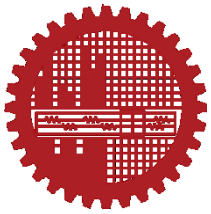

Bangladesh University of Engineering & Technology

Plan 402: Project Planning Studio

Project Title: Preparation of Master Plan for Pourashavas Under Upazila Towns Infrastructure Development Project

Technical Proposal and Financial Proposal

Level-4 Term-2

Department of Urban & Regional Planning, BUET

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PART A-TECHNICAL PROPOSAL

1.1 Background

The growth of cities and towns in Bangladesh is predominantly occurring in an unplanned manner. According to the population census of 2001 at present about 23.39% of the total population of the country or about 29 million people live in the urban areas. As per demand of people the transformation of important urban areas into Pourashavas is continuing to ensure planned development of Pourashavas and the total number of Pourashavas now stands nearly 300. Out of these 300 pourashavas a total of 223 pourashavas development programme is undertaken in Upazila Towns Infrastructure Development Project. In order to ensure a high standard of living and environmental quality in these spaces, it is imperative to have planned spatial and socio-economic development.

The development scenery of the pourashava is indicative of a profoundly serious situation. This can be attributed to the fact that the main and secondary drains, as well as the natural streams in the Upazila Towns, fail to function as a unified and coordinated drainage system. Furthermore, the problem is exacerbated by the encroachment on drainage reservations. As a result of this encroachment, numerous areas, including houses and roads, become inundated during periods of heavy storms. Besides problems such as traffic congestion, delays, accidents, difficulties for pedestrians and parking, as well as air and noise pollution are emerging. Traffic congestion has become a prominent and critical problem in urban areas. Over time, the situation has progressively worsened, affecting large areas and lasting for longer periods throughout the day. If this unplanned construction continues unchecked, it will render the environment of the Upazila level Pourashava unsuitable and uninhabitable. Currently, there is no proper Master Plan for the development of pourashava. In the absence of a proper Master Plan, the construction of various types of infrastructure, including houses, roads, drains, and markets, is proceeding in an unplanned manner. Given the severity of the situation, it has been proposed that the existing Master Plans of the 223 upazila towns be prepared or updated with a projection for a 20-year period. Additionally, to support the Master Plan, separate plans for Drainage and Environmental Management, Traffic Management, and Detailed Area Planning will be formulated.

The significance of planned growth in the Chittagong region cannot be overstated, as it greatly contributes to the creation of a better living environment. The project, known as ‘Preparation of Master Plan for Pourashavas under Upazila Towns Infrastructure Development Project (UTIDP), Package-04’ focuses on specific areas comprising of Chowmuhani of Chandpur, Laxmipur and

Noakhali and located in the southeastern region of the country. This section presents the approach, methodology, and work tasks that will be undertaken to achieve the stated objectives and activities outlined in the Terms of Reference (ToR). Prior to determining the approach and developing the methodologies, the consultants conducted a thorough examination of the study area and engaged in valuable discussions with the Project Director, Planning Officer, other officials from the Urban Development Department (UDD), officials from Chowmuhani of Chandpur, Laxmipur and Noakhali District in Chittagong, and members of the community. These structured discussions with relevant officials and individuals facilitated a rapid assessment of the problems and development issues specific to the project area, thereby aiding in the preparation of appropriate methodologies. Subsequently, the consultants discussed their understanding of the major plan documents before presenting the methodologies in accordance with the ToR.

The objectives of Pourashava Master Plan are to:

1. Find out development issues and potential of the pourashavas and make a 20-year development vision for the pourashava and prepare a Master Plan in line with the vision for the development.

2. Plan for the people of the town to develop and update provisions for better transport network, housing, infrastructures for 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; and

3.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.

4. Provide controls for private sector development, clarity and security with regard to future development.

5. Provide guideline for development considering the opportunity and constrains of future development of Upazila Town.

6. Prepare a 20-years Master Plan to be used as a tool to ensure and promote growth of the city in line with the guiding principles of the Master Plan and control any unplanned growth by any private and public organization.

3.1 Background

The rationale for undertaking the project is clearly articulated in the background. The project was undertaken in accordance with the Local Government (Paurashava) Act of 2009, which highlights the legal necessity of the project, although this was not explicitly stated in the Terms of Reference (ToR). Additionally, this project included 223 out of 300 pourashavas, specifically those classified as B and C category paurashavas according to the categorization outlined in the LGA, 2008. However, this significant information was not included in the document. Furthermore, the initiation and anticipated completion dates for the project were not specified.

3.2 Objectives

The objectives of the project were clearly defined and includes important issues such as like traffic, drainage, and environment by suggesting making separate detail area plan, drainage and environment plan and traffic management plan along with the master plan and separate projects under each plan.

3.4 Scope of Services

The scope was well defined and translated most of the objectives into measurable events and outcomes. The spatial and temporal dimensions of the project were clearly defined, and hierarchy of plan was maintained. Land use, transportation and drainage management was prioritized. It also mentioned public participation in determining the development vision and consultation before the publication of the final report. In transportation plan, role of non-motorized vehicles such as rickshaws were mentioned. In the ward action plan, priority scheme was instructed to be prepared for ease of implementation. Solid Waste Management is an important amenity but was not mentioned. Detail specification about the sample size of Socio-Economic Survey is absent in the ToR. Detail guidance about the sample population is not also described in the ToR.

3.3 Planning Area

Planning Area was clearly defined as “urban areas and their immediate surroundings” as the delineation of urban area for the pourashavas would be different depending on the context of individual pourashavas.

3.4 Consultancy Services

It has outlined the selection process of consultancy firms for performing the required tasks for preparation of Master Plan for 223 pourashavas. Consultant firms are asked to work at the pourashava level and maintain working relation with pourashava office and LGED. The duration of the consultancy service is mentioned. Consulting inputs such key experts and their total man month as well as number of supporting stuffs are mentioned.Composition of project teams, experts required educational qualification and experiences, their responsibilities are mentioned. For team leader, only master's degree in urban and regional planning is required. It could ask doctorate degree in any relevant field. The responsibilities of team leader are described in detail. However, the team leader is asked to conduct detailed socio economic and topographic survey and note down detail information on required data for the preparation of the plans. This task can be assigned to urban planners. For deputy team leader required educational qualification is only bachelors in urban and regional planning. The project team included two urban planners only for preparing base maps, supervise survey activities and data collection. On the other hand, it also included separated transport planning expert and architect planner. Urban planners having specialization in transport planning can perform the required tasks. Separate architect planner is not necessary as urban planners can perform the tasks. There is no mention for any hydrologist for the project.

3.5 List of Activities to be Carried by Consultant

List of activities are described in detail. Required inputs and outputs from the consultancy firm such as basic inputs, required documents and reports, list of maps, required technologies and software, survey equipment are mentioned in details. Formats for preparing maps and conducting surveys are described in details. There are no guidelines for conducting traffic and transportation survey before preparing traffic management plan, which is a crucial activity.

3.6 Time Schedule for Submission of Reports & Maps

List of deliverables, schedule for submitting reports and maps, and submission format is given. However, the deliverables are not specified according to the objectives of the terms of reference. Payment schedule of the consultancy firm in accordance with the deliverables is not mentioned.

3.7 Suggested contents for the plan reports

Required contents for structure plan report, master plan/urban area plan report, drainage and environmental management plan report, ward action plan report are given precisely.

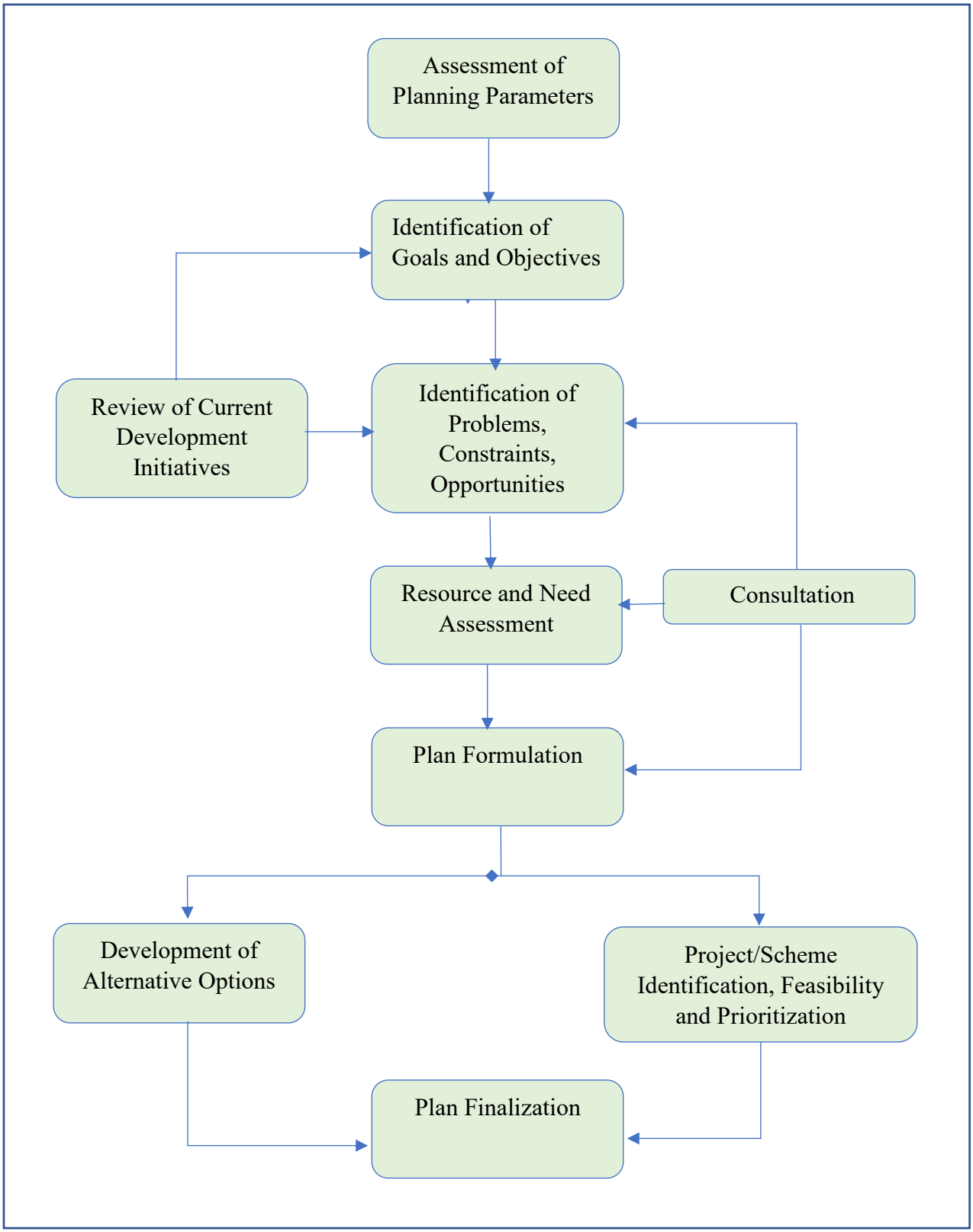

Figure 1: Planning Framework for the Preparation of Master Plan

4.1 Levels of Planning

According to the terms of reference (ToR), a comprehensive plan would be developed that outlines the proposed Master Plan at three different levels, namely the Structural Plan, Master Plan/Urban Area Plan, and Ward Action Plan. At the initial level, a strategic policy framework must be formulated to guide the preparation of a structure plan for each pourashavas included in the package. Following the completion of the structural plan, a Master Plan will be prepared, encompassing the Land Use Plan, Transportation and Traffic Management Plan, and Drainage and Environmental Management Plan. In alignment with the Master Plan, a ward action plan will also be developed.

Table 1: The interrelationships among all the plans and their primary characteristics

Name of the Plan	Spatial Coverage	Temporal Coverage	Purpose
Structure Plan	Entire Planning Arena	20 years	To prepare strategic policy for urban area development
Master Plan/Urban Area Plan	Entire Planning Arena	20 years	To promote growth of the city in line with the guiding principles of the Master Plan, development control and land reservation for infrastructure
Land Use Plan	Entire Planning Arena	20 years	To guide future land use through land use zoning system
Traffic Management Plan	Entire Planning Arena	20 years	To provide suggestion and enforcement measures for transportation management
Drainage and Environmental Plan	Entire Planning Arena	20 years	To provide guideline and control measures for protecting drainage structure and urban environment
Ward Action Plan	Individual Area of the Pouroshova where priority action is required	Short Term (5 years)	To develop roads, drains, traffic management and other social infrastructures where action is expected in short term

4.2 Steps in Plan Preparation

4.2.1 Assessment of Planning Parameters

For the preparation of the plan, required planning parameters are information regarding population, employment, land use, infrastructure, environmental conditions, etc. The majority of this data will be gathered from research, plans, and programs, as well as from government publications, statistical year books, pouroshova records, and other development organizations operating in the relevant pouroshova area.

4.2.2 Population Projection

Population growth rates in developing countries are much more than of the developed countries of the world. Moreover, migration to urban areas in the developing countries has been increasing over the years. Due to increased urbanization trend in the coming years, the cities in the developing country will face housing and settlement problems, infrastructural deficiencies for increased number of populations, slum and squatter settlements, environmental degradation, etc. In practical, it is difficult to attain the actual number of population but more accuracy in population projection will encourage the future investment as projection shows the population demand.

4.2.3 Identification of Problems

Consultants will first discuss issues with various interest groups in order to determine which problems are impacting which groups. By gathering the necessary data from secondary sources and from the inputs of the supporting studies that will be conducted under this project or that have already been conducted by other agencies, the nature of the problems and their quantification will be established. Additionally, issues will be categorized in order to determine areas of overlap and current or prospective accountability at the municipal or national level government.

4.2.4 Review of Current Development Initiatives

Sector-specific projects that are either planned or currently being constructed within the designated study area by various organizations will be identified. In accordance with the Terms of Reference (ToR), these projects will be visually represented through the utilization of thematic overlays. Essential information will be acquired from both public agencies and various formal and informal private sources as needed. The consultants will thoroughly assess exisiting urban and sector-specific policies and programs, design standards, the institutional arrangements responsible for implementing development initiatives within the study area, regulatory frameworks, and other

control mechanisms, examining their effectiveness. Furthermore, the consultants will scrutinize emerging efforts concerning to land development and management. Additionally, the consultants will evaluate the inadequate administrative and organizational structures that hinder efficient planning and management at the pouroshova level.

4.2.4 Assessment of Constraints & Opportunities

The identification of hazardous sites will be facilitated by government agencies, field inspections, and verification with the local. The primary results of this effort will be the identification of crucial locations where, for instance, natural causes, distance from essential services, dependence on major new transportation links, etc., cause infrastructure costs per capita to grow sharply.

4.2.5 Resource Assessment

The consultants will conduct an evaluation of the resources expected to be available with municipality authority and other development agencies operating in the region in order to secure funding and execute priority development projects. Consequently, the consultants will perform a financial analysis of the pouroshova and other prominent agencies engaged in service provision in the study area, covering a span of five years. The primary objective of the analysis of local resource potentials will be to tackle the followings:

- ✓ Availability of technical and physical resources like base map, construction equipment, other physical resources including land
- ✓ Availability of funds in the short term
- ✓ Human resource availability
- ✓ Commitment of development agencies to respond to the problems and short-term development objects identified

For the purpose of analysis, detailed information will be collected from pouroshova authority and other public sector agencies including NGOs operating in the area. For projection purpose, the consultant would draw on the work of other municipal finance projects.

4.2.6 Consultations

The process of planning approach will be carried out through two stages of consultations involving the concerned agencies and community representatives including potential beneficiaries, project affected people as per requirement of the respective consultation processes. The People's Participatory Planning Approach will be applied in the formulating the Structure Plan and Master

Plan/Urban Area Plan and Local Action Plan. The potential participants of the stakeholders for the consultation process would include the following: (i) The Government/Public Agencies (ii) Local Communities/Beneficiaries (iii) Private Sectors (iv) Non-Government Organizations (NGOs)

4.2.6.1 Stages of Consultation

In accordance with the ToR the consultants will have to carry out at least 2(two) consultations during the planning process. They are:

a. First Consultation: All opinion and recommendations expressed by the participants will be documented and deliberated upon during the meetings in order to formulate a consensus-based planning framework. This framework will be further refined in preparation for the second consultation process, encompassing all the findings derived from the input-output mix of detailed survey/investigation.

b. Second Consultation: The second consultation will be conducted with the objective of analyzing the outcomes of the first consultation for the purpose of formulating and adopting development strategies, proposals, approaches, and standards that are suitable for the pouroshava. Efforts will be made to address the specific demands of the location/area, in order to enhance the level of community acceptance during the implementation of the Master Plan. In the second consultation, the consultant will present detailed planning proposals along with alternative development options. This session will be conducted meticulously by firstly submitting the Draft Master Plan Report and secondly, incorporating the feedback and suggestions obtained from the consultation with interested stakeholders. Finally, in accordance with the Terms of Reference (ToR), the final Master Plan Report will be made accessible.

4.2.7 Plan Preparation

Finalizing preparation of the plans is the last stage of the planning process. The Consultants will prepare the Plan Packages comprising of a) Structure plan, b) Master Plan/Urban Area Plan, b-1) Land Use Plan, b-2) Drainage and Environmental Management Plan, b-3) Transportation Plan, c) Local Action Plan. These plans will be supported by the review of the database and information, assessment of the existing functional structure, problems in developing process, formulation of conceptual plan, formulation of planning principles, analysis of alternative plans, integration of optimum plans, priority phasing, development control, zoning, financial-economic, social, environmental impact assessment, legal support, etc. Scale of all plans will be 1:1980 (1"=165').

4.2.8 Identification of Priority Projects

Prioritization of Project: Project selection will be needed based on the areas of the upazilla as specified in the probable contents of Local Action Plan. Priority projects for different areas will include development and up gradation. The projects may also be non-physical in nature. In carrying out the identification of priority project certain selection criteria need to be fixed. These could be:

- Compatibility with other projects
- Equality Consideration
- Self-Finance Ability
- Acceptability to all parties concerned
- Sustainability
- Environmental Impacts

Issues Considered: The projects that are economically and financially feasible will be considered as bankable projects. To develop the inventory of Bankable Projects a list of the projects that are essential to implement the plan will first be prepared.

5.1 Preparation of List of Pouroshovas

Pourashavas contained in the package work will be visited and a list of possible names for those who will prepare the Master Plan will be prepared. If a pourashava already has a Master Plan and there is no need to prepare one, it will be excluded from the package. The Chairman of the pourashava will decide whether or not to include Master Plan preparation. The PD of UTIDP will receive a copy of the list of pourashavas that are practicable for Master Plan creation.

5.2 Client Meeting

An Inception Seminar at the pouroshava level will be arranged where they will be informaéd regarding the extent and parameters of the preparation of the Master Plan. Through engaging in a comprehensive inquiry and, considering the potential extent and opportunities existing in the local government, a long-term development Vision for the pouroshava spanning a period of 20 years by connecting the thoughts and perspectives of the people of pouroshavas.

5.3 Reconnaissance Survey

After conducting a preliminary assessment, members of the project team, will proceed to conduct a reconnaissance survey of the study area. This will enable them to acquire a firsthand understanding and comprehensive knowledge of the project area in relation to its physical features, socio-political-economic characteristics, transportation systems, and drainage infrastructure. The objective is to facilitate in-depth review of the existing database and ascertain any additional data and information requirements from primary and secondary sources that are essential for the planning process.

5.4 Data Collection

The study team will collect accessible secondary sources information, data, maps, photographs, satellite images, reports, etc., examine them, identify shortcomings and gaps, assess real data requirements, and conduct a survey of both primary and secondary sources.

5.4.1 Collection of Maps

Table 2: Maps, with specified scales, that will be obtained from relevant sources for surveys and development plan preparation

Type of Map	Scale	Source
CS Mouza Map	1 inch = 330 feet	Directorate of Land Records and Survey (DLR)/DC Office
RS Mouza Map	1 inch = 165 feet	
Thana/Upazila Maps	1:50,000	Relevant Thana/Upazilas
Contour Map	4 inches per mile	Local Government Engineering Department (LGED) for Topographical Maps
Thematic Maps	1 inch = 165 feet	Relevant pourashava.

Table 3: The list of Thematic Maps to be used

Type of Thematic Map	Name of Features
Water Supply, Sanitation, Electricity and Gas Supply	Source, distribution line & installation (primary, secondary and tertiary) cost revenue, maintenance
Drainage and Flood Protection	Storm water, rain water, in-let, out-let and cost, revenue, maintenance
Line Facilities	Telephone, television, radio, electronic mail
Waste	Household, industrial, clinical wastes collection, dumping and treatment & sludge disposal
Accessibility	Circulation, passenger & goods movement, (motorized & non-motorised, walkways, station stoppage, waiting & parking facilities, cost revenue and maintenance
Environment protection	Heritage, open space conservation & maintenance, sound, air quality and landscape.
Land Level	Buildable land, landfill. Recreation (open, close)
Housing	High, medium, low income
Employment	Industry, commerce, informal employment
Special area	Military, flood prone, earth quake prone, hazardous industry
Social infrastructure	Education, health care, community use, religious, band, post office, police, fire brigade, assembly place

Land ownership	Private, khas, Govt. acquisition, for various agencies, vested
Commitment area	Govt. private for development work
	Land value
	Administrative boundary

Source: Adopted from ToR of Upazilla Town Master Plan Package

5.4.2 Collection of Socio-economic/Demographic Data

The consultants shall compile data regarding the existing demographic indicators, encompassing population, gender distribution, household income, land valuation, and land ownership. This data, when combined with primary information, will be utilized to project future trends. Secondary data shall be acquired from diverse sources, comprising publications from the Bangladesh Bureau of Statistics and municipal project reports. The consultants shall also gather data regarding urban services and community facilities. Additionally, information on urban policies, strategies, plans, and programs shall be collected.

Aside from secondary sources, socioeconomic data will be obtained from primary sources as well. For primary data gathering, both a quantitative and qualitative method will be used. The quantitative method will be used to create a structured questionnaire and checklist for. The survey will be conducted among selected households using stratified random sampling based on socioeconomic status, land use, urban amenities, land type, and proximity to communication. A total of 384 houses will be selected, with 78 selected evenly for each group at 95% confidence level and 5% confidence interval. Each category's sample size will be decided by its share in the population. Focus Group Discussions (FGD) will be held to collect qualitative data from participants such as the municipality's chairman, staff members, ward commissioners, representatives from non-governmental organizations (NGOs), and other interested parties.

5.4.2 Collection of Drainage and Environmental Data

In order to adequately devise the drainage system, it is imperative to study the current state of the drainage in relation to topography, hydrology, and drainage structure. The topographical information will encompass information regarding topography of the municipal area, contour maps, intricate details of roadways, buildings, water bodies, etc., which will be procured from the mouza map. The hydrological data is indispensable for estimating the flow of water and determining the water level for the design, encompassing information such as temperature, duration of daylight, hours of sunshine, evaporation, transpiration, precipitation, and flood

conditions. This data can be obtained from esteemed institutions such as the Bangladesh Meteorological Department (BMD), Bangladesh Water Development Board (BWDB), and the Local Government Engineering Department (GED) on a smaller scale. Furthermore, data can be gathered from the national water resources database (NWRD), the agro-climate survey of Bangladesh (Manalo), and the Bangladesh Rice Research Institute (IRRI). The structural data, which includes the location, length, and dimensions of the existing infrastructure, will be acquired from the offices of the municipality. In addition, if there exists any previous drainage Master Plan for the Pourashavas, it will also be subjected to review. Data on natural resources, environmental hazard, air and water quality, and sanitation will be obtained through Department of Environment and Forest (DEF) for Environmental Guideline and Information and questionnaire survey and FGDs.

5.4.2 Collection of Transportation and Traffic Data

Additional data needed will be gathered through manual traffic volume surveys, origin-destination surveys through random sampling. Information on traffic volume and movement patterns, as outlined in the Terms of Reference, will be gathered through directed observation, volume surveys, origin-destination surveys. This help to estimate present traffic volume, forecast future traffic growth, identify travel patterns, areas of traffic conflicts and their underlying causes. During the traffic survey, data on non-pedestrian traffic movements that are dominated by cycle rickshaws will also be collected. Moreover, 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 three pourashava will be collected and assessed.

5.5 Data Entry and Analysis

Data acquired from secondary and primary sources will be entered into MS Excel. For mapping software, ArcMap 10.8.2 will be used. SPSS will be used for statistical analysis, and ArcGIS for geographical analysis. Detailed information, including size, dimensions, construction year, benefits and expenditures, and revenue earnings, will be captured in a GIS file with positional data and updated regularly.

5.5 Population Projection

Population will be projected for 2041 following the age cohort wise projection system. In that case age cohort structure and growth rate of Municipality Office BBS will be used. Base population year will be 2011.

5.6 Delineation of the Study Area

Study area will be defined based on the current state, demand for pourashava, and potential scope for future development as mentioned in the ToR. A complete socioeconomic, demographic, and topographic survey of the Pourashava area will be carried out in accordance with the authorized format, as well as collect data from primary and secondary sources will be collected and further analysis will be done to identity potential areas of intervention. Future population of each pourashava (15-20 years) will forecast and their need for diverse services, physical and social infrastructure facilities, employment generation, housing, right of way and land requirement for existing and proposed roads, drains, playgrounds, recreation centres, and other environmental and social infrastructure will be evaluated.

5.7 Methodology for Base Map Creation and Conduction of Surveys

5.7.1 Base Map Creation

5.7.1.1 Detail Information Regarding Physical Feature Required for Base Map Preparation

The base map will be prepared with the following information on the list of pouroshavas. The information will be collected from the topography and physical feature survey and provides a general overview of the area.

Table 4: Information of Physical Feature for Base Map Preparation

Physical Feature	Illustrated Information
River	Indicate direction and depth of flow
Khals	Indicate direction of flow
Drainage Channels	Indicate direction of flow for natural and improved ones
Ponds/Tanks/Ditches	Indicate Location
Marshlands/Flood	Land Liable to Flood During Monsoon
Buildings/Structures	Location and Status as Pucca/Semi Pucca Structure and Stories
Roads	Indicate Right of Way and Status as Pucca/HBB/Kacca earth etc
Railway Line and ROW, Railway Stations	Indicate alignment and junction points
Bus/Truck Terminals	Indicate place and area
Flood Works	Indicate place and area embankments, pump stations, sluice gates
Bridges/Culverts	Location, length, width, conditions of abutments and Wing walls
Electric Mains and ROW	Indicate Location, Covered Area and Type of Structure
Utility Substations	Electric, gas and telephone, Water Works, Waste Disposal and Treatment etc
Deep-Tubewell Stations	Location of Deep/tube well stations and outputs

Mouza and Wards	Indicate Location and Area
Thana and District Boundary	Administrative Boundaries

Source: Adopted from ToR of Upazilla Town Master Plan Package

5.7.1.2 Steps in Preparation of Base Map

Preparation of a base map at first would govern the survey works that would be conducted for the preparation of the Master Plan. A relational database of the survey results will also be prepared according to the base map in GIS. Base map will be prepared in following steps:

Table 5: Steps in Preparation of Base Map

Steps	Detail Methodology
1. Collection of RS and CS Mouza Maps	Both RS and CS mouza sheets/maps will be collected from DLR/DC office covering the entire project area. The mouza sheets having distortion due to rapping or pasting cloths/taps in the mouza maps will be avoided.
2. Scanning of Mouza Maps	To minimize the distortion and deviations, scanning of mouza maps will be carried out using drum scanner. Extra care will be taken for maintaining the proper rotation and alignment of mouza sheets during scanning.
3. Selection of Ground Control Point (GCP)	At least four numbers of Ground Control Point will be selected on each mouza sheets identical with the real field condition. For accuracy and quality work, maximum efforts will be given to identify as many as GCP for each mouza sheets. Geo-referenced (x,y,z) permanent Benchmark (BM) pillars uniformly distributed covering the mouza area have to be established to carry out the total topographic, physical feature and land use survey.
4. Digitization of Maps	On screen digitization method will be used for digitization of mouza maps. GIS based ArcGIS 10.8.2 Software will be used for this purpose. Feature wise manuscripts will be developed for digitizing the mouza maps and all features will be stored as layer coverage with a separate ID or code number of respective features in the GIS database.
	Manuscript-1: *Point Features:* This manuscript will contain all point features like boundary and other reference pillars, traverse stations, GT stations,

<table>
<tr><td></td><td>benchmarks etc. Every point will be stored with a numeric user ID representing feature type.
Manuscript-2: Polygon Features: This manuscript will contain all polygon type or closed boundary features like pond, water bodies, structures, plot and mouza boundaries etc. All features will be stored as polygon having a numeric user ID representing feature type.
Manuscript-3: Polyline Features: This manuscript will contain all line type features like roads, railways, drainage, sewerage line, embankment/flood wall etc. All features will be stored as line having a numeric user ID representing feature type.
Table format of each of the attribute (point, polygon, polyline) table in ArcMap 10.8.2 is shown in Table
<table>
<tr><th>Shape</th><th>User ID</th><th>SPZ_no.</th><th>Location_no.</th><th>Mahallah</th><th>Mouza</th><th>Sheet no.</th><th>Name</th><th>Use</th><th>Remarks</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>5. Checking/ Editing of Maps</td><td>After digitization of mouza maps, it will be printed containing the features in distinct colors. Then it will be checked and verified by superimposing on the original mouza maps using the light table. All errors (missing area, dislocation arcs, wrong or missing polygons, labels, tic locations, ID etc) will be solved and final digital mouza maps will be prepared.</td></tr>
<tr><td>6. Joining and Printing of Mouza Maps</td><td>After digitizing and geo-referencing of the mouza maps, all the maps of the study area will be joined together by conducting edge matching operation in ArcGIS 10.8.2. The geo-referenced mouza map containing all the features (point, polygon, polyline) will be prepared and printed for further survey works. The scale of the mouza maps will be 1 :1980 (1"=165').</td></tr>
</table>

5.7.2 Methodology for Topography and Physical Feature Survey

5.7.2.1 Topography Survey

Topographic survey will be performed by Optical Level in respect to established bench mark (BM) of Survey of Bangladesh (SoB) and 3d Stereo Satellite Image. Topographic data (DTM Points) having X, Y and Z values will be collected at 5-meter grid. All of the area's soil deposits, valleys, hills, and depressions must be mapped using contours after being surveyed. In order to locate and

draw the contours for the area or areas, the necessary leveling work for the whole area or areas must be surveyed and plotted on maps by creating horizontal location. on maps, at predetermined intervals and sizes. The engineer in charge at the site will choose the survey method, contour intervals, etc. in situations including steep slopes, dense vegetation, etc. where grid is not feasible. Plotting of any distinctive ground forms, rock outcrop locations, spring/fall locations, etc., should also be documented and included on the maps.

A. Traversing

In order to establish horizontal control and ascertain the precise relationship between various existing points on the ground, traversing and triangulating will be used. To cover the whole region, subsidiary stations will be set up at appropriate intervals from the main traverse/triangulation station. These stations' levels will be determined by comparing them to the benchmark set in the survey region. Using complete station equipment, all significant details will be surveyed in both the main and subsidiary stations. If more detail categorization is required, the plane table approach will be used.

B. Contouring

Spot level surveying to contour the area or regions at 25-meter intervals and levels will be recorded on all traverse stations and prominent spots scattered randomly over the region (ground points). Plotting the aforementioned points is followed by contour interpolation at 1 m intervals. The contours will be interpolated and be accurately surveyed on the ground to include things that fall in between the two succeeding levels. In order to do precise contouring, levels must be taken and sufficient points must be evenly dispersed over the whole region. The spots chosen must be near to one another in areas with sudden changes in direction or height, such as steep curves. It is also necessary to measure the salient spots on valley and ridge lines. The cross-section of the canal, or nallah, if applicable, will be created in accordance with the site circumstances and the engineer-in-charge's instructions by taking spot levels at intervals of no more than five meters. Sounding technique must be used for contouring within reservoirs and ponds. Every leveling operation must begin and conclude at the main or subsidiary stations, whose levels are determined by the benchmarks set in the survey area.

5.7.2.2 Physical Feature Survey

The positions of all the area's natural and artificial features, such as rivers, railroad tracks, trees, crops, houses or other structures, fences, pucca and kutcha roads, including culverts and crossings,

foot tracks, and other permanent objects like telephone posts and transmission towers, are to be determined. These positions should then be shown on survey maps using standard symbols.

Table 6: List of features to be included in the physical feature map

Cross section, long section, Type, width, length and name of road, road level above datum, flooding lands, slopes, borrow pit.
Identification of any bridge or culvert on the road their length, width and span of the bridge, condition of abutments, condition of the deck, wing walls abutments.
Type, size, depth, inlet and outlet location of drain along with flow direction width and depth of the canal, place of encroachment.
Type of sewer system, size, type and location of sewerage line, location of bins, identification of any other sewerage collection system.
Identification of the water supply system, location of overhead waters tank and its capacity, catchment area of overhead tank.
Identification, location and capacity of electric substation, telephone exchange. Titas gas subs station etc. Treatment plant, waste disposal facilities.
Identification, location and capacity of electricity, telephone gas, waste disposal and treatment system.

Utilizing the Total Station (TS) survey approach with RTK-GPS support, the location and dimensions of the majority of physical infrastructures will be measured and recorded. Each structure's unique ID or code number will be recorded on the TS memory card containing data. The GIS database will receive the TS data later on, and the features will be stored there separately according to code or ID. Data Logger ProXR DGPS (Differential Global Positioning System) will be used to survey the locations of point features, such as telephone poles, electricity poles, tiny hydraulic systems, etc. These features' positional data will be saved in a DGPS handheld computer along with a unique ID or code. This data will eventually be layer-by-layer transmitted to a GIS database following the requisite processing and differential correction.

Ground Control Point Survey

Ground control points and tertiary control points will be identified and located on the map by determining their latitude and longitude. These points will serve as georeferencing points and will be critical for survey work and the development of correction maps.

Map Preparation

1:1980 scale survey maps of the site with grid and contour lines that show the locations of all permanent structures, such as buildings, roads, railroads, canals, trees, power lines, and so on. Two types of maps will be generated for representing topography and physical features of the study area. One map will display spot levels, contours, and grid lines with a contour line spacing of one meter. The other will display grid lines, contour lines, and permanent features.

5.7.3 Methodology for Socio-Economic Survey

The following general data will be gathered from primary sources: employment and occupation patterns, family size, age, religion, education, land ownership patterns, land value, land utilization, income level, health and recreation facilities, etc. The data will be gathered using a specially created socio-economic questionnaire survey format that will be included with the Terms of Reference. Relevant sources will be gathered for secondary data. The problems of housing for underprivileged groups, informal business, traffic jams, waterlogging, drainage, unauthorized encroachment, parks and playgrounds and waste management will all be the focus of case studies. Involvement of stakeholders in planning and development management will be ensured. According to the structure outlined in the Terms of Reference, the questionnaire will have a broad range of data.

The sample size will be determined at 95% confidence level and 5% confidence interval for the socio-economic survey from the entire population of the paurashavas.

Format for Socio-Economic Survey

1. Demographic information: Age, sex, growth rate, household size, migration etc.

2. Socio-economic: status of the population educational status, occupational patterns, income levels, land ownership patterns etc.

3. Land and housing: Land value, housing type and condition, slum and squatter settlements etc.

4. Urban services: community facilities and Availability of water supply, sanitation, drainage and waste disposal facilities, availability and status of educational, recreational, marketing and other socio-economic facilities

5.7.4 Methodology for Land-Use Survey

Land use maps displaying broad and detailed land uses will be created on expanded cadastral survey mouza maps at a scale of 1:1980 (1"=165'). The land use survey will be conducted using a total station and DGPS survey approach, and the data collected will be cross-checked using stereo satellite imagery. Every survey feature will have a unique ID or code associated with it. Subsequently, during the data processing step, land use features will be recognized, classed, and divided into distinct layers using the recorded code. From there, a category-wise land use map may be created utilizing the identification layers of each land use feature. Following are the general land use categories that will be shown on the land use map:

Table 7: Land Use Categories

Land Use Categories	
▪ Residential	▪ Public administration and Defense
▪ Commercial	▪ Roads
▪ Industrial	▪ Agricultural use
▪ Open space	▪ Water bodies
▪ Institutions	▪ Wet land
▪ Community facilities	▪ Vacant land
▪ Public services and utilities	▪ Brick field
▪ Communication and Transport	▪ Railway land
▪ Institutions	▪ Urban Reserve
▪ Community facilities	▪ Mixed use

5.7.5 Methodology for Traffic and Transportation Survey

The consultant will conduct an inventory of the circulation system (roads and waterways) based on functional classification, as well as information about their capacities, conditions, and average daily traffic. The planned area will be the site of many volume and O-D surveys. On certain days, a survey of traffic levels will be conducted during peak travel times. Using the town office of the Upazilla Municipality as the center, an O-D survey will be conducted within a radius of one kilometer. As a component of the study, a pedestrian count will also be carried out.

The consultant will provide an overview of the data gathered and pinpoint the main transportation issues facing the upazilla, as well as the contributing elements to those issues.

The following tasks will be completed: Analysis of the study area, an assessment of the external links, sectoral programs to address the deficiencies, examine compatibility of the existing and

committed proposals by various agencies, preparation of realizable proposals for improving the traffic and transportation system.

5.7.6 Methodology for Scheme Identification Survey

An important part of planning is setting priorities for projects that are important for the environment, economy, and society to flourish in an orderly manner. To determine the priority projects, a meeting with the community and the authorities will be held. At the meeting with the pourashava authority and stakeholders, the detailed Ward Action Plan will be taken into consideration. to design the priority plan on infrastructure connected to roads, transportation, water supply, sanitation, waste disposal, and social services and flood mitigation.

The following proforma will then be followed in describing the scheme: Name of Scheme, Description of Project, Objective of the Project, Feasibility Report, Project Cost, Financing, Land Requirement, Impact Assessment (institutional, income, employment, socio-economic, environment), Duration of Construction, and Catchment Area.

5.8 Methodology of Data Base Preparation

The collected map information will be stored in Arc Info and the collected household and other quantitative data will be stored in SPSS for further descriptive and statistical analysis that will be used to formulate the plans.

5.9 Methodology of Plan Preparation

The structure plan will be based on the policies and guidelines outlined in Visión 2021, the Perspective Plan 2020, Poverty Reduction Strategy Paper (PRSP), National Water Management Plan (NWMP), Disaster Management Plan, Comprehensive Disaster Management Program, Wetland Protection Act, Environmental Laws, Forest Act, Land Port Authority Act, Economic Zone Act, and The Building Construction Act of 1952, among others.

5.9.1 Structure Plan Preparation

Studies for Structure Plan:

a. Hydrological Study: The following components will be studied under this section-

- Hydrodynamic Characteristics: The study of the motion and forces acting on a body of water (river)

- Morphological Characteristics: Examination of the size, shape, and quality of riverbed and water-related components.
- Morphological Development: Analysis of the geospatial, geographic, and topographic features.
- Dominant Hydrodynamic and Morphological Processes: An in-depth analysis of the water cycle and its processes in the river and waterbody.
- Conceptual Model of Dominant Hydro morphological Process: A conceptual model used to examine the prevailing hydro morphological processes in the river and wetland hydrology.

b. Disaster Management: A research study on disaster management with a focus on regional disasters like earthquakes, flash floods, and river erosion.

c. Water Resource Management: A study on local water resource management will be carried out to determine if the system is based on groundwater or surface water using the data available from the Water Development Board.

d. Land Study: A study examining changes in land classification, conversion rate and pattern, and land use type and projecting future land conversion (from rural to urban) will be conducted. **e. Livelihood study:** A study on the correlation between livelihood patterns and income levels, changes in livelihood and the evolving trends, will be conducted using data from the Bangladesh Bureau of Statistics (BBS).

f. Settlement Pattern: The current settlement pattern and the predicted future trend of settlements will be examined in order to determine the necessary control measures that need to be implemented in the structure plan.

g. Population Study: The pattern of population growth and future population will be predicted using the cohort age group method, utilizing data from the Bangladesh Bureau of Statistics (BBS).

h. Housing, Water supply and Sanitation: An analysis of the current housing types, materials for future housing, water supply systems and quality of service, as well as the sanitation conditions and related issues will be conducted.

i. Communication, Energy, Education and Health: An analysis of communication methods and types, energy sources and usage, education services and quality, health facilities and accessibility will be conducted.

j. Agriculture and Fisheries: The local conditions regarding the production of agricultural products and fisheries, including their various categories, will be analyzed.

k. Transport System: The current transportation system in use in, including road, water, and rail transportation, will be analyzed along with the existing transportation fare using relevant data.

l. Ecology and Environment: The areas that are ecologically and environmentally delicate and have a high impact potential will be recognized for the purpose of incorporating appropriate measures in the plan.

Preparation of Principal Component of Structure Plan

a. Inventory of existing physical, demographic, economic, social and infrastructure features:

A comprehensive inventory will be established using the results of a baseline survey of the study area. This inventory will encompass physical features (such as hydrology, land, settlement patterns, water resource management, and disaster management), demographic information (such as population), economic factors (including livelihoods, agriculture, and fisheries), and social and infrastructural aspects (such as transportation, communication, energy, health, and education). The structure plan will take into account the insights gleaned from this inventory and propose practical and feasible solutions to address any issues identified.

b. Analysis of the major existing problems:

A comprehensive list of issues faced by the residents of the Pourashovas will be compiled through a survey questionnaire and focus group discussions. This analysis of problems will then be taken into consideration while developing the strategy for the structure plan preparation.

c. Estimation of trends and changes likely in the future:

The prediction of trends will be made for land conversion, population, disaster, economic situation, and employment. The prediction will be made using the most suitable equation and data gathered from the aforementioned studies. The structure plan will then be formulated incorporating the estimated results for these aspects.

d. Identification of major constraints and opportunities:

A comprehensive analysis of the constraints and opportunities for growth and development across various sectors like agriculture, local economy, business, administration, and infrastructure will be conducted through a survey of key informants by experts.

e. Consideration of major development options and policies:

The prioritization of the local economy as a development option will be emphasized. Strategies in the structure plan will be designed to promote and support local businesses and small enterprises.

f. Indication of most suitable areas for development:

The most appropriate area for development will be determined through focused group discussions and key informant surveys with the local residents and relevant professionals. The structure plan will then be crafted with a focus on this identified area.

g. Prioritized sector for development strategy:

The following will be the prioritized sector where development strategy will be applicable-

(a) Local Economy: Agriculture, weaving and embroidery etc.

(b) Small Enterprise: Local cottage industry of weaving and embroidery.

(c) Transport System: Rail, Road, Water.

(d) Disaster Management (Earthquake)

h. Land zoning:

The following categories of land zoning will be considered in the structure plan after conducting a survey of land use and physical features:

- Flood flow zone
- Water supply protection zone
- Mixed use planned zone
- Mixed use spontaneous zone
- Rural settlements
- Low-hazard industrial zone
- Flood protection reserve
- Military/public safety zone
- Road/rail/utility reserve
- Restricted special height restriction zone (e.g., Civil Aviation)
- Exclusive tourist and recreation zone
- Trade and commercial zone
- Forest resources zone.

Map preparation for structure plan:

A map for the structure plan will be created using ArcGIS software, with a scale of 1in=330ft as specified in the terms of reference (TOR), using information from mouza maps.

Final structure Plan Preparation:

The final structure plan will be developed by incorporating the results of all necessary studies and incorporating them into the preparation of all essential components.

5.9.2 Methodology of Master Plan/Urban Area Plan Preparation

The focus of this plan will be on the potential of the urban areas and will be developed based on the framework of the Structure Plan. The purpose of the Urban Area Plan is to conduct a comprehensive analysis of the towns, from which plans and programs can be formulated. It provides a detailed implementation of the strategies and policies outlined in the structure plan and encompasses a wide range of content preparation, surveys, and facility provision studies. The components of the Master Plan Preparation process include:

i. Survey Completion

a. Physical survey on roads and traffic survey:

A physical survey will be conducted on major roads of Pourashava to assess the current road and traffic conditions, as well as to predict the future trend of traffic volume over a 20-year planning period. The survey will gather data on various road characteristics, including the type of existing roads, road width, and condition of the pavement. A traffic flow survey will be carried out to determine the volume of traffic on major roads in the area. Trip generation will then be estimated based on the collected data. The roads with heavy vehicle traffic, types and numbers of vehicles, and critical traffic intersections will be identified. Based on the survey data, a statistical analysis of traffic trends will be performed using the most suitable prediction equation. The future traffic volume will be forecasted in this manner. Maps and charts showing traffic flow, origin and destination in the major roads, and the potential for future expansion will also be created.

ii. Facility Provision related study

Table 8: List of Facilities to be Provided

Recreational open space	The current state of parks and playgrounds within the municipality will be analyzed through a reconnaissance survey. The location, size, and available facilities of these recreational areas will be recorded, and future projections on their potential changes in the study area will be explored.

Water supply data:	Data will be collected on the water supply system by surveying the sources of water in households and determining their capacity and the likelihood of future expansion. This will be done using catchment area analysis based on the central place theory.
Power supply	The current state of power supply will be determined through a survey and the coverage of the supply will be estimated. Additionally, the capacity and potential for future expansion of the catchment area will be evaluated using the central place theory analysis.
Growth of town	The future growth and expansion of the town will be estimated through population projection, using the cohort age group method, over a specified time period.
Health facilities	The location of healthcare facilities and their hinterland will be identified and the potential for future expansion of services will be analyzed through growth pole analysis, taking into consideration the projected population for the planning period.
Educational Facilities	The location and number of educational facilities in proportion to the population will be determined and the future expansion of these services will be analyzed through growth pole analysis.
Shopping	The number of retail and wholesale shops and commercial establishments will be recorded, and the rate of growth or decline in shopping over the last 20 years will also be estimated.
Municipal Budget	The municipal budget for the last five years will be obtained and presented with explanatory notes to assess the municipality's ability for development activities. A prediction will also be made regarding future allocation of municipal budget.
Disposal Services	The method of collecting and disposing of garbage will be observed and analyzed along with the public's level of satisfaction. The current condition of graveyards and cremation grounds will also be surveyed and reported. The methods of sewage disposal will also be studied and reported, including the potential location of a treatment plant, and comments will be made on their effectiveness.

Hazard mapping	A hazard map will be created to identify potential natural disasters such as earthquakes, floods, and water logging in the study area. This will be done in accordance with guidelines on hazard and risk management, with a focus on identifying areas prone to drainage congestion.

iii. Preparation of contents

a. Existing physical features and occupancy types:

5.9.3 Methodology of Land Use Plan Preparation

A 20-year land use plan will be created to regulate land use conversion according to the structure plan guidelines. This will be achieved through the following steps in the plan preparation process:

i. Data Requirement: The necessary information about current and past land use will be gathered from the district land office, 19

ii. Land use survey: The land use survey will be carried out to determine the current land use pattern in the study area. The data will be collected using cadastral survey mouza maps of 1:1980 scale and recorded using Total Station and DGPS methods. The projections for the next 20 years will be estimated using the Cellular automata (CA) method.

iii. Land-use Plan Making Process: By combining data on past and present land use from both secondary and primary sources, the trend in land use changes will be determined. This information will be used to create a plan for the land use. The steps involved in creating the plan include:

a. Determining the ideal locations for various land uses

b. Creating an order of preferred land use categories.

c. Creating maps to show the suitability of land for specific uses

d. Calculating the necessary space requirements for each land use

e. Evaluating the availability of suitable land

f. Designing a pattern for the land use that best fits the needs and requirements.

iv. Planning Considerations: The land use plan preparation will follow several key planning considerations:

- Promoting mixed-use development with compatible land uses, ensuring community facilities are within walking distance
- Maximizing economic use of housing land through the block housing concept,
- Focusing on land use development at major public transit nodes
- Utilizing underutilized lands, promoting cohesion in planning
- Developing growth centers and improving accessibility through improved transportation network, upgrading infrastructural facilities
- Preserving high potential agricultural and forest lands
- Assessing the risk of industrial uses
- Protecting archaeological and historic resources, preserving natural resources, open spaces and environmentally sensitive areas
- Incorporating disaster risk reduction into the land use planning process.

5.9.4 Traffic Management Plan Preparation

The transportation plan will encompass the planning and design of roadways, waterways, and railway systems within the study area.

Table 9: Detail Information Regarding Physical Feature Required for Traffic Management Plan Preparation

Road	**Inland Water**	**Railway**
Hierarchy of road network	Location and number of existing ghats and terminals	Location and number of existing station
Physical condition of road (ROW, cross sectional elements such as footpath, curb, carriageway, median, shoulder, camber etc), type of pavement	Route of water transportation modes such as boat, ferry, launch etc.	Type of rail line (meter gauge or broad gauge)
Detail geometric features of road intersections (turning roadway, sight distance, channelization, infrastructures etc)	Physical condition of waterway(navigability) Inter-modal transfer facilities	Type wise length of railway line

Bus routes and stations	Number, types, condition and Capacity of all types of river transport operating in the study area	Number, types, ccondition and capacity of all types of railway transport operating in the study area
Truck routes and stations	Types and frequency of services	Types and frequency of services
Major stations of auto-rickshaw, taxi, human hauler, rickshaw and van	Level of fare for Carrying passenger and goods	Level of fare for carrying passenger and goods
Traffic control management and signalling system		
Number of motorized and non-motorized vehicles		
Different form of public transportation services, their service conditions		
Level of fare for all modes		

Table 10: List and Details of Surveys to be conducted for the preparation of plan

Traffic Volume Surveys	**OD Survey**	**Speed and Delay survey**
• 7AM-9am and 4pm-6pm • Daily for one month • Manual and video photography • Traffic volume survey has been conducted to find out the scenario of average daily traffic, peak hour traffic and off-peak hour traffic	• Traffic Analysis Zone (TAZ) wise survey • Home Interview Survey • Travel demand forecasting: for next 10 years • Origin-Destination survey has been carried out to know the pattern of traffic generation, traffic	• Selection of points on major local roads • Speed and Delay Survey has been conducted to evaluate the quality of the traffic movement along a route and identifies the location, cause and extent of the delays in the same route.

	distribution, modal split etc	

Analysis of travel demand and preparation of transportation improvement plan will be conducted from the information collected from the data and the surveys,

Traffic Calming Measures

The purpose of traffic calming measure is to reduce the speed and volume of traffic to an acceptable level. Traffic calming uses physical design and other measures to improve safety for motorists, pedestrians and cyclists. speed humps, chicanes, curb extensions, modal filters, are some examples of traffic calming measures.

Planning Considerations:

- The plan will promote a mixed-use development concept for a balanced allocation of residential, business, and open space.
- The aim is to improve accessibility for urban residents within the study area, ensuring that different groups can reach their destinations efficiently.
- A road hierarchy-based transport network will be established for effective and efficient connectivity.
- People's mobility will be improved through the progressive provision of infrastructure.
- A comprehensive transport development strategy will be established.

5.9.5 Drainage and Environmental Plan Preparation

Table 11: Detail Information Regarding Physical Feature Required for Traffic Management Plan Preparation

Natural Resources	**Environmental hazards**	**Environmental Infrastructures**
Topographic Information	Past data of different disasters	Information about existing drainage system
Geological Information	Identification of exposure to hazard	Existing condition of water supply system
Hydrological Information	Information about existing mitigation and coping measure	Existing condition of sewage system

Identification of areas of special ecological value and aesthetic functions	Identification of environmental protection laws and regulations	Existing condition of solid waste management system
Information about air quality		

Table 12: List and Details of Surveys to be conducted for the preparation of plan

Topographic Survey	**FGD**
• Direct leveling system • Measurements of spot levels will occur every 5 meters, with closer intervals in areas of fluctuation.	• Assessment of the environmental and economic loss by previous disasters events. • Assessment of the existing coping and mitigation measures • Key-informants interview • Identification and adjusment the factors which should be considered for environmental management plan.

Planning considerations

- Preservation of environmentally sensitive areas (ie. environmentally critical area, protected area etc.)
- Preservation and restriction of construction on existing wetlands, flood plain area, marshland etc. according to Wetland Conservation Act, 1995.
- Location of residential and other sensitive developments
- Provision of green buffer zone
- Energy efficient transport and cleaner energy
- Effluent Treatment Plan (ETP) for hazardous industrial discharge
- Effective management of solid waste
- Special attention to preserve biodiversity and disaster management plan.

5.9.6 Ward Action Plan Preparation

Data Requirement: Data on existing Situation of the pourashava with respect to land use, community facilities, public services, utilities etc. need to be used.

Planning Considerations: The problems and opportunities of the area, along with the projected services required needs to be documented.

Scheme Development: Based on the Planning considerations, schemes need to be developed for each area according to their needs. The priority list of the schemes will be developed and implementation strategy should also be developed.

6.1 Work Schedule

Detail work schedule of the project has been developed with the help of Microsoft Office Project-2007 software. Lifetime of the project has been considered 430 working days. The whole project has been subdivided in a number of tasks and subtasks (Figure 2). Reports to be submitted in different stages of the project have been portrayed as milestone in the work schedule. The starting time of the project is 1st January, 2022 and the finishing time is 5th October, 2023.

6.2 Manning Schedule

Work duration of the respective professionals during the project's life time has been shown in the staffing schedule (Figure 3). The number of working days they will be involved is indicated in the third column. From those working days their monthly involvement will be obtained.

ID	Task Name	Duration	Start	Finish
1	Team Leader	240 days	Sat 1/1/22	Thu 12/22/22
2	Deputy Team Leader	430 days	Sat 1/1/22	Tue 10/3/23
3	Urban Planner 1	430 days	Sun 1/2/22	Wed 10/4/23
4	Urban Planner 2	430 days	Sun 1/2/22	Wed 10/4/23
5	Demographer	138 days	Tue 3/1/22	Tue 9/27/22
6	Urban Development Economist	138 days	Tue 3/1/22	Tue 9/27/22
7	Municipal Engineer	390 days	Tue 3/1/22	Thu 10/5/23
8	Hydrologist	138 days	Tue 3/1/22	Tue 9/27/22
9	Transport Planning Expert	390 days	Sun 1/2/22	Sun 8/6/23
10	Environmental Analyst	138 days	Tue 3/1/22	Tue 9/27/22
11	GIS Expert	138 days	Tue 3/1/22	Tue 9/27/22
12	Surveyor	138 days	Tue 3/1/22	Tue 9/27/22
13	Office Manager	430 days	Sat 1/1/22	Tue 10/3/23
14				
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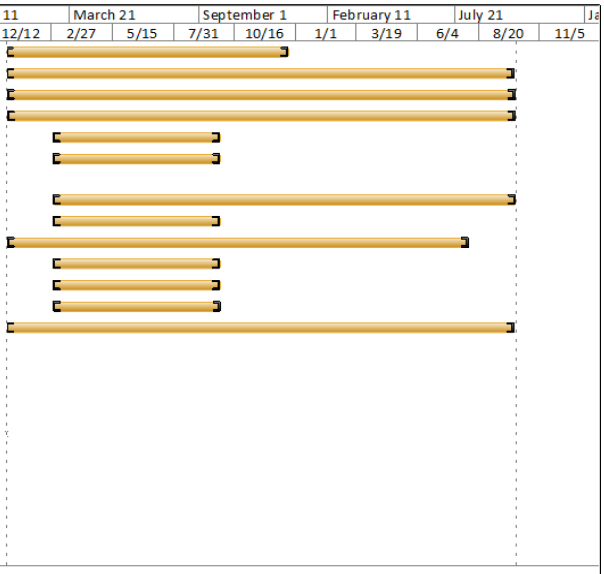
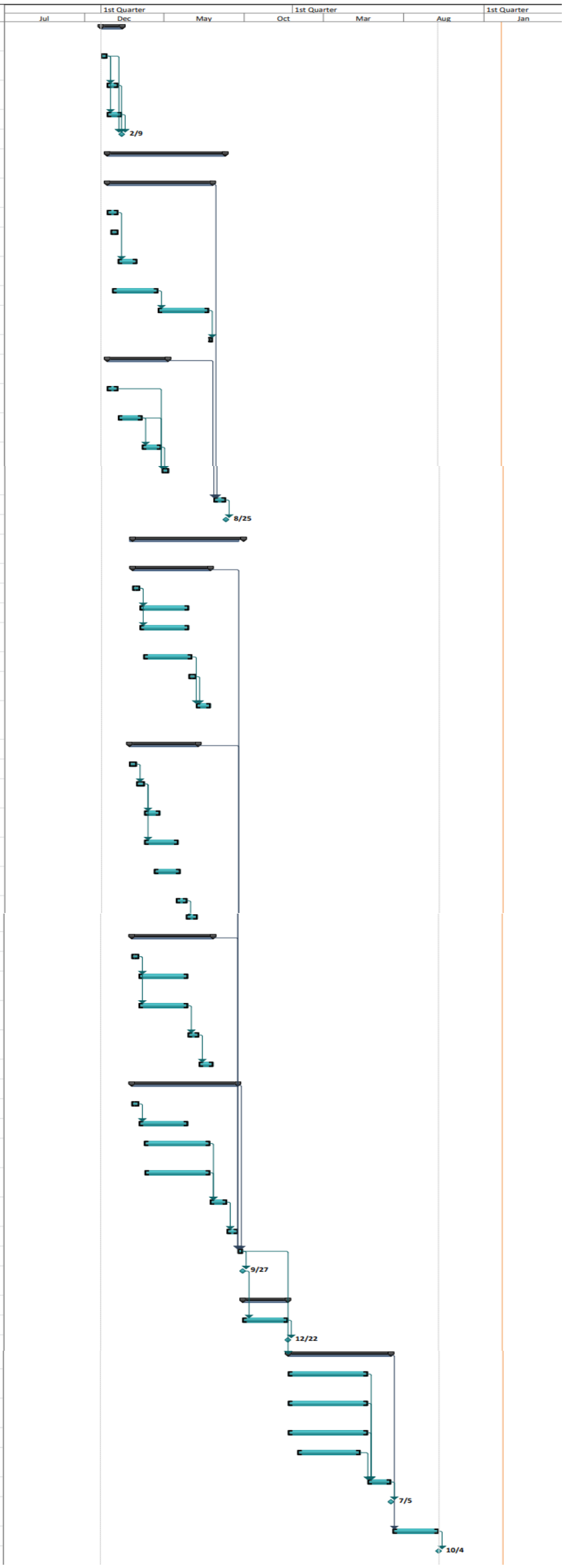


Figure 3: Manning Schedule

Figure 2: Working Schedule

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		**Inception Report**	**31 days**	**Sat 1/1/22**	**Thu 2/10/22**	
2		Mobilization	10 days	Sat 1/1/22	Wed 1/12/22	
3		Reconnaissance Survey	15 days	Wed 1/12/22	Wed 2/2/22	2
4		Project desgin and report preparation	20 days	Thu 1/13/22	Wed 2/9/22	2
5		Submission of inception report	0 days	Wed 2/9/22	Wed 2/9/22	4,2,3
6		**Study area report**	**147.13 days**	**Thu 1/13/22**	**Thu 8/25/22**	
7		**Preparation of base maps**	**131.13 days**	**Thu 1/13/22**	**Mon 8/1/22**	
8		Collection of RS ans CS mouza maps	15 days	Thu 1/13/22	Wed 2/2/22	
9		Scanning of mouza maps	10 days	Thu 1/20/22	Wed 2/2/22	
10		Selection of ground control point and GCP survey	25 days	Wed 2/2/22	Thu 3/10/22	8
11		Digitization of mouza maps	60 days	Sun 1/23/22	Tue 4/19/22	
12		Checking and editing ma	60 days	Wed 4/20/22	Mon 7/25/22	11
13		Joining and printing of mouza maps	5 days	Tue 7/26/22	Mon 8/1/22	12
14		**Delineation of Study Area**	**75 days**	**Thu 1/13/22**	**Sun 5/8/22**	
15		Secondary Data Collection (reports, relevant statistical data)	15 days	Thu 1/13/22	Wed 2/2/22	
16		Secondary Data Analysis	30 days	Thu 2/3/22	Sun 3/20/22	
17		Population Projection	25 days	Sun 3/20/22	Mon 4/25/22	16
18		Demarcation of Paurashava Boundary/Area/Location	5 days	Tue 4/26/22	Sun 5/8/22	15,16,17
19		Preparation of base maps and study area report	15 days	Tue 8/2/22	Wed 8/24/22	7,14
20		Submission of study area report with maps	0 days	Thu 8/25/22	Thu 8/25/22	19
21		**Preparation of Survey Report**	**138.13 days**	**Tue 3/1/22**	**Tue 9/27/22**	
22		**Topography and Physical Feature Survey Report**	**95.13 days**	**Tue 3/1/22**	**Tue 7/26/22**	
23		Mobilization of Survey Team	10 days	Tue 3/1/22	Mon 3/14/22	
24		Topographic Survey and Physical Survey	60 days	Tue 3/15/22	Wed 6/15/22	23
25		Processing of survey dat	60 days	Tue 3/15/22	Wed 6/15/22	23
26		Development GIS Database	60 days	Tue 3/22/22	Tue 6/21/22	
27		Ground Truthing	10 days	Thu 6/16/22	Wed 6/29/22	
28		Preparation of topography and physical feature survey report and printing of maps	15.13 days	Thu 6/30/22	Tue 7/26/22	27,26
29		**Socio Economic Survey Report**	**86 days**	**Wed 2/23/22**	**Sun 7/3/22**	
30		Mobilization of manpower and	10 days	Wed 2/23/22	Tue 3/8/22	
31		Preparation of questionnaire and checklist	10 days	Tue 3/8/22	Wed 3/23/22	30
32		FGD	20.13 days	Wed 3/23/22	Thu 4/21/22	31
33		Household Survey	40 days	Wed 3/23/22	Thu 5/26/22	31
34		Database preparation	30 days	Mon 4/11/22	Mon 5/30/22	
35		Data compilation and analysis	15 days	Mon 5/23/22	Sun 6/12/22	
36		Preparation of socio economic survey report	15 days	Sun 6/12/22	Sun 7/3/22	35
37		**Preparation of Land Use Survey Report**	**100 days**	**Tue 3/1/22**	**Tue 8/2/22**	
38		Mobilization of manpower and	10 days	Tue 3/1/22	Mon 3/14/22	
39		Land Use Survey	60 days	Mon 3/14/22	Wed 6/15/22	38
40		Data base preparation	60 days	Mon 3/14/22	Wed 6/15/22	38
41		Data Compilation	15 days	Thu 6/16/22	Wed 7/6/22	40
42		Preparation of land use survey report	15 days	Thu 7/7/22	Tue 8/2/22	41
43		**Preparation of traffic survey report**	**131 days**	**Tue 3/1/22**	**Sun 9/18/22**	
44		Mobilization of manpower and	10 days	Tue 3/1/22	Mon 3/14/22	
45		Determination of survey location	60 days	Tue 3/15/22	Wed 6/15/22	44
46		Traffic survey	80 days	Fri 3/25/22	Wed 7/27/22	
47		Data compilation	80 days	Sat 3/26/22	Wed 7/27/22	
48		Data Analysis	20 days	Thu 7/28/22	Sun 8/28/22	46,47
49		Preparation of traffic survey report	15 days	Mon 8/29/22	Sun 9/18/22	48
50		Compilation of all survey reports	7 days	Sun 9/18/22	Tue 9/27/22	22,29,37,43
51		Submission of survey reports	0 days	Tue 9/27/22	Tue 9/27/22	50
52		**Preparation of Interium report**	**60 days**	**Wed 9/28/22**	**Thu 12/22/22**	
53		Preparation of Draft Structure Plan	60 days	Tue 9/27/22	Thu 12/22/22	51
54		Submission of interium report	0 days	Thu 12/22/22	Thu 12/22/22	53
55		**Preparation of Draft master plan and ward action plan**	**130.13 days**	**Fri 12/23/22**	**Wed 7/5/23**	**50**
56		land use plan	100 days	Fri 12/23/22	Mon 5/22/23	
57		traffic management plan	100 days	Fri 12/23/22	Mon 5/22/23	
58		drainage and environmental plan	100 days	Fri 12/23/22	Mon 5/22/23	
59		ward action plan	78 days	Tue 1/10/23	Mon 5/8/23	
60		Compilation of all the plans and reports	30 days	Tue 5/23/23	Wed 7/5/23	56,57,58,59
61		Submission of draft report	0 days	Wed 7/5/23	Wed 7/5/23	60
62		Prepartion of Final Structure Plan and Master Plan	60 days	Sun 7/9/23	Tue 10/3/23	55
63		Sumission of final structure plan and master plan	0 days	Wed 10/4/23	Wed 10/4/23	62



Project: Project1
Date: Sat 2/3/24

Task
Split
Milestone
Summary
Project Summary
External Tasks
External Milestone
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
Deadline
Progress

6.3 Responsibility Linkage: Responsibility linkages of the project professionals are described in Table 13. Primary and Secondary responsibility according to activity is expressed in a tabular format.

Table 13: Professional Personnel Responsibility Linkage

Key Activity / **Professional Personnel**	Team Leader	Deputy Team Leader	Urban Planner Senior	Urban Planner Junior	Demographer	Urban Development	Environmental Analyst	Municipal Engineer	Hydrologist	GIS Specialist	Transport Planning Expert
Mobilization, Reconnaissance Survey, Project Design and Preparation of Inception Report	P	P	P	P				P			
Preparation of Base Map and Demarcation of Study Area and Preparation of Study Area Report	S	S	P	P		S	S	P			
Topography and Physical Feature Survey	P	P	P	P	P	P	P	P	P	P	
Land Use Survey	S	S	S	P	S		P	P	P	P	
Socio-economic Survey	S	S	P	P	P	P	S	S		P	
Traffic Survey	S	S	S	P		P	S	P			P
Compilation of all Survey Reports	S	S	P	P	S	S	S	P			P
Draft Structure Plan and Interim Report Preparation	S	S	P	P	S	S	S	P	S	S	P
Draft Master Plan/Urban Area Plan and Ward Action Plan Preparation	P	P	P	P					S	S	S
Final Master Plan Preparation	S	P	P	P				P	P		P

*P= Primary Responsibility, S= Secondary Responsibility

Table 14: List of Reports to be submitted

Type of Report	**Language**	**Number of copies for each pourashava**	**Submission Period**	**Submission Date**
Preparation of Inception Report	English	10	End of 2nd month	February 2022
Preparation of Survey Report demarcation of study area Volume 1: Topographic and Physical Features Survey Volume 2: Socio-Economic Survey Volume 3: Land Use Survey Volume 4: Traffic Survey Report	English	10	End of 9th Month	September 2022
Interim Report	English	5	End of 12th Month	December 2022
Draft Master Plan with Report Land Use Plan Traffic Management Plan Drainage and Environmental Plan Ward Action Plans	English	5	End of 18th Month	July 2022
Final Master Plan with Report - Land Use Plan - Traffic Management Plan - Drainage and Environmental Plan - Ward Action Plans	English	25	End of 22th Month	October 2022

PART B- FINANCIAL PROPOSAL

Financial Proposal

1. Project's Reimbursable Cost

Sl. No.	Description	Unit	Unit Cost in BDT	Quantity	Total in BDT
A	**Office Management Expense**				
1	Rental Cost of Local Office	Month	140,000.00	22	3,080,000.00
2	Office Operation Logistics	Lump Sum	500,000.00	1	500,000.00
3	Electronic Equipment's	Lump Sum	500,000.00	1	500,000.00
4	Transportation Cost	Month	150,000.00	22	3,300,000.00
B	**Data Collection and Compilation**				
5	Cost of Procurement of Mauza Maps	Number	300.00	8	2,400.00
6	Secondary Data Collection Cost	Lump Sum	1,500,000.00	1	50,000.00
7	Cost of Construction and Installation of Benchmark/Ground Control Point	Number	3,000.00	800	2,400,000.00
8	Cost of GIS Database Preparation on the Basis of Subcontract - Scanning, Digitizing of Maps	Number	500.00	40	20,000.00
C	**Cost of Survey**				
9	i. Topography and Physical Feature Survey	Km	209,950.00	43.55	9,143,322.50
10	ii. Land Use Survey	Km	3,000.00	43.55	130,650.00
11	iii. Socio Economic Survey	Per HH	350.00	3484	1,219,400.00
12	iv. Transportation Survey	Package	300,000.00	1	300,000.00
D	**Cost of Printing Maps**				
13	i. Base/Mouza Map	Number	500.00	8	4,000.00
14	ii. Survey Maps				
	a) Topography	Number	500.00	10	5,000.00
	b) Physical Feature Map	Number	500.00	10	5,000.00
	c) Land Use Map	Number	500.00	10	5,000.00
15	iii. Utility Service (Thematic Map)				
	Road Network	Number	500.00	10	5,000.00
	River/Khal/Drainage	Number	500.00	10	5,000.00
	Electricity/Water Supply/GAS	Number	500.00	10	5,000.00
16	iv. Plans (Thematic) on Base Map	Number	500.00	10	5,000.00
E	**Cost of Reports for the Service (Including Printing, Binding and Photocopy Cost)**				
17	i. Inception Report	Number	800.00	10	8,000.00
18	ii. Study Area Report	Number	1,000.00	10	10,000.00
19	iii. Survey Report				
	a. Topography and Physical Feature Survey	Number	3,000.00	10	30,000.00
	b. Land Use Survey	Number	3,000.00	10	30,000.00
	c. Socio Economic Survey	Number	3,000.00	10	30,000.00
	d. Transportation Survey	Number	3,000.00	10	30,000.00
20	iv. Interium Report	Number	3,500.00	10	35,000.00
21	v. Draft Reports				
	a) Land Use Plan	Number	4,000.00	15	60,000.00
	b) Transportation and Traffic Management Plan	Number	4,000.00	15	60,000.00
	c) Drainage and Environmental Plan	Number	4,000.00	15	60,000.00
	d) Ward Action Plan	Number	4,000.00	15	60,000.00
22	vi. Final Report	Number	5,000.00	25	125,000.00
F	**Grand Total of Projects Reimbursable Cost**				**21,222,772.50**

2. Project Staff Remuneration

Serial No.	Position	Number of Personnel	Monthly Salary (BDT)	Working Month	Total (BDT)
A. Professional Staff					
1	Team Leader	1	4,00,000	12	4,800,000
2	Deputy Team Leader	1	3,50,000	22	7,700,000
3	Urban Planner Senior	1	2,70,000	22	5,940,000
4	Urban Planner Junior	1	1,90,000	22	4,180,000
5	Demographer	2	50,000	7	700,000
6	Urban Development Economist	1	50,000	12	600,000
7	Municipal Engineer	2	1,90,000	19	7,220,000
8	Hydrologist	1	50,000	5	250,000
9	Transport Planning Expert	2	1,90,000	20	7,600,000
10	Environmental Analyst	1	50,000	6	300,000
11	GIS Specialist	2	1,00,000	6	1,200,000
12	Legal Expert	1	50,000	2	100,000
Sub-Total A					**40,590,000**
B. Supporting Staff					
13	Office Manager	3	30,000	22	1,980,000
14	Surveyor	20	50,000	6	6,000,000
15	Office Peon	5	15,000	22	1,650,000
16	Computer Operator	5	30,000	22	3,300,000
Sub-Total B					**9,630,000**
Grand Total of Project Staff Remuneration					**50,220,000**

3. Summary Cost

Component of Cost	Cost in BDT
A. Reimbursable Expenses	21,222,772.50
B. Staff Remuneration	50,220,000
Sub-Total (A+B)	71,442,773
C. Miscellaneous Cost [(A+B)*5%]	3,572,138.63
Total Cost (A+B+C)	75,014,911.13
D. Local Taxes (VAT 15%+IT10%)	
Value Added Tax (VAT) = (A+B+C).15%	11,252,236.67
Advance Income Tax (AIT) = B.10%	5,022,000.00
Grand Total (Total Cost+D)	**91,289,147.79**

4. Cost Schedule

		Year-2022												Year-2023										
Serial No.	Items	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	Total
A.	**Reimbursable Cost**																							
	Office Management Expense																							
1	Rental Cost of Local Office	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	3080000
2	Office Operation Logistics																						500000	500000
3	Electronic Equipment's																						500000	500000
7	Transportation Cost	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	3300000
9	**Data Collection and Compilation**																							
	Cost of Procurement of Mauza Maps	2400																						2400
	Secondary Data Collection Cost	50000																						50000
	Cost of Construction and Installation of Benchmark/Ground Control Point		2400000																					2400000
	Cost of GIS Database Preparation on the Basis of Subcontract - Scanning, Digitizing of Maps			20000																				20000
10	**Cost of Survey**																							
	i. Topography and Physical Feature Survey			9143322.5																				9143322.5
	ii. Land Use Survey			130650																				130650
	iii. Socio Economic Survey		1219400																					1219400
	iv. Transportation Survey			300000																				300000
11	**Cost of Printing Maps**																							
	i. Base/Mouza Map								4000															4000
	ii. Survey Maps																							
	a) Topography							5000																5000
	b) Physical Feature Map							5000																5000
	c) Land Use Map								5000															5000
	iii. Utility Service (Thematic Map)																							
	Road Network								5000															5000
	River/Khal/Drainage								5000															5000
	Electricity/Water Supply/GAS								5000															5000
	iv. Plans (Thematic) on Base Map								5000															5000
12	**Cost of Reports**																							
	i. Inception Report		8000																					8000
	ii. Study Area Report								10000															10000
	iii. Survey Report																							
	a. Topography and Physical Feature Survey									30000														30000
	b. Land Use Survey									30000														30000
	c. Socio Economic Survey									30000														30000
	d. Transportation Survey									30000														30000
	iv. Interium Report												35000											35000
	v. Draft Reports																							
	a) Land Use Plan																	60000						60000
	b) Transportation and Traffic Management Plan																	60000						60000
	c) Drainage and Environmental Plan																	60000						60000
	d) Ward Action Plan																	60000						60000
	vi. Final Report																						125000	125000
B.	**Staff Remuneration (Including 10% Income TAX)**																							
13	**Professional Staff**																							
	Team Leader	440000	440000	440000	440000	440000	440000	440000	440000	440000	440000	440000	440000	440000	440000	440000	440000	440000	440000	440000	440000	440000	440000	9680000
	Deputy Team Leader	385000	385000	385000	385000	385000	385000	385000	385000	385000	385000	385000	385000	385000	385000	385000	385000	385000	385000	385000	385000	385000	385000	8470000
	Urban Planner Senior	297000	297000	297000	297000	297000	297000	297000	297000	297000	297000	297000	297000	297000	297000	297000	297000	297000	297000	297000	297000	297000	297000	6534000
	Urban Planner Junior	209000	209000	209000	209000	209000	209000	209000	209000	209000	209000	209000	209000	209000	209000	209000	209000	209000	209000	209000	209000	209000	209000	4598000
	Demographer			105000	105000	105000	105000	105000	105000															630000
	Urban Development Economist			55000	55000	55000	55000	55000	55000															330000
	Municipal Engineer	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	8778000
	Hydrologist			55000	55000	55000	55000	55000	55000															330000
	Transport Planning Expert	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	399000	8778000
	Environmental Analyst			55000	55000	55000	55000	55000	55000															330000
	GIS Specialist			210000	210000	210000	210000	210000	210000															1260000
	Legal Expert	55000																						55000
14	**Supporting Staff**																							
	Office Manager	93000	33000	33000	33000	33000	33000	33000	33000	33000	33000	33000	33000	33000	33000	33000	33000	33000	33000	33000	33000	33000	33000	786000
	Surveyor			1005000	1005000	1005000	1005000	1005000	1005000															6030000
	Office Peon	76500	76500	76500	76500	76500	76500	76500	76500	76500	76500	76500	76500	76500	76500	76500	76500	76500	76500	76500	76500	76500	76500	1683000
	Computer Operator	153000	153000	153000	153000	153000	153000	153000	153000	153000	153000	153000	153000	153000	153000	153000	153000	153000	153000	153000	153000	153000	153000	3366000

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