal Facilities
Poultry
Private Garages
Professional Office
Retail Shops Ancillary To Studio \ Workshop
Stone \ Cut Stone Products Sales

Source: Compiled by the Consultants

Restricted Uses

All other uses except;, the permitted and conditionally permitted uses.

d. Rural Settlement

Land Use Permitted

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

Table A.7: Land Use Permitted

Permitted Rural Settlement

Permitted Rural Settlement
Agricultural Dwellings
Animal Husbandry
Animal Shelter
Graveyard \ Cemetery
Child Daycare \ Preschool
Primary School
CommunicationTower Within Permitted Height
Cottage
Crematorium
Dairy Firming
General Store
Grocery Store
Handloom (Cottage Industry)
Housing For Seasonal Firm Labor
Mosque, Place Of Worship
Newspaper Stand
Nursery School
orphanage
Outdoor Religious Events (Eidgah)
Playing Field
Satellite Dish Antenna
NGO \ CBO Facilities
Special Dwelling (E.G. Dorm For Physically Challenged Etc.)
Temporary Shed \ Tent
Specialized School: Dance, Art, Music, Physically Challenged & Others
Static Electrical Sub Stations
Transmission Lines
Utility Lines
Woodlot
Plantation (Except Narcotic Plant)
Social Forestry
Memorial Structure

Source: Compiled by the Consultants

Land Use Conditionally Permitted

The following uses may be permitted or disallowed in this zone after review and approval by the authority/committee following appropriate procedure while the application meets the criteria mentioned in the requirement.

Table No. A.8: Land Use Conditionally Permitted

Conditionally permitted uses under Rural Settlement
Artisan's Shop (Potter, Blacksmith, and Goldsmith Etc.)
Research organization (Agriculture \ Fisheries)
Energy Installation
Fish Hatchery
GardenCenter or Retail Nursery
Emergency Shelter
Sports and Recreation Club, FiringRange: Indoor

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

e. Mixed use zone

Land Use Permitted

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

Table A.11: Land Use Permitted

Permitted uses in Mixed Use Zone
Accounting, Auditing or Bookkeeping Services
AddictionTreatmentCenter
Billboards, Advertisements & Advertising Structure
Agricultural Sales and Services
Antique Store
Appliance Store
Art Gallery, Art Studio \ Workshop
Artisan's Shop
Assisted Living or Elderly Home
Auditorium, Coliseum, Meeting Halls, and Conference Facilities, Convention
Auto Leasing or Rental Office
Automobile Wash
Automobile Driving Academy
Confectionery Shop
Bakery or Confectionery Retail
Bank & Financial Institution
Barber Shop
Bicycle Shop
Billiard Parlor \ Pool Hall
Blacksmith
Boarding and Rooming House
Book or Stationery Store or Newsstand
Bus Passenger Shelter
Child Daycare \ Preschool
Cleaning \ Laundry Shop
Commercial Recreational Buildings
Communication Service Facilities
CommunicationTower Within Permitted Height
Community Center
Condominium or Apartment
Correctional Institution
Courier Service
Cyber Café
Daycare Center (Commercial or Nonprofit)
Doctor \ Dentist Chamber
Employee Housing
Fabric Store
Fast Food Establishment \ Food Kiosk
Funeral Services
General Store

Permitted uses in Mixed Use Zone
Grocery Store
Guest House
Hospital
Jewelry and Silverware Sales
Landscape and Horticultural Services
Mosque, Place Of Worship
Newspaper Stand
Nursery School
Photocopying and Duplicating Services
Pipelines and Utility Lines
Primary School
Project Identification Signs
Property Management Signs
Public Transport Facility
Resort
Satellite Dish Antenna
Shelter (Passers By)
Shoe Repair or Shoeshine Shop (Small)
Slaughter House
Social organization
Software Development
Special Dwelling
Toys and Hobby Goods Processing and Supplies
Training Centre
Transmission Lines
Utility Lines
Vehicle Sales & Service, Leasing or Rental
Warehousing
Woodlot
Children's Park
ATM Booth
Water Pump \ Reservoir
Social Forestry
Dormitory
Rickshaw \ Auto Rickshaw Stand

Source: Compiled by the Consultants

Land Use Conditionally Permitted

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

Table A.12: Land Use Conditionally Permitted

Conditionally permitted uses in Mixed Use Zone
Agricultural Chemicals, Pesticides or Fertilizers Shop
Amusement and Recreation (Indoors)
Beauty and Body Service
Broadcast Studio \ Recording Studio (No Audience)
Building Maintenance \ Cleaning Services, No Outside Storage
Building Material Sales or Storage (Indoors)
Graveyard \ Cemetery
Coffee Shop \ Tea Stall
Computer Maintenance and Repair
Computer Sales & Services
Concert Hall, Stage Shows
ConferenceCenter
Construction Company
Construction, Survey, Soil Testing Firms
Cottage
Counseling Services
Craft Workshop
Crematorium
Plantation (Except Narcotic Plant)
Cultural Exhibits and Libraries
Department Stores, Furniture & Variety Stores
Drug Store or Pharmacy
Energy Installation
Fitness Centre
Flowers, Nursery Stock and Florist Supplies
Freight Handling, Storage & Distribution
Freight Transport Facility
Gaming Clubs
Garages
GardenCenter or Retail Nursery
Commercial Office
Project Office
Government Office
Hotel or Motel
Household Appliance and Furniture Repair Service
Indoor Amusement Centers, Game Arcades
Indoor Theatre
Lithographic or Print Shop
Market (Bazar)
Health Office, Dental Laboratory, Clinic or Lab
Musical Instrument Sales or Repair
Optical Goods Sales
Outdoor Café
Outdoor Fruit and Vegetable Markets
Painting and Wallpaper Sales
Paints and Varnishes
Patio Homes
Photofinishing Laboratory & Studio
Poultry
Printing, Publishing and Distributing
Psychiatric Hospital
Retail Shops Ancillary To Studio \ Workshop
Radio \ Television or T&T Station With TransmitterTower
Refrigerator or Large Appliance Repair
Restaurant

Conditionally permitted uses in Mixed Use Zone
Retail Shops \ Facilities
Sporting Goods and Toys Sales
Sports and Recreation Club, FiringRange: Indoor
Telephone Exchanges
Television, Radio or Electronics Repair (No Outside Storage)

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

f. Education and Research Area

Land Use Permitted

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

Table A.13: Land Use Permitted

Permitted uses under Education & Research Zone
AddictionTreatmentCenter
Billboards, Advertisements & Advertising Structure
Art Gallery, Art Studio \ Workshop
Automobile Driving Academy
Confectionery Shop
Bus Passenger Shelter
Child Daycare \ Preschool
College, University, Technical Institute
Communication Service Facilities
CommunicationTower Within Permitted Height
ConferenceCenter
Correctional Institution
Cultural Exhibits and Libraries
Cyber Café
Freight Transport Facility
General Store
Grocery Store
High School
Hospital
Lithographic or Print Shop
Mosque, Place Of Worship
Multi-Storey Car Park
Newspaper Stand
Nursery School
Outdoor Religious Events
Photocopying and Duplicating Services
Post Office
Primary School
Professional Office
Project Identification Signs
Property Management Signs
Public Transport Facility
Satellite Dish Antenna
School (Retarded)
Scientific Research Establishment
Shelter (Passers By)
Specialized School: Dance, Art, Music & Others
Training Centre
Transmission Lines
Utility Lines
Vocational, Business, Secretarial School
Woodlot
ATM Booth
Water Pump \ Reservoir
Social Forestry
Dormitory
VeterinarySchool \ College and Hospital

Source: Compiled by the Consultants

Land Use Conditionally Permitted

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

Table A.14: Land Use Conditionally Permitted

Conditionally permitted uses under Education and Research Zone
Auditorium, Coliseum, Meeting Halls, and Conference Facilities, Convention
Bank & Financial Institution
Barber Shop
Boarding and Rooming House
Book or Stationery Store or Newsstand
Coffee Shop \ Tea Stall
Counseling Services
Courier Service
Plantation (Except Narcotic Plant)
Daycare Center (Commercial or Nonprofit)
Doctor \ Dentist Chamber
Drug Store or Pharmacy
Fast Food Establishment \ Food Kiosk
Flowers, Nursery Stock and Florist Supplies
Gallery \ Museum
Garages
Indoor Theatre
orphanage
Outdoor Café
Parking Lot
Pipelines and Utility Lines
Postal Facilities
Psychiatric Hospital

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

g. Government Office

Land Use Permitted

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

Table A.15: Land Use Permitted

Permitted uses under Government Office Zone
Accounting, Auditing or Bookkeeping Services
Billboards, Advertisements & Advertising Structure
Confectionery Shop
Bus Passenger Shelter
Civic Administration
Communication Service Facilities
CommunicationTower Within Permitted Height
Construction, Survey, Soil Testing Firms
Cultural Exhibits and Libraries
Cyber Café
Emergency Shelter
Freight Transport Facility
General Store
Project Office
Government Office
Grocery Store
Guest House
Multi-Storey Car Park
Newspaper Stand
Outdoor Religious Events
Photocopying and Duplicating Services
Post Office
Professional Office
Public Transport Facility
Satellite Dish Antenna
Scientific Research Establishment
Shelter (Passers By)
Training Centre
Transmission Lines
Utility Lines
Woodlot
ATM Booth
Water Pump \ Reservoir
Social Forestry

Source: Compiled by the Consultants

Land Use Conditionally Permitted

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

Table A.16: Land Use Conditionally Permitted

Conditionally permitted uses under Government office
Amusement and Recreation (Indoors)
Auditorium, Coliseum, Meeting Halls, and Conference Facilities, Convention
Bank & Financial Institution
Boarding and Rooming House
Book or Stationery Store or Newsstand
Coffee Shop \ Tea Stall
ConferenceCenter
Courier Service
Plantation (Except Narcotic Plant)
Daycare Center (Commercial or Nonprofit)
Detention Facilities
Doctor \ Dentist Chamber
Energy Installation
Fast Food Establishment \ Food Kiosk
Flowers, Nursery Stock and Florist Supplies
Freight Handling, Storage & Distribution
Freight Yard
Gallery \ Museum
Garages
Police Box \ Barrack
Fire \ Rescue Station
Lithographic or Print Shop
Mosque, Place Of Worship
Outdoor Café
Parking Lot
Parking Lot (Commercial)
Pipelines and Utility Lines
Postal Facilities

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

h. Agricultural Zone

Land Use Permitted

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

Table A17: Land Use Permitted

Permitted uses under Agricultural Zone
Food Grain Cultivation
Vegetable Cultivation
Cash Crop Cultivation
Horticulture
Arboriculture
Dairy Firming
Deep Tube Well
Shallow Tube Well
Irrigation Facilities (IrrigationCanal, Culvert, Flood Wall etc)
Temporary Structure (Agricultural)
Animal Shelter
Duckery
Aquatic Recreation Facility (Without Structure)
Tree Plantation (Except Narcotic Plant)
Aquaculture
Static Transformer Stations
Transmission Lines

Permitted uses under Agricultural Zone
Utility Lines
Woodlot
Social Forestry

Source: Compiled by the Consultants

Land Use Conditionally Permitted

Table A18: Land Use Conditionally Permitted

Conditionally permitted uses under Agricultural Zone
Graveyard \ Cemetery
CommunicationTower Within Permitted Height
Crematorium
Fish Hatchery
GardenCenter or Retail Nursery
Poultry

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted in this zone.

j. Open Space

Land Use Permitted

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

Table A.19: Land Use Permitted

Permitted uses under Open Space
Botanical Garden & Arboretum
Bus Passenger Shelter
CaravanPark \ Camping Ground
Carnivals and Fairs
Circus
Plantation (Except Narcotic Plant)
Landscape and Horticultural Services
Open Theater
Park and Recreation Facilities (General)
Pipelines and Utility Lines
Playing Field
Special Function Tent
Tennis Club
Transmission Lines
Urban-Nature Reserve
Utility Lines
Woodlot
Zoo
Roadside Parking
Social Forestry
Memorial Structure

Source: Compiled by the Consultants

Landuse Conditionally Permitted

Table A 20: Land Use Conditionally Permitted

Conditionally permitted uses under open space
CommunicationTower Within Permitted Height
Trade Shows
Fitness Centre
Flowers, Nursery Stock and Florist Supplies
Golf Course
Motorized Recreation
Outdoor Recreation Facilities
Outdoor Recreation, Commercial
Outdoor Sports and Recreation
Park Maintenance Facility
RetreatCenter
Sports and Recreation Club, FiringRange: Indoor

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted.

k. Water Body

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

Land Use Permitted

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

Table A.21: Land Use Permitted

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

Source: Compiled by the Consultants

Land Use Conditionally Permitted

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

Table A.22: Land Use Conditionally Permitted

Conditionally permitted uses under water body
Plantation (Except Narcotic Plant)
Marina \ Boating Facility
Motorized Recreation

Source: Compiled by the Consultants

Restricted Uses

All uses except permitted and conditionally permitted uses are restricted.

Annexure-B: Proposed Road Inventory

Details of Road Network Proposals of Shhibganj Paurashava

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR1	20 ft	25.69	1.75	Local Access			3rd Phase
WR2	20 ft	46.46	2	Local Access			3rd Phase
WR3	20 ft	67.85	2.001	Local Access			3rd Phase
WR4	20 ft	54.95	2.5	Local Access			3rd Phase
WR5	20 ft	59.45	1.5	Local Access			3rd Phase
WR6	20 ft	61.27	2.001	Local Access			3rd Phase
WR7	20 ft	57.84	1.5	Local Access			3rd Phase
WR8	20 ft	155.52	3.001	Local Access			3rd Phase
WR9	20 ft	90.41	2	Local Access			3rd Phase
WR10	20 ft	115.14	2.007	Local Access			3rd Phase
WR11	20 ft	423.61	3.007	Local Access			3rd Phase
WR12	20 ft	165.99	3.001	Local Access			3rd Phase
WR13	20 ft	258.77	3.008	Local Access			3rd Phase
WR14	20 ft	57.28	1.001	Local Access			3rd Phase
WR15	20 ft	113.47	3.001	Local Access			3rd Phase
WR16	20 ft	77.51	4.326	Local Access			3rd Phase
WR17	30 ft	1321.11	4	Tertiary Road			3rd Phase
WR18	30 ft	558.54	2.976	Tertiary Road			3rd Phase
WR19	20 ft	461.58	2.635	Local Access			3rd Phase
WR20	20 ft	62.62	2.501	Local Access			3rd Phase
WR21	20 ft	41.96	2	Local Access			3rd Phase
WR22	20 ft	27.45	2.004	Local Access			3rd Phase
WR23	20 ft	221.23	3.4	Local Access			3rd Phase
WR24	40 ft	987.29	3.198	Secondary Road		2nd Phase	
WR25	40 ft	356.41	3.053	Secondary Road		2nd Phase	
WR26	40 ft	879.43	3.291	Secondary Road		2nd Phase	
WR27	30 ft	331.40	3.216	Tertiary Road			3rd Phase
WR28	30 ft	516.78	3.309	Tertiary Road			3rd Phase
WR29	40 ft	1253.01	4.186	Secondary Road		2nd Phase	
WR30	20 ft	15.64	1	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR31	20 ft	93.70	2.203	Local Access			3rd Phase
WR32	20 ft	67.35	2.007	Local Access			3rd Phase
WR33	20 ft	316.67	2.509	Local Access			3rd Phase
WR34	20 ft	119.79	2.996	Local Access			3rd Phase
WR35	20 ft	46.74	2.011	Local Access			3rd Phase
WR36	20 ft	100.00	2	Local Access			3rd Phase
WR37	20 ft	148.18	2.52	Local Access			3rd Phase
WR38	20 ft	398.47	3.585	Local Access			3rd Phase
WR39	30 ft	479.70	3.002	Tertiary Road			3rd Phase
WR40	20 ft	69.23	3	Local Access			3rd Phase
WR41	20 ft	52.70	3.016	Local Access			3rd Phase
WR42	20 ft	47.41	2.012	Local Access			3rd Phase
WR43	20 ft	106.09	2	Local Access			3rd Phase
WR44	20 ft	55.86	2	Local Access			3rd Phase
WR45	20 ft	44.48	3.003	Local Access			3rd Phase
WR46	20 ft	67.31	2.501	Local Access			3rd Phase
WR47	20 ft	9.14	3.398	Local Access			3rd Phase
WR48	20 ft	118.12	3.003	Local Access			3rd Phase
WR49	20 ft	392.53	3.004	Local Access			3rd Phase
WR50	20 ft	21.85	2.517	Local Access			3rd Phase
WR51	20 ft	12.86	1.503	Local Access			3rd Phase
WR52	20 ft	42.11	1.499	Local Access			3rd Phase
WR53	20 ft	102.63	3.003	Local Access			3rd Phase
WR54	20 ft	47.24	2.5	Local Access			3rd Phase
WR55	20 ft	32.59	2	Local Access			3rd Phase
WR56	20 ft	73.65	2.499	Local Access			3rd Phase
WR57	30 ft	836.89	3.908	Tertiary Road			3rd Phase
WR58	20 ft	168.08	3.655	Local Access			3rd Phase
WR59	20 ft	46.93	2.5	Local Access			3rd Phase
WR60	20 ft	49.16	1.715	Local Access			3rd Phase
WR61	20 ft	51.49	2	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR62	20 ft	50.00	1.414	Local Access			3rd Phase
WR63	20 ft	81.44	2.104	Local Access			3rd Phase
WR64	20 ft	65.57	2.001	Local Access			3rd Phase
WR65	20 ft	335.87	3.018	Local Access			3rd Phase
WR66	20 ft	44.20	3	Local Access			3rd Phase
WR67	20 ft	95.22	2.217	Local Access			3rd Phase
WR68	20 ft	105.55	2.001	Local Access			3rd Phase
NR69	20 ft	45.25	2.006	Local Access			3rd Phase
WR70	20 ft	51.74	2.004	Local Access			3rd Phase
WR71	20 ft	178.80	3.011	Local Access			3rd Phase
WR72	30 ft	403.58	3.001	Tertiary Road			3rd Phase
WR73	30 ft	977.86	3.001	Tertiary Road			3rd Phase
WR74	20 ft	49.43	2.005	Local Access			3rd Phase
WR75	40 ft	103.60	3.5	Secondary Road		2nd Phase	
WR76	40 ft	1317.04	3.153	Secondary Road		2nd Phase	
WR77	20 ft	542.96	3.002	Local Access			3rd Phase
WR78	30 ft	574.88	4.001	Tertiary Road			3rd Phase
WR79	20 ft	144.83	1.996	Local Access			3rd Phase
WR80	20 ft	132.67	2.545	Local Access			3rd Phase
WR81	30 ft	1660.98	3.192	Tertiary Road			3rd Phase
WR82	20 ft	79.14	4	Local Access			3rd Phase
WR83	20 ft	469.09	2.73	Local Access			3rd Phase
WR84	20 ft	101.05	1.999	Local Access			3rd Phase
WR85	20 ft	13.56	2.101	Local Access			3rd Phase
WR86	40 ft	1331.13	3.963	Secondary Road		2nd Phase	
WR87	40 ft	298.47	4	Secondary Road		2nd Phase	
WR88	20 ft	28.30	2	Local Access			3rd Phase
WR89	40 ft	410.14	3.006	Secondary Road		2nd Phase	
WR90	20 ft	11.31	2.5	Local Access			3rd Phase
WR91	30 ft	935.02	4.001	Tertiary Road			3rd Phase
WR92	30 ft	691.30	3.001	Tertiary Road			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR93	20 ft	22.03	2.001	Local Access			3rd Phase
WR94	20 ft	231.55	2.502	Local Access			3rd Phase
WR95	20 ft	58.62	1.019	Local Access			3rd Phase
WR96	40 ft	1675.52	3.358	Secondary Road		2nd Phase	
WR97	20 ft	24.68	3.601	Local Access			3rd Phase
WR98	30 ft	524.41	3.987	Tertiary Road			3rd Phase
WR99	30 ft	151.75	3.518	Tertiary Road			3rd Phase
WR100	20 ft	214.31	3.003	Local Access			3rd Phase
WR101	20 ft	20.28	1	Local Access			3rd Phase
WR102	20 ft	30.89	2	Local Access			3rd Phase
WR103	20 ft	37.73	0.997	Local Access			3rd Phase
WR104	20 ft	205.21	3	Local Access			3rd Phase
WR105	20 ft	26.45	1.5	Local Access			3rd Phase
WR106	20 ft	25.35	1	Local Access			3rd Phase
WR107	20 ft	67.59	2.222	Local Access			3rd Phase
WR108	20 ft	27.20	3.087	Local Access			3rd Phase
WR109	20 ft	52.30	2	Local Access			3rd Phase
WR110	20 ft	197.32	2.988	Local Access			3rd Phase
WR111	20 ft	32.92	2	Local Access			3rd Phase
WR112	20 ft	147.18	3.002	Local Access			3rd Phase
WR113	20 ft	309.54	3	Local Access			3rd Phase
WR114	20 ft	177.78	2	Local Access			3rd Phase
WR115	20 ft	48.41	3.001	Local Access			3rd Phase
WR116	20 ft	53.09	3.004	Local Access			3rd Phase
WR117	20 ft	31.87	1.497	Local Access			3rd Phase
WR118	20 ft	57.38	4.001	Local Access			3rd Phase
WR119	40 ft	196.28	4.072	Secondary Road		2nd Phase	
WR120	20 ft	315.56	3	Local Access			3rd Phase
WR121	20 ft	39.86	1.499	Local Access			3rd Phase
WR122	20 ft	46.56	2.5	Local Access			3rd Phase
WR123	30 ft	425.92	2.783	Tertiary Road			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR124	30 ft	94.76	2.715	Tertiary Road			3rd Phase
WR125	20 ft	91.88	3	Local Access			3rd Phase
WR126	20 ft	52.87	1.499	Local Access			3rd Phase
WR127	20 ft	97.30	2.001	Local Access			3rd Phase
WR128	20 ft	99.48	3.006	Local Access			3rd Phase
WR129	20 ft	62.19	2.515	Local Access			3rd Phase
WR130	20 ft	379.76	3.601	Local Access			3rd Phase
WR131	20 ft	43.08	2	Local Access			3rd Phase
WR132	20 ft	35.80	2	Local Access			3rd Phase
WR133	20 ft	35.96	2	Local Access			3rd Phase
WR134	30 ft	466.86	3.024	Tertiary Road			3rd Phase
WR135	20 ft	188.24	3	Local Access			3rd Phase
WR136	30 ft	527.77	3.019	Tertiary Road			3rd Phase
WR137	20 ft	17.83	2.5	Local Access			3rd Phase
WR138	20 ft	10.15	4.708	Local Access			3rd Phase
WR139	30 ft	612.96	3.014	Tertiary Road			3rd Phase
WR140	20 ft	52.48	1.5	Local Access			3rd Phase
WR141	20 ft	42.41	2.01	Local Access			3rd Phase
WR142	20 ft	131.02	1.011	Local Access			3rd Phase
WR143	40 ft	492.34	3.028	Secondary Road		2nd Phase	
WR144	20 ft	101.28	2.997	Local Access			3rd Phase
WR145	20 ft	105.91	2.018	Local Access			3rd Phase
WR146	20 ft	101.17	2	Local Access			3rd Phase
WR147	20 ft	100.95	1.038	Local Access			3rd Phase
WR148	30 ft	352.65	3.042	Tertiary Road			3rd Phase
WR149	20 ft	54.10	3.222	Local Access			3rd Phase
WR150	40 ft	116.19	3.098	Secondary Road		2nd Phase	
WR151	40 ft	226.36	2.999	Secondary Road		2nd Phase	
WR152	40 ft	272.52	3.013	Secondary Road		2nd Phase	
WR153	20 ft	46.22	4.009	Local Access			3rd Phase
WR154	20 ft	32.77	1.004	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR155	30 ft	166.00	3.999	Tertiary Road			3rd Phase
WR156	20 ft	55.25	1.2	Local Access			3rd Phase
WR157	20 ft	91.57	2.5	Local Access			3rd Phase
WR158	20 ft	210.77	3.053	Local Access			3rd Phase
WR159	20 ft	112.33	3	Local Access			3rd Phase
WR160	20 ft	190.10	3.01	Local Access			3rd Phase
WR161	20 ft	49.37	2	Local Access			3rd Phase
WR162	20 ft	48.55	1.5	Local Access			3rd Phase
WR163	20 ft	13.50	2.001	Local Access			3rd Phase
WR164	20 ft	147.17	4	Local Access			3rd Phase
WR165	20 ft	165.64	4.001	Local Access			3rd Phase
WR166	20 ft	59.79	3.003	Local Access			3rd Phase
WR167	20 ft	67.45	2.999	Local Access			3rd Phase
NR168	30 ft	88.27		Tertiary Road			3rd Phase
WR169	20 ft	73.84	2.501	Local Access			3rd Phase
WR170	20 ft	50.96	2.5	Local Access			3rd Phase
WR171	20 ft	44.68	3	Local Access			3rd Phase
WR172	20 ft	37.47	4.02	Local Access			3rd Phase
WR173	20 ft	100.76	3	Local Access			3rd Phase
WR174	20 ft	33.89	1	Local Access			3rd Phase
WR175	40 ft	160.21	3.236	Secondary Road		2nd Phase	
WR176	20 ft	122.99	3.116	Local Access			3rd Phase
WR177	20 ft	89.98	2	Local Access			3rd Phase
WR178	20 ft	41.70	1.5	Local Access			3rd Phase
WR179	20 ft	36.19	2.5	Local Access			3rd Phase
WR180	30 ft	415.84	3.915	Tertiary Road			3rd Phase
WR181	30 ft	296.16	3.802	Tertiary Road			3rd Phase
WR182	20 ft	71.26	2	Local Access			3rd Phase
WR183	20 ft	41.68	2.5	Local Access			3rd Phase
WR184	20 ft	41.70	2.019	Local Access			3rd Phase
WR185	20 ft	66.06	2.508	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR186	20 ft	41.33	1.5	Local Access			3rd Phase
WR187	20 ft	71.01	1.5	Local Access			3rd Phase
WR188	20 ft	168.47	4.001	Local Access			3rd Phase
WR189	20 ft	45.67	3.002	Local Access			3rd Phase
WR190	20 ft	51.97	3.501	Local Access			3rd Phase
WR191	40 ft	489.65	3.017	Secondary Road		2nd Phase	
WR192	20 ft	21.13	2.5	Local Access			3rd Phase
WR193	20 ft	33.01	2.003	Local Access			3rd Phase
WR194	20 ft	86.19	3.511	Local Access			3rd Phase
WR195	20 ft	26.73	2.502	Local Access			3rd Phase
WR196	20 ft	38.00	2.5	Local Access			3rd Phase
WR197	20 ft	76.07	2	Local Access			3rd Phase
WR198	20 ft	31.03	2	Local Access			3rd Phase
WR199	20 ft	84.22	2	Local Access			3rd Phase
WR200	20 ft	73.41	2	Local Access			3rd Phase
WR201	20 ft	223.26	3.013	Local Access			3rd Phase
WR202	40 ft	964.18	3.022	Secondary Road		2nd Phase	
WR203	20 ft	111.52	2	Local Access			3rd Phase
WR204	20 ft	126.55	3	Local Access			3rd Phase
WR205	20 ft	109.86	3.021	Local Access			3rd Phase
WR206	20 ft	96.77	2.5	Local Access			3rd Phase
WR207	20 ft	37.79	2	Local Access			3rd Phase
WR208	20 ft	50.31	1.5	Local Access			3rd Phase
WR209	40 ft	295.94	3.001	Secondary Road		2nd Phase	
WR210	20 ft	251.17	3.014	Local Access			3rd Phase
WR211	20 ft	34.18	2.5	Local Access			3rd Phase
WR212	20 ft	49.66	2	Local Access			3rd Phase
WR213	20 ft	22.55	2	Local Access			3rd Phase
WR214	20 ft	54.15	2	Local Access			3rd Phase
WR215	20 ft	73.79	1	Local Access			3rd Phase
WR216	20 ft	158.47	3.999	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR217	20 ft	379.46	4.4	Local Access			3rd Phase
WR218	20 ft	88.24	3	Local Access			3rd Phase
WR219	20 ft	17.71	2	Local Access			3rd Phase
WR220	20 ft	21.23	3	Local Access			3rd Phase
WR221	20 ft	17.53	2	Local Access			3rd Phase
WR222	20 ft	67.78	2.5	Local Access			3rd Phase
WR223	20 ft	29.08	2	Local Access			3rd Phase
WR224	20 ft	126.12	2	Local Access			3rd Phase
WR225	20 ft	106.38	3.001	Local Access			3rd Phase
WR226	20 ft	72.18	1.5	Local Access			3rd Phase
WR227	20 ft	188.64	4.008	Local Access			3rd Phase
WR228	20 ft	183.06	3.085	Local Access			3rd Phase
WR229	20 ft	16.00	2.5	Local Access			3rd Phase
WR230	40 ft	458.02	3.029	Secondary Road		2nd Phase	
WR231	40 ft	1572.86	3.013	Secondary Road		2nd Phase	
WR232	20 ft	30.38	1.5	Local Access			3rd Phase
WR233	20 ft	101.00	4.003	Local Access			3rd Phase
WR234	20 ft	38.21	2	Local Access			3rd Phase
WR235	30 ft	313.83	3.986	Tertiary Road			3rd Phase
WR236	20 ft	34.17	1.5	Local Access			3rd Phase
WR237	20 ft	117.90	2	Local Access			3rd Phase
WR238	40 ft	243.63	3.073	Secondary Road		2nd Phase	
WR239	30 ft	259.75	3.022	Tertiary Road			3rd Phase
WR240	20 ft	51.66	2	Local Access			3rd Phase
WR241	20 ft	40.79	2	Local Access			3rd Phase
WR242	20 ft	85.07	3.029	Local Access			3rd Phase
WR243	30 ft	516.36	3.005	Tertiary Road			3rd Phase
WR244	20 ft	100.16	2.5	Local Access			3rd Phase
WR245	20 ft	40.94	2.5	Local Access			3rd Phase
WR246	60 ft	992.93	4.356	Tertiary Road			3rd Phase
WR247	20 ft	148.79	3.066	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR248	20 ft	54.11	2.018	Local Access			3rd Phase
WR249	20 ft	45.10	2	Local Access			3rd Phase
WR250	20 ft	34.77	4	Local Access			3rd Phase
WR251	20 ft	408.77	3.993	Local Access			3rd Phase
WR252	20 ft	155.86	3	Local Access			3rd Phase
WR253	20 ft	105.45	3.001	Local Access			3rd Phase
WR254	20 ft	30.47	2	Local Access			3rd Phase
WR255	20 ft	103.86	2.5	Local Access			3rd Phase
WR256	20 ft	71.70	2.998	Local Access			3rd Phase
WR257	20 ft	24.47	2	Local Access			3rd Phase
WR258	40 ft	504.71	3.882	Secondary Road		2nd Phase	
WR259	20 ft	19.55	5.405	Local Access			3rd Phase
WR260	20 ft	109.72	2	Local Access			3rd Phase
WR261	20 ft	101.77	3.027	Local Access			3rd Phase
WR262	20 ft	41.63	2	Local Access			3rd Phase
WR263	20 ft	51.93	1.75	Local Access			3rd Phase
WR264	20 ft	161.57	3	Local Access			3rd Phase
WR265	30 ft	560.51	3.996	Tertiary Road			3rd Phase
WR266	20 ft	17.08	0.616	Local Access			3rd Phase
WR267	20 ft	65.80	3.014	Local Access			3rd Phase
WR268	20 ft	74.67	1.799	Local Access			3rd Phase
WR269	20 ft	203.19	2.557	Local Access			3rd Phase
WR270	20 ft	37.63	2	Local Access			3rd Phase
WR271	20 ft	148.60	3	Local Access			3rd Phase
WR272	20 ft	57.42	2	Local Access			3rd Phase
WR273	20 ft	58.77	2.5	Local Access			3rd Phase
WR274	20 ft	96.94	2.251	Local Access			3rd Phase
WR275	30 ft	212.38	3.023	Tertiary Road			3rd Phase
WR276	20 ft	81.31	3.009	Local Access			3rd Phase
WR277	20 ft	20.27	2	Local Access			3rd Phase
WR278	20 ft	78.40	2.503	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR279	20 ft	34.66	2.003	Local Access			3rd Phase
WR280	20 ft	40.80	2	Local Access			3rd Phase
WR281	20 ft	90.38	1.999	Local Access			3rd Phase
WR282	20 ft	35.32	2	Local Access			3rd Phase
WR283	20 ft	65.50	2.5	Local Access			3rd Phase
WR284	20 ft	25.86	2	Local Access			3rd Phase
WR285	20 ft	48.32	2	Local Access			3rd Phase
WR286	20 ft	28.42	2	Local Access			3rd Phase
WR287	20 ft	63.24	2	Local Access			3rd Phase
WR288	20 ft	23.38	1.5	Local Access			3rd Phase
WR289	20 ft	44.60	2	Local Access			3rd Phase
WR290	20 ft	88.42	2.503	Local Access			3rd Phase
WR291	20 ft	18.39	2	Local Access			3rd Phase
WR292	20 ft	100.58	2	Local Access			3rd Phase
WR293	20 ft	61.80	2.5	Local Access			3rd Phase
WR294	20 ft	22.72	2	Local Access			3rd Phase
WR295	20 ft	63.23	2	Local Access			3rd Phase
WR296	20 ft	12.56	1.5	Local Access			3rd Phase
WR297	20 ft	112.36	3.498	Local Access			3rd Phase
WR298	20 ft	49.74	2	Local Access			3rd Phase
WR299	20 ft	149.80	2	Local Access			3rd Phase
WR300	20 ft	61.92	4	Local Access			3rd Phase
NR301	20 ft	6.57		Local Access			3rd Phase
WR302	20 ft	52.30	2	Local Access			3rd Phase
WR303	20 ft	47.97	2	Local Access			3rd Phase
WR304	20 ft	73.00	2.046	Local Access			3rd Phase
WR305	20 ft	45.50	2	Local Access			3rd Phase
WR306	20 ft	37.47	1.5	Local Access			3rd Phase
WR307	20 ft	43.57	2	Local Access			3rd Phase
WR308	20 ft	56.24	2	Local Access			3rd Phase
WR309	20 ft	44.00	2	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR310	20 ft	167.05	3.005	Local Access			3rd Phase
WR311	20 ft	116.87	2.516	Local Access			3rd Phase
WR312	20 ft	23.65	1.2	Local Access			3rd Phase
WR313	20 ft	32.87	2.5	Local Access			3rd Phase
WR314	20 ft	82.16	3	Local Access			3rd Phase
WR315	20 ft	77.55	2	Local Access			3rd Phase
WR316	20 ft	44.39	1.2	Local Access			3rd Phase
WR317	20 ft	212.83	4	Local Access			3rd Phase
WR318	20 ft	233.25	4.504	Local Access			3rd Phase
WR319	20 ft	61.76	3	Local Access			3rd Phase
WR320	20 ft	47.81	2	Local Access			3rd Phase
WR321	20 ft	17.45	1.5	Local Access			3rd Phase
WR322	20 ft	177.50	4.01	Local Access			3rd Phase
WR323	20 ft	84.24	3	Local Access			3rd Phase
WR324	20 ft	43.16	3.245	Local Access			3rd Phase
WR325	20 ft	38.65	1.5	Local Access			3rd Phase
WR326	20 ft	90.38	2	Local Access			3rd Phase
WR327	20 ft	122.72	2	Local Access			3rd Phase
WR328	20 ft	97.94	1.993	Local Access			3rd Phase
WR329	20 ft	54.03	2	Local Access			3rd Phase
WR330	20 ft	18.61	1.5	Local Access			3rd Phase
WR331	20 ft	28.71	3.5	Local Access			3rd Phase
WR332	40 ft	465.57	3.049	Secondary Road		2nd Phase	
WR333	30 ft	547.95	4.104	Tertiary Road			3rd Phase
WR334	20 ft	74.32	2.5	Local Access			3rd Phase
WR335	20 ft	94.21	3.22	Local Access			3rd Phase
WR336	20 ft	75.87	2	Local Access			3rd Phase
WR337	20 ft	14.18	2.099	Local Access			3rd Phase
WR338	20 ft	130.87	3.031	Local Access			3rd Phase
WR339	60 ft	1968.23	3.874	Tertiary Road			3rd Phase
WR340	30 ft	275.52	3	Tertiary Road			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR341	30 ft	332.01	3.034	Tertiary Road			3rd Phase
WR342	30 ft	477.46	3.24	Tertiary Road			3rd Phase
WR343	20 ft	59.71	1.5	Local Access			3rd Phase
WR344	20 ft	48.57	3	Local Access			3rd Phase
WR345	20 ft	13.25	3.089	Local Access			3rd Phase
WR346	30 ft	72.94	3.381	Tertiary Road			3rd Phase
WR347	20 ft	17.07	2	Local Access			3rd Phase
WR348	20 ft	16.34	1.915	Local Access			3rd Phase
WR349	20 ft	15.80	2	Local Access			3rd Phase
WR350	40 ft	249.62	4.028	Secondary Road		2nd Phase	
WR351	20 ft	17.29	2	Local Access			3rd Phase
WR352	20 ft	56.12	3.496	Local Access			3rd Phase
WR353	20 ft	35.85	3	Local Access			3rd Phase
WR354	20 ft	16.83	2	Local Access			3rd Phase
WR355	20 ft	17.43	2	Local Access			3rd Phase
WR356	20 ft	58.66	1.501	Local Access			3rd Phase
WR357	20 ft	16.60	1.888	Local Access			3rd Phase
WR358	20 ft	14.18	2	Local Access			3rd Phase
WR359	20 ft	23.63	1.5	Local Access			3rd Phase
WR360	20 ft	113.90	1.486	Local Access			3rd Phase
WR361	20 ft	107.53	3	Local Access			3rd Phase
WR362	20 ft	36.66	1.2	Local Access			3rd Phase
WR363	20 ft	176.94	3.499	Local Access			3rd Phase
WR364	20 ft	53.33	1.5	Local Access			3rd Phase
WR365	20 ft	33.37	3.509	Local Access			3rd Phase
WR366	20 ft	34.00	2	Local Access			3rd Phase
WR367	20 ft	15.47	2	Local Access			3rd Phase
WR368	20 ft	14.63	2	Local Access			3rd Phase
WR369	20 ft	14.30	2	Local Access			3rd Phase
WR370	20 ft	12.88	3.5	Local Access			3rd Phase
WR371	20 ft	14.13	2	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR372	20 ft	13.02	3.5	Local Access			3rd Phase
WR373	20 ft	63.77	2.501	Local Access			3rd Phase
WR374	20 ft	17.53	3.5	Local Access			3rd Phase
WR375	20 ft	27.88	2	Local Access			3rd Phase
WR376	20 ft	55.21	2	Local Access			3rd Phase
WR377	20 ft	26.51	3.5	Local Access			3rd Phase
WR378	20 ft	45.17	1.5	Local Access			3rd Phase
WR379	30 ft	285.72	3.192	Tertiary Road			3rd Phase
WR380	20 ft	17.75	2	Local Access			3rd Phase
WR381	20 ft	49.13	3.537	Local Access			3rd Phase
WR382	20 ft	19.24	2.008	Local Access			3rd Phase
WR383	20 ft	26.94	3.5	Local Access			3rd Phase
WR384	20 ft	68.51	5	Local Access			3rd Phase
WR385	20 ft	61.18	2	Local Access			3rd Phase
WR386	20 ft	26.91	1.503	Local Access			3rd Phase
WR387	20 ft	54.24	1.5	Local Access			3rd Phase
WR388	20 ft	58.69	1.5	Local Access			3rd Phase
WR389	20 ft	21.15	1.2	Local Access			3rd Phase
WR390	20 ft	46.39	1.984	Local Access			3rd Phase
WR391	20 ft	28.06	1.2	Local Access			3rd Phase
WR392	20 ft	40.27	5.051	Local Access			3rd Phase
WR393	30 ft	118.88	3.065	Tertiary Road			3rd Phase
WR394	20 ft	54.58	2	Local Access			3rd Phase
WR395	20 ft	146.85	3	Local Access			3rd Phase
WR396	20 ft	28.05	2	Local Access			3rd Phase
WR397	20 ft	24.16	2	Local Access			3rd Phase
WR398	20 ft	238.92	3.201	Local Access			3rd Phase
WR399	20 ft	9.28	2	Local Access			3rd Phase
WR400	20 ft	70.30	2.001	Local Access			3rd Phase
WR401	40 ft	61.69	1.034	Secondary Road		2nd Phase	
WR402	40 ft	271.07	3.003	Secondary Road		2nd Phase	

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR403	20 ft	46.11	1.999	Local Access			3rd Phase
WR404	20 ft	23.99	2	Local Access			3rd Phase
WR405	20 ft	71.31	3	Local Access			3rd Phase
WR406	20 ft	114.67	3	Local Access			3rd Phase
WR407	20 ft	49.29	2	Local Access			3rd Phase
WR408	20 ft	64.43	2.002	Local Access			3rd Phase
WR409	20 ft	72.18	1.996	Local Access			3rd Phase
WR410	20 ft	22.06	1.99	Local Access			3rd Phase
WR411	20 ft	13.31	2.002	Local Access			3rd Phase
WR412	20 ft	123.86	2.999	Local Access			3rd Phase
WR413	20 ft	78.26	2.075	Local Access			3rd Phase
WR414	20 ft	114.41	3	Local Access			3rd Phase
WR415	20 ft	18.08	2.006	Local Access			3rd Phase
WR416	20 ft	35.72	2	Local Access			3rd Phase
WR417	20 ft	157.89	3.999	Local Access			3rd Phase
WR418	20 ft	16.33	1.8	Local Access			3rd Phase
WR419	20 ft	82.50	1.5	Local Access			3rd Phase
WR420	20 ft	64.13	2	Local Access			3rd Phase
WR421	20 ft	39.17	2.252	Local Access			3rd Phase
WR422	20 ft	21.24	2.5	Local Access			3rd Phase
WR423	20 ft	52.12	4.502	Local Access			3rd Phase
WR424	20 ft	37.69	1.5	Local Access			3rd Phase
WR425	20 ft	24.82	1.849	Local Access			3rd Phase
WR426	20 ft	34.20	1.8	Local Access			3rd Phase
WR427	20 ft	37.98	1.5	Local Access			3rd Phase
WR428	20 ft	59.00	2.5	Local Access			3rd Phase
WR429	20 ft	70.90	3.036	Local Access			3rd Phase
WR430	20 ft	200.88	3.026	Local Access			3rd Phase
WR431	20 ft	52.52	3	Local Access			3rd Phase
WR432	20 ft	78.42	2.55	Local Access			3rd Phase
WR433	20 ft	59.13	3	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR434	20 ft	39.55	1.201	Local Access			3rd Phase
WR435	20 ft	71.32	1.5	Local Access			3rd Phase
WR436	20 ft	16.14	2	Local Access			3rd Phase
WR437	20 ft	63.31	2.136	Local Access			3rd Phase
WR438	30 ft	539.99	2.999	Tertiary Road			3rd Phase
WR439	20 ft	89.13	3	Local Access			3rd Phase
WR440	20 ft	10.98	0.841	Local Access			3rd Phase
WR441	20 ft	87.05	2.507	Local Access			3rd Phase
WR442	20 ft	48.41	2	Local Access			3rd Phase
WR443	30 ft	239.82	3.031	Tertiary Road			3rd Phase
WR444	30 ft	338.40	3.025	Tertiary Road			3rd Phase
WR445	20 ft	101.34	2	Local Access			3rd Phase
WR446	20 ft	54.60	3.015	Local Access			3rd Phase
WR447	20 ft	216.14	2.999	Local Access			3rd Phase
WR448	20 ft	118.51	2.517	Local Access			3rd Phase
WR449	20 ft	25.81	3.002	Local Access			3rd Phase
WR450	20 ft	19.25	3	Local Access			3rd Phase
WR451	20 ft	313.17	3.07	Local Access			3rd Phase
WR452	20 ft	24.76	1.5	Local Access			3rd Phase
WR453	20 ft	13.79	2	Local Access			3rd Phase
WR454	20 ft	23.18	2.5	Local Access			3rd Phase
WR455	20 ft	57.84	2	Local Access			3rd Phase
WR456	20 ft	197.91	3.035	Local Access			3rd Phase
WR457	20 ft	69.53	2	Local Access			3rd Phase
WR458	20 ft	132.88	2.002	Local Access			3rd Phase
WR459	20 ft	91.78	3.003	Local Access			3rd Phase
WR460	20 ft	159.83	3	Local Access			3rd Phase
WR461	20 ft	162.87	2.5	Local Access			3rd Phase
WR462	20 ft	47.24	2.06	Local Access			3rd Phase
WR463	20 ft	739.70	3.39	Local Access			3rd Phase
WR464	20 ft	95.38	1.499	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR465	20 ft	59.23	2.005	Local Access			3rd Phase
WR466	30 ft	169.68	4.016	Tertiary Road			3rd Phase
WR467	20 ft	41.29	2	Local Access			3rd Phase
WR468	30 ft	305.98	2.998	Tertiary Road			3rd Phase
WR469	20 ft	47.22	2	Local Access			3rd Phase
WR470	20 ft	196.00	2.002	Local Access			3rd Phase
WR471	20 ft	71.22	2	Local Access			3rd Phase
WR472	20 ft	68.07	2	Local Access			3rd Phase
WR473	20 ft	44.83	2	Local Access			3rd Phase
WR474	20 ft	42.16	2.005	Local Access			3rd Phase
WR475	20 ft	55.59	3.006	Local Access			3rd Phase
WR476	20 ft	183.09	2.501	Local Access			3rd Phase
WR477	20 ft	37.52	2	Local Access			3rd Phase
WR478	20 ft	23.35	2.017	Local Access			3rd Phase
WR479	20 ft	22.71	2	Local Access			3rd Phase
WR480	20 ft	22.50	2	Local Access			3rd Phase
WR481	20 ft	49.30	1.5	Local Access			3rd Phase
WR482	30 ft	370.35	3	Tertiary Road			3rd Phase
WR483	20 ft	62.06	1.5	Local Access			3rd Phase
WR484	40 ft	177.18	3.032	Secondary Road		2nd Phase	
WR485	20 ft	20.90	2	Local Access			3rd Phase
WR486	20 ft	51.23	2	Local Access			3rd Phase
WR487	20 ft	17.26	1	Local Access			3rd Phase
WR488	20 ft	38.84	2.5	Local Access			3rd Phase
WR489	20 ft	23.12	1	Local Access			3rd Phase
WR490	20 ft	61.82	2.512	Local Access			3rd Phase
WR491	20 ft	41.85	2	Local Access			3rd Phase
WR492	30 ft	463.75	3.194	Tertiary Road			3rd Phase
WR493	20 ft	56.23	3.011	Local Access			3rd Phase
WR494	20 ft	32.89	1.504	Local Access			3rd Phase
WR495	30 ft	613.54	3.017	Tertiary Road			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR496	30 ft	248.86	3.135	Tertiary Road			3rd Phase
WR497	20 ft	26.99	2.006	Local Access			3rd Phase
WR498	20 ft	20.12	1.502	Local Access			3rd Phase
WR499	20 ft	41.52	1.508	Local Access			3rd Phase
WR500	20 ft	101.07	1.501	Local Access			3rd Phase
WR501	20 ft	22.55	1.507	Local Access			3rd Phase
WR502	20 ft	47.91	1	Local Access			3rd Phase
WR503	20 ft	45.63	1	Local Access			3rd Phase
WR504	20 ft	174.86	2.808	Local Access			3rd Phase
WR505	20 ft	69.26	3.023	Local Access			3rd Phase
WR506	20 ft	48.76	2	Local Access			3rd Phase
WR507	30 ft	208.63	3	Tertiary Road			3rd Phase
WR508	60 ft	883.41	3.013	Tertiary Road			3rd Phase
WR509	20 ft	32.62	2.005	Local Access			3rd Phase
WR510	20 ft	8.06	2.526	Local Access			3rd Phase
WR511	20 ft	55.75	2	Local Access			3rd Phase
WR512	20 ft	99.40	3.025	Local Access			3rd Phase
WR513	20 ft	281.18	3.016	Local Access			3rd Phase
WR514	20 ft	65.69	2	Local Access			3rd Phase
WR515	40 ft	216.56	3.001	Secondary Road		2nd Phase	
WR516	20 ft	34.55	2	Local Access			3rd Phase
WR517	20 ft	29.42	2.026	Local Access			3rd Phase
WR518	20 ft	62.65	3	Local Access			3rd Phase
WR519	20 ft	44.93	2	Local Access			3rd Phase
WR520	20 ft	219.10	2.893	Local Access			3rd Phase
WR521	20 ft	35.03	2.524	Local Access			3rd Phase
WR522	20 ft	226.08	3.03	Local Access			3rd Phase
WR523	20 ft	41.76	2	Local Access			3rd Phase
WR524	20 ft	57.73	2	Local Access			3rd Phase
WR525	20 ft	24.92	2	Local Access			3rd Phase
WR526	20 ft	28.90	2	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR527	20 ft	27.28	2	Local Access			3rd Phase
WR528	20 ft	7.73	2	Local Access			3rd Phase
WR529	20 ft	5.95	2	Local Access			3rd Phase
WR530	20 ft	5.16	2	Local Access			3rd Phase
WR531	20 ft	23.48	2	Local Access			3rd Phase
WR532	20 ft	98.01	1.999	Local Access			3rd Phase
WR533	20 ft	11.25	1.2	Local Access			3rd Phase
WR534	20 ft	169.28	1.998	Local Access			3rd Phase
WR535	20 ft	58.52	2	Local Access			3rd Phase
WR536	30 ft	180.36	3.102	Tertiary Road			3rd Phase
WR537	20 ft	88.77	2	Local Access			3rd Phase
WR538	20 ft	42.84	2	Local Access			3rd Phase
WR539	20 ft	63.49	3.047	Local Access			3rd Phase
WR540	20 ft	160.15	3.012	Local Access			3rd Phase
WR541	20 ft	58.14	1.509	Local Access			3rd Phase
WR542	20 ft	84.55	3	Local Access			3rd Phase
WR543	30 ft	236.92	3.023	Tertiary Road			3rd Phase
WR544	30 ft	1156.52	3.211	Tertiary Road			3rd Phase
WR545	20 ft	45.02	1.514	Local Access			3rd Phase
WR546	20 ft	105.70	2.236	Local Access			3rd Phase
WR547	20 ft	101.28	2.512	Local Access			3rd Phase
WR548	20 ft	269.54	3.144	Local Access			3rd Phase
WR549	20 ft	29.79	8.027	Local Access			3rd Phase
WR550	40 ft	619.32	3.018	Secondary Road		2nd Phase	
WR551	20 ft	26.15	2	Local Access			3rd Phase
WR552	20 ft	97.72	2.5	Local Access			3rd Phase
WR553	20 ft	72.14	2.629	Local Access			3rd Phase
WR554	30 ft	905.70	4.004	Tertiary Road			3rd Phase
WR555	20 ft	215.65	3.043	Local Access			3rd Phase
WR556	20 ft	43.62	2.5	Local Access			3rd Phase
WR557	20 ft	60.12	2.026	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR558	20 ft	40.13	2.048	Local Access			3rd Phase
WR559	20 ft	579.58	3.024	Local Access			3rd Phase
WR560	20 ft	38.92	2.5	Local Access			3rd Phase
WR561	20 ft	33.30	2.608	Local Access			3rd Phase
WR562	30 ft	86.39	3.013	Tertiary Road			3rd Phase
WR563	30 ft	241.09	3.057	Tertiary Road			3rd Phase
WR564	20 ft	19.75	2.193	Local Access			3rd Phase
WR565	20 ft	71.57	2.059	Local Access			3rd Phase
WR566	20 ft	21.09	2.003	Local Access			3rd Phase
WR567	20 ft	24.64	2.009	Local Access			3rd Phase
WR568	20 ft	15.55	2.015	Local Access			3rd Phase
WR569	20 ft	53.03	2.14	Local Access			3rd Phase
WR570	20 ft	19.18	1.995	Local Access			3rd Phase
WR571	20 ft	46.80	2.022	Local Access			3rd Phase
WR572	20 ft	20.72	2	Local Access			3rd Phase
WR573	20 ft	25.77	2.012	Local Access			3rd Phase
WR574	20 ft	63.85	2.631	Local Access			3rd Phase
WR575	20 ft	56.64	2	Local Access			3rd Phase
WR576	30 ft	331.38	3.035	Tertiary Road			3rd Phase
WR577	40 ft	652.82	2.762	Secondary Road		2nd Phase	
WR578	20 ft	15.80	3.104	Local Access			3rd Phase
WR579	20 ft	69.06	3.01	Local Access			3rd Phase
WR580	30 ft	236.22	2.964	Tertiary Road			3rd Phase
WR581	30 ft	58.73	3.021	Tertiary Road			3rd Phase
WR582	20 ft	111.99	2.025	Local Access			3rd Phase
WR583	20 ft	77.31	3.006	Local Access			3rd Phase
WR584	20 ft	49.15	3	Local Access			3rd Phase
WR585	20 ft	64.85	2	Local Access			3rd Phase
WR586	20 ft	124.49	1.5	Local Access			3rd Phase
WR587	30 ft	114.18	3.176	Tertiary Road			3rd Phase
WR588	30 ft	620.83	3.014	Tertiary Road			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR589	20 ft	116.78	5.06	Local Access			3rd Phase
WR590	40 ft	705.99	4.059	Secondary Road		2nd Phase	
WR591	30 ft	82.61	3.029	Tertiary Road			3rd Phase
WR592	20 ft	35.56	2.501	Local Access			3rd Phase
WR593	20 ft	49.46	2.54	Local Access			3rd Phase
WR594	20 ft	56.17	2.01	Local Access			3rd Phase
WR595	30 ft	275.55	3.01	Tertiary Road			3rd Phase
WR596	30 ft	48.95	4.237	Tertiary Road			3rd Phase
WR597	20 ft	166.32	4.049	Local Access			3rd Phase
WR598	20 ft	52.80	3.061	Local Access			3rd Phase
WR599	40 ft	640.58	3.508	Secondary Road		2nd Phase	
WR600	20 ft	193.50	3.632	Local Access			3rd Phase
WR601	40 ft	330.83	3.012	Secondary Road		2nd Phase	
WR602	20 ft	113.88	3.033	Local Access			3rd Phase
WR603	20 ft	140.48	3.001	Local Access			3rd Phase
WR604	20 ft	69.94	1	Local Access			3rd Phase
WR605	20 ft	86.75	2	Local Access			3rd Phase
WR606	20 ft	41.42	1.12	Local Access			3rd Phase
WR607	20 ft	121.67	2.507	Local Access			3rd Phase
WR608	20 ft	69.54	4.095	Local Access			3rd Phase
WR609	20 ft	257.50	3.019	Local Access			3rd Phase
WR610	20 ft	81.62	3.498	Local Access			3rd Phase
WR611	20 ft	32.08	2.003	Local Access			3rd Phase
WR612	20 ft	150.11	3.501	Local Access			3rd Phase
WR613	20 ft	191.61	2.02	Local Access			3rd Phase
WR614	20 ft	91.24	2.508	Local Access			3rd Phase
WR615	20 ft	83.55	3.014	Local Access			3rd Phase
WR616	20 ft	149.86	3.036	Local Access			3rd Phase
WR617	30 ft	184.88	3	Tertiary Road			3rd Phase
WR618	30 ft	489.25	3.002	Tertiary Road			3rd Phase
WR619	20 ft	473.36	2.504	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR620	30 ft	545.29	4.012	Tertiary Road			3rd Phase
WR621	20 ft	51.44	3.138	Local Access			3rd Phase
WR622	20 ft	185.61	2.011	Local Access			3rd Phase
WR623	20 ft	97.56	3.023	Local Access			3rd Phase
WR624	20 ft	11.00	2.004	Local Access			3rd Phase
WR625	40 ft	1013.57	3.028	Secondary Road		2nd Phase	
WR626	20 ft	63.92	2.523	Local Access			3rd Phase
WR627	20 ft	28.40	1.751	Local Access			3rd Phase
WR628	20 ft	72.78	3.006	Local Access			3rd Phase
WR629	20 ft	67.90	3	Local Access			3rd Phase
WR630	20 ft	23.17	3.046	Local Access			3rd Phase
WR631	20 ft	67.06	1.5	Local Access			3rd Phase
WR632	20 ft	148.02	3.021	Local Access			3rd Phase
WR633	20 ft	43.34	2.546	Local Access			3rd Phase
WR634	20 ft	56.22	3.004	Local Access			3rd Phase
WR635	20 ft	251.71	2.501	Local Access			3rd Phase
WR636	20 ft	53.57	1.558	Local Access			3rd Phase
WR637	20 ft	27.27	2.011	Local Access			3rd Phase
WR638	30 ft	559.44	3.334	Tertiary Road			3rd Phase
WR639	20 ft	21.50	2.008	Local Access			3rd Phase
WR640	20 ft	38.80	1.508	Local Access			3rd Phase
WR641	30 ft	476.76	3.038	Tertiary Road			3rd Phase
WR642	150 ft	4897.49	6.088	Primary Road	1st Phase		
WR643	20 ft	54.52	1	Local Access			3rd Phase
WR644	20 ft	226.00	3.026	Local Access			3rd Phase
WR645	30 ft	397.07	3.065	Tertiary Road			3rd Phase
WR646	20 ft	196.40	3.991	Local Access			3rd Phase
WR647	20 ft	25.48	2.045	Local Access			3rd Phase
WR648	20 ft	26.24	3.036	Local Access			3rd Phase
WR649	20 ft	99.53	3.001	Local Access			3rd Phase
WR650	20 ft	18.70	3.001	Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
WR651	60 ft	6053.31	4.107	Tertiary Road			3rd Phase
WR652	20 ft	75.31	4.107	Local Access			3rd Phase
WR653	20 ft	10.13	4.107	Local Access			3rd Phase
WR654	80 ft	4259.62	4.561	Secondary Road			3rd Phase
WR655	80 ft	24.96	4.561	Secondary Road		2nd Phase	
WR656	80 ft	21.73	4.561	Secondary Road		2nd Phase	
WR657	20 ft	13.58	3.02	Local Access			3rd Phase
WR658	40 ft	1245.25	3.02	Secondary Road		2nd Phase	
WR659	30 ft	53.72	3.002	Tertiary Road			3rd Phase
WR660	30 ft	20.81	2.001	Tertiary Road			3rd Phase
WR661	30 ft	108.25	2	Tertiary Road			3rd Phase
WR662	30 ft	182.14	2	Tertiary Road			3rd Phase
WR663	30 ft	109.22	2	Tertiary Road			3rd Phase
WR664	30 ft	134.89	3.002	Tertiary Road			3rd Phase
WR665	30 ft	52.88	3.5	Tertiary Road			3rd Phase
WR666	30 ft	57.35	2	Tertiary Road			3rd Phase
WR667	30 ft	54.05	3	Tertiary Road			3rd Phase
WR668	30 ft	66.39	3	Tertiary Road			3rd Phase
WR669	30 ft	48.53	2	Tertiary Road			3rd Phase
WR670	30 ft	217.73	2	Tertiary Road			3rd Phase
WR671	30 ft	289.11	3.071	Tertiary Road			3rd Phase
WR672	30 ft	76.65	2	Tertiary Road			3rd Phase
WR673	30 ft	108.82	2.5	Tertiary Road			3rd Phase
WR674	30 ft	110.87	1.5	Tertiary Road			3rd Phase
WR675	30 ft	84.94	3	Tertiary Road			3rd Phase
WR676	30 ft	88.78	3	Tertiary Road			3rd Phase
WR677	30 ft	96.00	3.022	Tertiary Road			3rd Phase
WR678	30 ft	66.68	2	Tertiary Road			3rd Phase
NR679	30 ft	687.29		Tertiary Road			3rd Phase
NR680	30 ft	464.13		Tertiary Road			3rd Phase
NR681	40 ft	919.12		Secondary Road		2nd Phase	

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
NR682	30 ft	484.39		Tertiary Road			3rd Phase
NR683	30 ft	513.41		Tertiary Road			3rd Phase
NR684	30 ft	33.72		Tertiary Road			3rd Phase
NR685	30 ft	140.87		Tertiary Road			3rd Phase
NR686	30 ft	616.32		Tertiary Road			3rd Phase
NR687	30 ft	520.80		Tertiary Road			3rd Phase
NR688	30 ft	164.91		Tertiary Road			3rd Phase
NR689	30 ft	59.02		Tertiary Road			3rd Phase
NR690	30 ft	148.36		Tertiary Road			3rd Phase
NR691	30 ft	267.69		Tertiary Road			3rd Phase
NR692	30 ft	288.25		Tertiary Road			3rd Phase
NR693	30 ft	97.18		Tertiary Road			3rd Phase
NR694	30 ft	227.34		Tertiary Road			3rd Phase
NR695	20 ft	201.17		Local Access			3rd Phase
NR696	30 ft	75.41		Tertiary Road			3rd Phase
NR697	40 ft	457.97		Secondary Road		2nd Phase	
NR698	40 ft	464.75		Secondary Road		2nd Phase	
NR699	30 ft	271.98		Tertiary Road			3rd Phase
NR700	30 ft	371.37		Tertiary Road			3rd Phase
NR701	30 ft	151.07		Tertiary Road			3rd Phase
NR702	20 ft	72.01		Local Access			3rd Phase
NR703	30 ft	173.42		Tertiary Road			3rd Phase
NR704	30 ft	81.21		Tertiary Road			3rd Phase
NR705	30 ft	196.30		Tertiary Road			3rd Phase
NR706	20 ft	181.28		Local Access			3rd Phase
NR707	30 ft	462.25		Tertiary Road			3rd Phase
NR708	20 ft	54.27		Local Access			3rd Phase
NR709	20 ft	70.45		Local Access			3rd Phase
NR710	20 ft	123.35		Local Access			3rd Phase
NR711	20 ft	6.98		Local Access			3rd Phase
NR712	20 ft	27.74		Local Access			3rd Phase

Road ID	Proposed Width (ft)	Length (m)	Existing Width (m)	Road Type	Phase wise Development		
					1st Phase	2nd Phase	3rd Phase
NR713	20 ft	27.11		Local Access			3rd Phase
NR714	20 ft	16.29		Local Access			3rd Phase
NR715	20 ft	69.13		Local Access			3rd Phase
NR716	20 ft	61.53		Local Access			3rd Phase
NR717	20 ft	7.59		Local Access			3rd Phase
NR718	20 ft	33.98		Local Access			3rd Phase
WR719	30 ft	86.22	2.5	Tertiary Road			3rd Phase
NR720	30 ft	118.41		Tertiary Road			3rd Phase
NR721	30 ft	171.43		Tertiary Road			3rd Phase
NR722	20 ft	206.32		Local Access			3rd Phase
NR723	20 ft	141.97		Local Access			3rd Phase
NR724	20 ft	42.73		Local Access			3rd Phase
NR725	20 ft	34.04		Local Access			3rd Phase
NR726	20 ft	115.12		Local Access			3rd Phase
NR727	20 ft	256.74		Local Access			3rd Phase
NR728	20 ft	140.29		Local Access			3rd Phase
NR729	20 ft	116.86		Local Access			3rd Phase
NR730	20 ft	67.10		Local Access			3rd Phase
NR731	20 ft	46.62		Local Access			3rd Phase
NR732	20 ft	13.69		Local Access			3rd Phase
NR733	20 ft	64.10		Local Access			3rd Phase
NR734	20 ft	101.32		Local Access			3rd Phase
NR735	20 ft	5.21		Local Access			3rd Phase
NR736	20 ft	82.70		Local Access			3rd Phase
NR737	20 ft	45.63		Local Access			3rd Phase
NR738	20 ft	97.13		Local Access			3rd Phase
NR739	30 ft	589.23		Tertiary Road			3rd Phase
NR740	20 ft	29.22		Local Access			3rd Phase
NR741	20 ft	50.13		Local Access			3rd Phase
NR742	20 ft	91.33		Local Access			3rd Phase
NR743	20 ft	28.44		Local Access			3rd Phase

Annexure-C: Proposed Drain Inventory and Schedule of Major Facilities

Details of Drainage Network Proposals of Shibganj Paurashava

ID	Type	Length (m)	Width	Phase	Remarks
PD-1	Primary	173.55	≥3m	Second Phase	Covered Drain
PD-79	Primary	1492.71	≥3m	Second Phase	Covered Drain
SD-2	Secondary	583.70	1-3m	Second Phase	Covered Drain
SD-4	Secondary	1443.50	1-3m	Second Phase	Covered Drain
SD-5	Secondary	1641.64	1-3m	Second Phase	Covered Drain
SD-6	Secondary	924.43	1-3m	Second Phase	Covered Drain
SD-33	Secondary	265.05	1-3m	Second Phase	Covered Drain
SD-34	Secondary	742.10	1-3m	Second Phase	Covered Drain
SD-40	Secondary	1030.91	1-3m	Second Phase	Covered Drain
SD-43	Secondary	1096.44	1-3m	Second Phase	Covered Drain
SD-51	Secondary	892.16	1-3m	Second Phase	Covered Drain
SD-59	Secondary	371.37	1-3m	Second Phase	Covered Drain
SD-60	Secondary	2236.53	1-3m	Second Phase	Covered Drain
SD-61	Secondary	609.33	1-3m	Second Phase	Covered Drain
SD-80	Secondary	855.67	1-3m	Second Phase	Covered Drain
SD-81	Secondary	212.39	1-3m	Third Phase	Covered Drain
SD-82	Secondary	10.17	1-3m	Third Phase	Covered Drain
SD-91	Secondary	752.93	1-3m	Third Phase	Covered Drain
SD-94	Secondary	324.33	1-3m	Third Phase	Covered Drain
SD-129	Secondary	548.04	1-3m	Third Phase	Covered Drain
SD-178	Secondary	124.29	1-3m	Third Phase	Covered Drain
SD-179	Secondary	41.81	1-3m	Third Phase	Covered Drain
TD-3	Tertiary	291.71	≤1m	Third Phase	Covered Drain
TD-7	Tertiary	565.19	≤1m	Third Phase	Covered Drain
TD-8	Tertiary	3.69	≤1m	Third Phase	Covered Drain
TD-9	Tertiary	51.05	≤1m	Third Phase	Covered Drain
TD-10	Tertiary	528.02	≤1m	Third Phase	Covered Drain
TD-11	Tertiary	637.24	≤1m	Third Phase	Covered Drain
TD-12	Tertiary	896.61	≤1m	Third Phase	Covered Drain
TD-13	Tertiary	770.23	≤1m	Third Phase	Covered Drain
TD-14	Tertiary	801.73	≤1m	Third Phase	Covered Drain
TD-15	Tertiary	115.85	≤1m	Third Phase	Covered Drain
TD-16	Tertiary	94.33	≤1m	Third Phase	Covered Drain
TD-17	Tertiary	1178.37	≤1m	Third Phase	Covered Drain
TD-18	Tertiary	1572.97	≤1m	Third Phase	Covered Drain
TD-19	Tertiary	838.35	≤1m	Third Phase	Covered Drain
TD-20	Tertiary	862.75	≤1m	Third Phase	Covered Drain
TD-21	Tertiary	434.91	≤1m	Third Phase	Covered Drain
TD-22	Tertiary	889.37	≤1m	Third Phase	Covered Drain
TD-23	Tertiary	667.49	≤1m	Third Phase	Covered Drain

TD-24	Tertiary	535.85	≤1m	Third Phase	Covered Drain
TD-25	Tertiary	557.70	≤1m	Third Phase	Covered Drain
TD-26	Tertiary	1.07	≤1m	Third Phase	Covered Drain
TD-27	Tertiary	158.77	≤1m	Third Phase	Covered Drain
TD-28	Tertiary	1223.11	≤1m	Third Phase	Covered Drain
TD-29	Tertiary	652.45	≤1m	Third Phase	Covered Drain
TD-30	Tertiary	575.73	≤1m	Third Phase	Covered Drain
TD-31	Tertiary	658.42	≤1m	Third Phase	Covered Drain
TD-32	Tertiary	196.46	≤1m	Third Phase	Covered Drain
TD-35	Tertiary	786.61	≤1m	Third Phase	Covered Drain
TD-36	Tertiary	485.60	≤1m	Third Phase	Covered Drain
TD-37	Tertiary	12.07	≤1m	Third Phase	Covered Drain
TD-38	Tertiary	2615.66	≤1m	First Phase	Covered Drain
TD-39	Tertiary	62.96	≤1m	First Phase	Covered Drain

Detail Mouza Schedule of Development Proposal of Shibganj Paurashava

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.
Ward Center-1	0.46	1	Gopalnagar 151_00	110-113(P)
Ward Center-2	1.60	2	Salimabad 148_00	184-186
Ward Center-3	0.20	3	Chak Daulatpur 146_00	329
Ward Center-4	0.33	4	Shibganj 147_00	15
Ward Center-5	0.22	5	Shibganj 147_00	845
Ward Center-6	0.12	6	Jot Binod 140_00	110(P)
Ward Center-7	0.45	7	Mohodipur 145_00	108(P)
Ward Center-8	0.47	8	Chelabot Khani 182_02	817(P)
Ward Center-9	0.65	9	Chelabot Khani 182_05	5290(P)
Low Income Housing	18.45	1	Debinagar 152_01	157-173
Resettlement Area	9.85	1	Gopalnagar 151_00	28-37
General Industrial Area	66.06	1	Debinagar 152_01	36,37,63,64,60,62, 520,523,522,525,518, 519,52,53,54,56,57,58, 59
Cattle Hat	2.37	8	Chelabot Khani 182_02	1203-1211
Neighborhood Market	2.11	6	Rasulpur 139_00	159-163
	1.23	8	Chelabot Khani 182_02	1298-1299
	0.60	9	Chelabot Khani 182_05	5421
	1.53	6	Kashibati 141_00	181
	0.93	2	Salimbad 148_00	200-206

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.
Super Market	1.76	3	Chak Daulatpur 146_00	495, 545 (P)
	1.15	4	Shibganj 147_00	618-622
Wholesale Market	1.40	3	Chak Daulatpur 146_00	159, 160
Slaughter House	0.55	5	Shibganj 147_00	285
Primary School	5.04	8	Chelabot khani 182_2	1480,1481,1482
Primary School	2.72	1	Debi Nagar 152_1	96,97,98,99,102,135
High School	1.53	8	Chakdaulatpur 146_00	829(P)
Playground	3.08	1	Debi Nagar 152_01	150,151,152,153,154,50
	3.22	4	Shibganj 147_00	663,664,665,666,667,669,671
	4.96	8	Chelabot Khani 182_02	811,814,815,816,817, 820,821,822,826
	3.74	6	Rasulpur 139_00	181,182,205,209,210, 211
Central Park	21.77	3	Chak Daulatpur 146_00	360,361,362,336,335,259,516
Neighborhood Park	4.40	1	Debi Nagar 152_01	319,327,328,329,330,331,225,227,229, 226,233,229,230,231,232
	5.60	2	Salimabad 148_00	249,250,251,77,241,235
	1.17	5	Jagnnathpur 144_00	80,81,82,83,84,85,76,78,77,53,54,55,56
	4.50	8	Chelabot Khani 182_02	1400,1408,1409,1410,1411,1403,1404,1407, 1405,1406,1412,1421,1422,1423,1424
	4.20	5	Jagnnathpur 144_00	80,81,82,83,84,85,76,78,77,53,54,55,56
	5.45	9	Chelabot Khani 182_05	5302,5303,5305,5300,5306,5309,5310,5311, 5312,5313,5381,5382,5383,5384,5385, 5386,8387,5388,5389,5301

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.
Truck Terminal	1.11	1	Gopal Nagar 151_00	159,160
	1.42	7	Chelabot Khani 182_01	520,521,528,532
Bus Terminal	2.30	2	Norottampur 146_00	140, 144, 178
Passenger Shed	0.35	2	Norottampur 146_00	179,180
Tempo Stand	0.40	9	Chelabot Khani 182_05	5292,5294,5297,5295
	0.05	2	Salimabad 148_00	204
	0.05	4	Shibganj 147_00	742
	0.06	4	Shibganj 147_00	748
	0.04	4	Shibganj 147_00	842
	0.17	8	Chelabot Khani 182_02	1400,1408
	0.60	3	Chak Daulatpur 146_00	329,330,331
	0.05	5	Chaturpur 143_00	26,27
Neighborhood Clinic	0.23	5	Shibganj 147_00	801, 820
	2.11	8	Chelabot Khani 182_02	899-917
	0.20	6	Rasulpur 139_00	185
	1.55	9	Chelabot Khani 182_05	5460-5464
Community Center	2.90	3	Chak Daulatpur 146_00	190-195, 246
Waste Dumping Ground	4.15	1	Debinagar 152_02	1207-1214

Type of Facilities	Area in Acre	Ward No.	Mouza Name	Plot No.
Water Pump House	0.90	2	Salimbad 148_00	429, 446-447
	0.13	9	Chelabot Khani 182_05	5432(P)
Public Toilet	0.04	6	Rasulpur 139_00	159(P)
	0.06	6	Jot Binod 140_00	109(P)
	0.20	1	Gopalnagar 15_00	110(P)
	0.05	2	Salimabad 148_00	67(P)
	0.01	4	Shibganj 147_00	19(P)
	0.03	5	Shibganj 147_00	137(P)
	0.03	5	Shibganj 147_00	362(P)
	0.01	5	Shibganj 147_00	823(P)
	0.15	8	Chelabot Khani 182_02	832(P)
	0.16	9	Chelabot Khani 182_05	5432(P)

Annexure-D: Schedule of Land Use (Waterbody) Planning Proposal

Planning Schedule of Land Use Plan Zones (Waterbody) of Shibganj Paurashava

Type of Land Use	Mouza Name	Plot No.	Area (Acres)
Waterbody	Chak Daulatpur_146_00	21, 23-25, 35, 53, 68, 115, 231-232, 240, 253, 276, 279, 283, 308, 312, 329, 372, 375-379, 404, 414-416, 423, 425, 451, 457-458, 460-462 & 471-472.	3.12
	Chaturputr_143_00	77-80, 109 & 112.	0.19
	Chelabot Khani_182_01	265-266, 305-307, 818, 829, 847-850, 856, 865, 870-872, 874-875, 934, 936-937, 951-952, 954, 997-1001, 1004-1005, 1009-1010, 1012-1013, 1113, 1203-1207, 1211-1216, 1219, 1280-1285, 1289-1290, 1302, 1311-1313, 1322, 1328, 1331-1332, 1338-1343, 1346-1347, 1352-1353, 1366, 1368, 1371-1372, 1374, 1378-1380, 1387-1388, 1391-1394, 1416-1418, 1427-1428, 1430-1431, 1434, 1463, 1469-1470, 1478, 1491-1494, 1525, 1529-1532, 1596-1597, 1603, 1605-1608, 1610, 1645-1646, 3328, 3330, 3335, 3368-3369, 3460-3461, 3463, 3466-3467, 3637, 3661-3663, 3680-3682, 3685-3686, 3697, 3700, 3719-3720, 5265-5270, 5275-5284, 5299-5300, 5355-5357, 5369-5371, 5390, 5394-5466, 5474-5475, 5483-5484, 5486-5487, 5503-5506, 5510, 5513-5516, 5606, 5609, 5622, 5638, 5643-5645, 5661-5663, 5676-5677, 5685-5686, 5689, 5692, 5702-5711, 5800, 5802-5806, 5850-5856, 6239-6242, 6262, 6269, 6280-6283, 6314-6315, 6321-6322, 6325, 6381-6383, 6387, 6432, 6513, 6761, 6763-6764, 6786 & 6799.	26.52
	Debi Nagar_152_01	8-9, 19-21, 40-43, 73, 75, 108, 124-126, 129-130, 141-142, 144, 147, 187-189, 200-202, 209, 222, 230, 233-234, 251, 254-255, 319, 523-524, 526, 648, 713, 722, 1074, 1076, 1404-1405, 1412-1413, 1449-1450&1460-1465.	3.06
	Gopal Nagar_151_00	98-100 & 143.	0.11
	Jot Binod_140_00	65, 68, 71, 73, 90, 158-159 & 183-184.	0.30
	Kashibati_141_00	91, 105-107, 114, 157, 162, 168-170 & 187-188.	0.66
	Mohodipur_145_00	105, 120-124, 128, 191 & 196.	0.95
	Norottampur_149_00	32, 34, 50, 53, 98-102, 128, 132-134 & 152-153.	0.71
	Rajnagar_150_00	72-75 & 77.	1.35

Type of Land Use	Mouza Name	Plot No.	Area (Acres)
	Rasulpur_139_00	119, 128, 139, 184, 255-256, 260, 278, 280, 282, 284-285, 306, 333-335 & 337-341.	0.66
	Salimabad_148_00	273-275, 366, 368-377, 387-396, 450, 533-534, 597, 601-603&615-617.	2.51
	Shibganj_147_00	1, 126-129, 146, 174-178, 181, 186-187, 189, 211-212, 244, 292, 486, 591, 596, 598-599, 608-610, 745, 747, 766, 768-769, 771, 774-775, 785, 798, 800-801, 853-857, 898&903.	1.59
	Taratipur_142_00	3, 5, 9-10, 13, 19, 21, 23-26, 29-32, 40-41, 47-48, 63, 92-94, 106, 121, 129, 142-143, 165-166, 177, 179-180, 182-184, 207&268.	2.08

Annexure-E: Resoulation of Final Consultation Meeting

Annexure-F: Gazette of Shibganj Paurashava

Appendix

Appendix-1: Structure Plan Map of Paurashava

Appendix-2: Land Use Plan Map of Paurashava

Appendix-3: Transportation and Traffic Management Plan Map

Appendix-4: Drainage and Enviornmental Management Plan Map