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NARAYANGANJ CITY CORPORATION
ACTION AREA PLAN

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NARAYANGANJ CITY CORPORATION ACTION AREA PLAN

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EXECUTIVE SUMMARY

With a vision to meet the accretive demand on urban utilities and municipal services, Local Government Engineering Department (LGED) has taken initiative to formulate Action Area Plan for Narayanganj City Corporation (NCC) areas with objectives to provide municipal facilities, city-environment and to develop land use controlling mechanism.

The Inception report has focus on project description, background and objectives of this project, scope of services and concept of Action Area Plan (AAP). This report has also provided project management plan with the list of Professional Staffs, Staffing Schedule, tasks to be performed by professionals and detail tasks specification of the project. Activity schedule presented via Gantt chart articulates completion of the project within 15 months from the date of commencement.

The Review report has comprise the relevant plans, strategies, studies and programmes which are essential for AAP proposals. NCC has been formed from paurashava to corporation on May, 2011 comprising the former paurashava Narayanganj, Siddirganj and Kadam Rasul with an area of 72.43 sq.km (47.24 sq.km according to Gazette and GIS) are also recorded in the report . At this stage, the NCC areas are divided into 27 wards. Physically, NCC areas are separated into two parts by the river Sitalakhya: one part encompasses Narayanganj and Siddirganj areas where lands are contiguous, whereas Kadam Rasul is situated along the eastern side of river. However, both the parts are connected with water transport. Within the jurisdiction of DMDP, NCC areas are covered by the strategies and policies

The action oriented-projects are to be undertaken in NCC areas; accordingly, whole areas of NCC are divided into Six Blocks (considering ward boundary, physical conditions and homorganic characteristics) by the DDC consultant groups to undertake AAP projects based on the planning indicators, secondary sources information and field experiences. The Block comprises number of wards are stated, these are: block 1(wards 5); block-02(wards 3); block-03(wards 5); block-04(wards 5); block-05(wards 3); and block-06(ward 6). In necessity arise, block will divided into sub-blocks and address the sectors (like transportation, drainage management, solid waste management, water supply system, sanitation and municipal facilities). Inclusive technique has to adopt for preparation of plan projects and implementation.

Study Area report describes historical background and importance of the Narayanganj City in national and regional perspective and the existing important feature of the city. It includes area map preparation and identification of blocks based on some specific criteria and identifies some tentative projects which might be taken in account at the time of final project selection. Those projects are being selected from three zones; Narayanganj, Siddirganj and Kadam Rasul areas.

The Survey Report contains project introductory, planning area demarcation, the survey methodology, survey findings, topography of the areas, land use, drainage, traffic and transportation and municipal service/facilities. The survey data/information has been collected through primary and secondary sources. Adapting the method of GIS (Geographic Information System) the physical feature, topographic, land use and drainage surveys were conducted. Traffic and Transportation survey was carried out at the important intersections and municipal service facilities were surveyed through set- questionnaire.

Moreover, the DDC (Development Design Consultants Ltd.) Consulting Team has made several consultations with NCC's Mayor, NCC officials, ward Councilors, Local leaders and city-dwellers regarding the problems and prospects of the project areas. Consultation has also extended to the representatives of the different government officials, NGOs, CBOs, local leaders, researchers, academic personnel those are working in NCC areas.

The project area is divided into three zones, namely Narayanganj, Siddirganj and Kadam Rasul areas. In this regard the key information are stated in Section B. Methodology of survey works have been explained which includes physical feature, topographic, land use, drainage, traffic and transportation and municipal services/facilities survey, data processing of surveys, preparation of database structure, demarcation and storage of data/information. Database structure is followed by spatial data, attribute data, linking of spatial and attribute data, database structure of different shape files. Finally data will have to be used in the report/document depending in its appropriateness.

Physical feature survey has contained road network, rail way, waterway, flow direction of drainage network and solid waste disposal. (i) The survey has revealed that the total road length of NCC areas is about 609 km, of which katcha road is 211 km, semi-pucca road is 82 km and pucca road is 316 km. (ii) Within NCC areas the total number of structure are 126421 which is found from the physical feature survey and the types structure are katcha, pucca, semi-pucca and under construction. Buildings and structures have been categorized into thirteen general use categories. It has been found from survey that the numbers of residential structures are 103811 (82.10%), commercial structures are 11339 (8.9%), industrial structures are only 2982 (2.36%) and mixed use structures contributed about 1.97% in NCC area.

The land use of the NCC area has been divided into fifteen broad categories. The categories are administrative, agriculture, commercial, community facilities, education and research, health facilities, industrial, miscellaneous, mixed use, open space, recreational facilities, residential, restricted, transportation and communication and water body. Block wise land use has been analyzed and categorized. Residential use is dominant in NCC area which is 30.65% of the total area. Being served by Sitalakkhya river and a large number of water bodies like canal, pond, ditches, borrow pits and marsh lands, water bodies occupy considerably 23.40% (11.02 sq. km) of the total land area. NCC has a hoary history of development of industries and commerce. This promotes mixed use developments in the city area. Industrial uses occupies 5.04% areas mostly along Sitalakkhya river. Very limited agricultural practice can be seen in Bandar and Shiddirganj region. It has been observed that government and non-governemnt organizations occupy 4.51% land, commercial use is 1.5% and open space (mostly vacant land) covers 5.05% of the project area.

Topographic survey has been shown land levels/spot levels, contour descriptions, alignment of road, long-section of road, cross-section of road and alignment and cross-section of river, canal and drainage channel. A total 47321 nos. spot values were interpolated after collecting spot heights throughout the city area at an average 10m interval. The highest spot value of 13.954 mMSL has been found in Block 4. The lowest average spot value of -0.561 mMSL has been observed in the Block.

Municipal facility services were conducted/ like business center, medical facilities, park and open spaces, playground, sanitation and utility services (water, gas electricity).

Traffic and Transportation, Drainage and Environmental survey represent in the report. It covers the origin-destination survey, traffic volume survey, registered motorize and non-motorized vehicle.

Drainage and Environmental survey includes the drainage network (both open and covered) of NCC areas and some extended areas (where necessary). In terms of environment sources of hazards, natural disaster, flooding and so on.

A new multidisciplinary collection of data and focuses on demographic which includes population by sex and age composition, family size, religion, and education are which represented in the report. The socio-economic condition of city dwellers, economy and commerce of the project areas are also added. Information related to sanitation, waste management are also included.

The findings of primary survey and collected documents from the secondary source have been analysed in regard to undertake the development projects. In terms of implementation of the projects 'Inclusive Approach' will be prevailed for sustainable urban development of NCC areas.

The Interim report represents policy guidelines corresponding planning approach, strategies and adapting inclusive technique in implementation process for preparing AAP of NCC areas. Planning approaches, plan preparation, strategies and implementation challenges are illustrated in this report. Project identification, preparation process, implementation constraints are revealed in this report. The opinion and suggestions of Honorable Mayor, Ward Councilors, local people and stockholders have been considered and incorporated in the report. DDC Consultants provides design principles and standards particularly land use categories of school playground, park and open spaces areas and other common amenities. A comprehensive development project list has been prepared at this stage along with the proposals of government and semi-government organizations and included in the report.

The Draft Final Report report comprises the Action Area Plan (AAP) projects of Narayanganj City Corporation (NCC). The project detailing consists: descriptions, location of the projects, covered area and design with estimated cost and so on. The projects have been selected based on Consultants view, survey findings and demand of stockholders. Moreover, a lot of discussion and interaction with of Narayanganj City Mayor, Ward Councilors, local people and the representatives of different agencies were taken place. Their suggestions are reflected in this process. The identified AAP projects are: i. Driveway with walkway along the Sitalakhya River; ii. Solid Waste Management System for NCC Area (Jalkundi, Shiddirganj-Jalkundi Road, Narayanganj); iii. Haziganj Fort Redevelopment Project (Haziganj); iv. Neighborhood Complex (at ward level); v. Development (improvement) of Station area with multi-modal transport system (Station area, Bus stand, BIWTA Ghat).

The Final Report has been furnished based on the government policies/strategies, project documents (review of higher level plans, existing surveys and field observation), requirements of NCC and other stakeholders. The AAPs include reports and plans /maps in the different scales covering all aspects. This document contains land use, management plan of drainage and environmental, transportation and traffic issues and also municipal/utility services plan. Finally, the plan proposals/Action Area Plans have been presented in presence of Honorable Mayor, Councilors of NCC and stackers and collect their comments on the AAP projects. Such comments/suggestions have been considered with its appropriateness and incorporate in the plan documents.

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PREPARATION OF ACTION AREA FOR NARAYANGANJ CITY CORPORATION

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List of Abbreviation

AAP	Action Area Plan
BBS	Bangladesh Bureau of Statistics
BNBC	Bangladesh National Building Code
BIWTA	Bangladesh Inland Water Transport Authority
BWDB	Bangladesh Water Development Board
CBO	Community Based Organization
CS	Cadastral Survey
DoE	Department of Environment
DESA	Dhaka Electric Supply Authority
DPDC	Dhaka Power Distribution Company
DTCB	Dhaka Transport Co-ordination Board
DTCA	Dhaka Transport Co-ordination Authority
DMDP	Dhaka Metropolitan Development Plan
DCC	Dhaka City Corporation
DMA	Dhaka Metropolitan Area
DPHE	Department of Public Health Engineering
DWASA	Dhaka Water and Sewerage Authority
GIS	Geographic Information System
GoB	Government of Bangladesh
ICGP	Inclusive City Governance Project
JICA	Japan International Cooperation Agency
Km	Kilometer
LGED	Local Government Engineering Department
LOS	Level of Service
msl	Mean Sea Level
MSW	Municipal Solid Waste
NCC	Narayanganj City Corporation
NGO	Non Government Organization
NMT	Non-motorized Transport
PCU	Passenger Car Unit
PMO	Project Management Office
RAJUK	Rajdhani Unnayan Karttripakkha
RS	Revenue Survey
STP	Strategic Transport Plan
SWM	Solid Waste Management
Sq. Km	Square Kilometer
ToR	Terms of Reference

CHAPTER 01

INTRODUCTION

1.1 Introduction

The Final Report is the sixth deliverables among the six according to ToR of “Preparation of Action Area Plan (AAP) for Narayanganj City Corporation (NCC)” initiated by the Local Government Engineering Department (LGED). This Report has been prepared based on the findings of Draft Final Report, Interim report, survey data/information and problems and prospects of different sectors of NCC area, the indication of approach and strategies of plan. At this stage, block wise Action Area plans was prepared for NCC area. This report has been submitted on the ending of the October, 2016 due to some unavoidable situation; this report also delayed according to chronology of work.

1.2 Project Background

Narayanganj, the 7th declared city corporation of Bangladesh is about 17 Km Southeast of Dhaka. Narayanganj city corporation is extends over 47.22 sq. km with 7,09,364 populations (BBS, 2011). Declaration of a Paurashava into city corporation is not only change of status of the Paurashava but also change the administer area of the city corporation. Newly declared city corporation faces different types of problems to provide facility of the added area. It becomes a big challenge of City corporation authority to provide municipal services and facilities of additional area with limited financial and human resources. The problems faces by newly declared city corporation are given below.

- Lack of sufficient financial support to provide services and development works newly declared urban area.
- Lack of adequate Manpower to give services of the additional population.
- Due to lack of financial and technical resources, City Corporation cannot control and development their jurisdiction for this reason land speculation and haphazard Development takes place.
- Absence of proper and appropriate planning to control the development of new urban area.

Government and Donor agencies address those problem and they allocated huge amount of money for the improvement of City Corporation especially newly declared urban area. AAP identifies the critical area and specific problematic area where immediate action needs to solve the problem. AAP provides specific projects and programs to solve the particular problem with implementation cost of the project.

Narayanganj, Siddirganj and Kadam Rasul Paurashava declared as City Corporation in 2011. After declaration of City Corporation, City Corporation Authority has not taken any kind of physical development plan to ensure planned and systematic development of the city. City Corporation follows Dhaka DAP which is last updated physical plan from RAJUK, to give permission of building construction and other development control. But this plan cannot be give any guideline for investment priority of the NCC authority. On the other hand, Government and Donor Agencies like JICA, World Bank, ADB etc. want appropriate physical plan and priority works of City Corporation to invest their fund in a systematic way. Action Area Plan for Narayanganj City Corporation will help to determine

the problems and critical issues of City Corporation as well as it will give priority projects and works list with proper implementation budget which is essential to make the city livable for the inhabitants and give guideline for the investment of Government and Donors.

1.3 Mission and Vision of NCC

NCC is an Autonomous body under Ministry of LGRD. The vision of NCC and Approach to vision realization are stated below.

Vision of NCC

- To build an environmental friendly, clean, healthy, safe and poverty free planned city by providing necessary services to all the city dwellers.

Mission of NCC

- Environmental friendly Infrastructure Area development
- Solid waste management
- Less disaster, crime, traffic and boat accident
- Infrastructure Area that support industry and basic human needs
- Equity in Public service to all wards

1.4 Objectives of the Report

General objectives of the consultancy services for the preparation of the Action Area Plan of NCC area envisage:

- a) Formulation of Action Area Plan for provision of Municipal facilities to meet basic infrastructure needs.
- b) Facilitate to improve environment of the Cities.
- c) To formulate policies for the best use of land and its control.

Tasks to Fulfill the Objectives

AAP is a totally new concept in Bangladesh. There are some guidelines in the ToR to prepare a comprehensive AAP report for NCC area. According to the ToR, the following tasks should be addressed or focused in this report to achieve the objectives of the AAP.

- Preparation of Integrated Plan from the input of Public/Private Sectors, Local Leaders, Communities, Interest Groups, NGOs and Foreign Investors. Study of Feasibility, Cost-Benefit Ratio, Social, Economic and Environmental Impact Assessment of different kinds of projects.
- Consultation with Public Representative, Local People, Government/Semi-government/ Public Sectors/Corporation/Departments/Institutions, NGOs and Donor Agencies.

- Incorporation of peoples' aspiration and thoughts in the development proposals and making further revision and modification of Plan Proposals and Develop Planning Options and Alternatives.
- Prioritizing and Phasing Public Sector Action Plan/Program. On the basis of importance of the issues needs to be addressed for immediate action under the policies/Decision made by the Government/Sector Agencies.
- List of Sub-projects under project with indication of implementation mechanism of possible agency and possible source of financing.
- Preparation of Mechanism for Development Control, Zoning and Land Management Techniques following the Policies/Guidelines proposed in the Land Use Plan.
- Preparation of legal support documents to be imposed Legal and Judicial Power/Act, Laws, Rules and Regulations for any sorts of deviation, alteration, modification, violation or misuse of Plan or Plan Proposals.
- Submission of Draft Plan Report with maps and figures. Detail description of Development Plans and Planning Proposals with Alternative Development Options and Plan Proposals.

1.5 Strategic objectives to achieve the vision

Infrastructure facilities

- Provide drive-way both side of the Sitalakhya river for relieving traffic congestion
Justification: Traffic congestion occurs frequently on the main road of NCC area. Construction of a drive-way both the side of the Sitalakhya River will mitigate the existing traffic congestion.
- Improve safety of all modes of travel and ensure transit availability of the area.
Justification: Vehicles accident occurs frequently and losses of lives are common affairs in NCC area. Therefore a long-term transportation planning with safe, affordable, easy and convenient transport system is indispensable for this area.
- Broad linkage development of transport and drainage network
Justification: Transport and drainage sector are related to each other. But in NCC area there is lack of proper co-ordination between these two components.
- Improve drainage networks for solving water logging problems in case of sewerage or storm water.
Justification: Drainage networks of NCC area are not maintained properly. Therefore it creates water logging and over spill is prevalent sometimes. Sewerage network are not covered in NCC area fully and there exists only one Sewerage Treatment Plant for whole of NCC area.

Housing facilities

- Provide appropriate proposal for re-setting land use for NCC area.
Justification: There are many places within NCC area which are being developed as a haphazard way without maintaining proper planning rules and regulations. To regulate the development pattern of this area, re-setting land use can be adopted.

- Improvement of existing housing condition which are more earthquake vulnerable by applying readjustment techniques
Justification: Many residential buildings are not safe for living purposes which needs to be improved with applying land readjustment techniques.
- Improve access to a broad range of quality housing that is safe, accessible and affordable for the local inhabitants of NCC.
Justification: Housing affordability and quality of housing is a prior need for the local inhabitants of the area as people living in low quality of houses now-a-days.

Municipal facilities

- Provide appropriate municipal facilities like water supply, waste management, health and education facilities, electricity, gas, etc. for the welfare of the inhabitants.
Justification: There is huge scarcity of proper municipal facilities and people are bound to lead a degraded life. Provision of appropriate municipal facilities will augment the value of life of the local inhabitants.

Social and recreational facilities

- Provide appropriate social facilities like institutions, community centers, active and passive recreation like open space, parks, garden etc. which will be easily accessible to the general people.
Justification: It is known that recreational facilities and open spaces which are accessible to the general public can provide an integral and necessary part of urban living. But people of NCC area are deprived from getting these kinds of facilities. Overall community facilities provided in this area are not enough to meet the demand at a satisfactory level.
- Identification of heritage for preservation or conservation
Justification: Due to the lack of proper maintenance many heritage sites are abandoned now-a-days in NCC area which needs to be identified for proper preservation or conservation.

Solid Waste disposal system

- Provide designated areas and incorporate policies for proper waste collection and disposal system in the NCC area.
Justification: Solid waste collection and disposal system are inadequate to meet the demand of waste management of the NCC area. Substantial amount of solid waste generated from daily activities are not collected and therefore these are disposed of road sides in a haphazard way.

Environmental Health

- Protect and monitor water pollution in case of industrial, residential or commercial uses of water and establishment of industrial waste treatment plant for each industry.
Justification: Due to the industrial uses of river and surface water, water quality of this area is being deteriorated day by day. Toxic elements which are coming from existing garments and textile industries cause for water pollution of these area. People who are visiting near water body may easily find out an intolerable odor coming from this polluted water.

- Conserve and restore biodiversity and habitat of the NCC area.
Justification: Environmental degradation creates losses of biodiversity of the area and eventually some species of birds and insects are not observed. It is need to conserve and protect all the agricultural lands, water bodies, trees of the NCC area.

Water Supply System

- Provide safe drinking water individually or community level.
Justification: A large number of inhabitants of NCC area use tube well water having no access of municipal water supply. So it is essential to provide safe drinking water individually or community level basis.
- Ensure development of rainwater harvesting system for all constructing new buildings to provide safe drinking water and to recharge ground water properly.
Justification: Ground water level decreasing day by day and safe drinking water is not accessible to a great extent in the NCC area. Practicing rainwater harvesting system will mitigate the demand for pure drinking water and will help to recharge ground water.

1.6 Components of the Plan Package

The Plan package is comprised of 2 components. The components of the plan package are:

- Framing of a short term Development Strategy on the basis of national, regional and local perspective indicating the short term policy outline, vision, major objectives and targets encompassing areas beyond the city corporation jurisdiction also;
- Preparation of AAP including Detail Project design on maps of RF 1:990 scale for the areas need development in near future within 3-5 years.

1.7 Action Area of the AAP and Area Selection Approach

1.7.1 Concept of Action Area Plan

Action Plan is a sequence of steps that should be taken, or activities that should be performed well, for a strategy to succeed. An action plan has some specific tasks: what will be done and by whom, has define time frame: when will it be done and has resource allocation: what specific funds are available for specific activities.

An AAP is a development plan document that provides specific planning policy and guidance for an area where significant regeneration or investment needs to be managed. AAPs address the specific challenges of an area and to specify the required land uses in particular locations and identify key strategic interventions. AAPs have a strong focus on delivery and implementation.

AAP should be based on evidence of the economic, social and environmental characteristics and prospects of the area. Authority gather this evidence through several numbers of consultations with local people, stakeholders, officials of govt. and non government officials need to conduct to identify

the strengths, weaknesses, opportunities and threats for the area and their views to possible solution of the problem. Authority need to assessments in relation to housing, social, economic, and environmental sustainability, and the environmental impact of development. Plans must also be consistent with national and regional level plans, policy and laws that's why a critical review of higher level plans need to identify the direction of higher level plans.

AAP sets out area wise general policy and specific area priorities that should be followed some specific topic area like residential, traffic and transportation, sustainable design, natural and build environment etc. AAP also sets out mechanisms through which the Plan will be implemented like source of financial resources of the project, administrative Action Area of the project etc; the priorities and phasing of development in the area; Identifies the alternative options, proposals that have been considered up to this stage.

1.7.2 Project Area Selection Approach

Selection of problematic area is an important issue to solve the problem of the total area. A sequential process was follow to select AAP projects for NCC area. The process of area selection of AAP has given below:

- Several consultations were held with stakeholders, public representatives and local people to identify the problem, prospects and their demand. At the time of consultation, peoples also identify the areas where need to be development with specific solution.
- A physical feature survey was held on the whole NCC area. The consultant team identified the problem area like congested area, unplanned area, narrow road network, lack of drainage (natural and man-made) etc. of NCC from the survey.
- The consultant team identified the opportunity of the city on the basis of field visit, survey data and demand assessment of the city dwellers.
- Population projection and distribution of facilities against the population is also a determinant factor to development project selection.
- Present national level plan like Perspective Plan, Seventh Five Year Plan, Annual Development Program (ADP), 2016-2017 etc was also consider knowing the national government views about NCC.
- After review of above all, the consultant team finalized the AAP area and projects for the planned and sustainable development of NCC area.

1.8 Supporting Reports

The final report has been prepared as the 6th of the 6 reports of the preparation of AAP for NCC area with supporting maps and figures. Five (5) successive reports were already submitted to reach the present stage of the plan preparation. The reports are: (1) Inception Report, (2) Review of Study Area report, (3) Survey Report (4), Interim Report and Draft Final Report (5).

The Inception Report provided a short description of the background, objectives and scope of services of the plan package. It gave a general idea about the NCC area and surrounding places, brief history of NCC and its regional importance, heritage and historic sites, population, urban development pattern.

The Review of Higher Level Plan and Study Area Report with maps describe the policies of higher level plan for the NCC area and the demarcation process of NCC area.

The Survey Report has been prepared related to various surveys and studies like Physical Feature Survey, Land Use Survey, Topographic Survey, Socio-economic Survey, Transportation Study, Economic Activities etc. GIS based survey technology was used in carrying out the survey activities.

The Interim Report is the analytical presentation of the survey report. In this report opportunities and problems and likely impacts in the perspective of future physical development of the city as derived from the various surveys and studies has been analyzed and ground and rationale for the plan preparation has been established. Attempts have been made to establish the standard for different community facilities, some selected land uses and estimation/projection criteria for calculating future need of utility services and road network standards for NCC area.

The Draft Final Report has represent the overall development proposal for NCC area which has been checked by the NCC official and councilors.

The Final Report has been prepared according to the baseline information of last five reports and considering the comments of NCC officials and councilor's to prepare a comprehensive Action Area Plan for NCC Area.

1.9 Format of Action Area Plan (AAP)

The draft report of AAP is presented in three parts. The detail description of the parts of the report area:

- Part A describes the general information about AAP, profile of NCC area, existing development projects of the NCC area, standards of facilities, process of development control and management etc.
- Part B describes the planning proposals of the AAP and specific area development and detail design of the projects.
- Part C included with the supporting data of the Part A and Part B.

1.10 Custodian of the Plan

Clause 16 of Schedule 3 of City Corporation Act 2009 describes the function of City Planning Department of the city corporations. This section authorizes the city corporations to prepare Master Plan for the physical development of the city corporations. This implies that the custodian of the plan is the respective city corporation. As NCC has been created very recently and is yet to build capacity to accomplish such a huge work, LGED has taken the responsibility of preparation of Master Plan Package on behalf of NCC. On preparation, approval and enactment the plan package will be the property of NCC and naturally NCC will be its custodian.

1.11 Duration and Amendment of the Plan

Usually AAP package is prepared for period of 5 years. According to ToR, AAP for NCC area is preparing for the next five year from the plan preparation period. So the valid period of the plan will 2016-2021. AAP needs periodic review to match it with the time and it is recommended that the first review of the plan should be initiated at the end of 2017.

1.12 Scope of the Services

Planning projects are designed to perform extensive field of study and activities. Planning Projects need to provide different kinds of activities to be done. ToR has described all types of activities would be done in the project period.

- Assess the current land use with regard to transportation, bus and truck terminals, waterway, railway stations etc and recommend actions to optimize this land use.
- Study and develop a practical short term demonstration traffic management scheme of implementation, including one way systems, restricted access for large vehicles, improved signal system, traffic islands, roundabout, pedestrian crossings, and deceleration lanes for turning traffic, suitable turning radius, parking policies and separation of pedestrians and rickshaws.
- Consultant will review DMDP (Structure Plan, Urban Area Plan and Detailed Area Plan) and any other higher level plan linked to the study area. Objectives and legal matters of the higher level plans must be up hold.
- To identify the areas reserved for agriculture, flood flow, public/private open spaces, parks, play grounds, play lots and other recreational uses like green belts, retention pond, water bodies, water front, natural reservoir, historical monuments.
- Review storm water drainage system (with treatment plant) which will include discharge calculations for the catchments areas, design of main and secondary drains including their sizes, types and gradients and retention areas with preliminary cost estimates for the proposed drainage system.
- Study of the existing drainage maintenance procedures and budgets, if any including solid waste collection and design and estimate costs for a planned maintenance system to ensure that the drains are kept free from blockages and physical damage.
- Development of proposal of bye-laws for land development, real estate development, Urban Area Development Control and Natural Resources/Green belt and places of historical interest.
- Recommend planning, institutional and legal mechanisms to ensure provision of adequate land for rights of way for storm water drainage, which will also determine demarcation of encroachment areas.
- In line with the higher level plan, propose Action Area Plans with list of priority schemes for the development of roads, drains, traffic management and other social facilities for implementation during the first five years of plan period.
- Allocating the zones where public utilities, institutions and civic services will be established. Moreover zones of urban deferred areas for future development, expanded areas and areas for new development have to be considered.
- Allocating zones for as high, middle, low density (including the disadvantaged group, mixed residential and blocks for residential apartments where it is necessary.

- Detailed Design, drawing and BOQ of specifies project under Action Area Plan.
- Guidelines for control/promote industries at different locations according to their nature such as heavy industrial, light industrial, and service industries including waste disposal/treatment plants.
- Prepare plan to show the phase-wise implementation schedule in an affordable and practical manner considering the technical, environmental, institutional, economic and social feasibility of the proposed works.
- The plan shall assess major investments and activities of the various development agencies/Ministers and indicate the stages of development preferably through 5 year programming approach. Consultants shall be making to liaison with all government and semi-government and other agencies concerned with their development with the study area. Contract should also be made with the headquarters of such agencies and full details of such plans should be referenced in the plan.
- The plan package shall indicate/outline possible frameworks/strategy for management and development control, institutional arrangement ensuring people participation etc. for effective implementation of the plan.
- To ensure planning principles/standards, gross/net densities, guideline for future development and development control.
- To exercise control over architectural features, elevations, frontage of buildings and Action Areas including zoning regulations to regulate locations, preservation of heritage and type of buildings within planning area.
- Facilitate City Corporation about the plan, its preparation strategy, function and their role through ‘miking’, leaflet, cable line, FGD etc.

1.13 Limitations of the Report

Limitation of the report lies mostly in the non-availability of data from different secondary sources. Socio-economic data like income and expenditure, inflated the amount of loss due to water logging etc, drainage data and environment related data like noise pollution, air pollution, soil pollution and so on are not available due to lack of appropriate previous study and research. The consultants had to cross verify these statements to find out the actual fact which involved time as well as monetary loss. A vast rural area has been included in the city jurisdiction. Making provision for sustainable standard utility services for these areas poses really difficult for very high cost and very low prospect of cost recovery.

CHAPTER 02

PROFILE OF NARAYANGANJ CITY CORPORATION

2.1 Historical Background and Heritage Site

2.1.1 Historical Background

Narayanganj, as an urban area is one of the oldest urban settlements in the country. It has a glorious past, and used to be known as the Dundee of the East for its numerous jute mills. Bicon Lal Pandey, a Hindu religious leader who was recognized as Benur Thakur or Lakshmi Narayan Thakur leased the area from the British East India company in 1766 following the Battle of Plassey. He donated the land and markets on the banks of the river as Devottor or Given to God property which was bequeathed for maintaining expenses for the worship of the god Narayan. By this way, Narayanganj got its name.

British Government appointed HT Wilson as the first Chairman of the Municipality. Narayanganj Municipality was formed on 08 September, 1876 with 27,876 population and 11.65 sq. km area. According to the proclamation of Dhaka Judge court the municipality area had been expanded to 23.56 sq.km in 1952 with Narayanganj and Kadam Rasul area. Mr. Ali Ahmed Chunka was the first elected Chairman of the Municipality after the liberation. He has been elected in 1974. Narayanganj was the Mahakuma of Dhaka District. In 15 February, 1984, Narayanganj has been separated from Dhaka district and upgraded into an independent district. In 1992, Kadam Rasul area with 13.37 sq. km area was separated from Narayanganj Paurashava and declared a new Paurashava named Kadam Rasul Paurashava. In 2003, a major portion of Siddirganj upazila was declared as urban area named Siddirganj Paurashava(23.66 sq.km).

Narayanganj was became a Model Municipality of Bengal due to the surrounding environment of the municipality was very clean and the management was excellent. Narayanganj Victoria Hospital, the first hospital of Narayanganj was established in 1885 by the Municipality with financial contributions from Harakanta Banerjee. For the first time, a post office was set up in 1866 and Dhaka-Narayanganj telegram facility was established in 1877 in Narayanganj area. All the street lights of old Narayanganj municipality were lighted by kerosene oil. Narayanganj municipality was succeeded in providing electricity facility with assistance of Chittagong electricity Supply Company. After 1947, a huge acceleration of industrialization took place which increased the necessity of electricity to great extent. 40,000 MW Power Plant was established to meet the excessive demand of power.

Narayanganj City Corporation including with former Narayanganj Paurashava, Kadam Rasul Paurashava and Siddirganj Paurashava has been declared as city Corporation on 21 March, 2011. A Gazette has been published regarding this on that day (SRO No. 115/211). Prior to this, a Public Notice was released by the Government to hear from related mass people and to take their opinion regarding the formation of NCC. After receiving their feedback and opinion, the Deputy Commissionaire of Narayanganj District, submitted a Detailed Report to the Government. After analyzing the report, Government took decision to form Narayanganj City Corporation (NCC).

Historically, Narayanganj was a salt trading center which is continuing till today in a much larger scale. Flour milling and small-scale engineering workshops to meet the local needs are also found in

Narayanganj. As a new development, cement manufacturing has claimed a large chunk of land. This trend is expected to continue. A Grain Silo and Narayanganj Dockyard are other important establishments of Narayanganj.

2.1.2 Heritage Sites

Narayanganj has also historical glory for a long time which can be easily understood by the presence of rich heritage sites. As a place of historical importance, Narayanganj will remain in the front line for its relics of settlements of 12 Bhuiyas, Haziganj Fort and Sonakanda Fort, Shahi Masjid, Kadam Rasul Dargah etc.

a) Haziganj Fort is situated on the western bank of Sitalakhya River which is also called as Khizpur Fort. It may have been built soon after Islam Khan established the Mughal capital at Dhaka. The only gateway of the fort towards the river side suggests that the means of communication was by the river. There having no other structure inside the fort. The fort area is now being used as the Fire Brigade headquarters of Narayanganj.



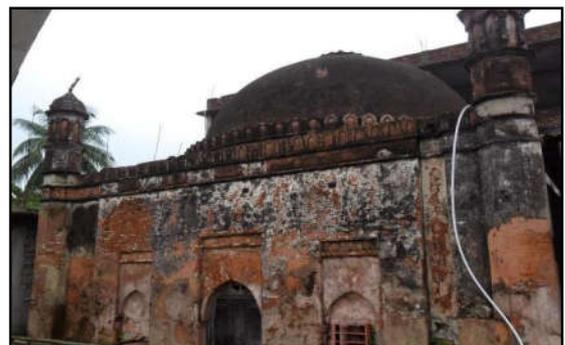
Photograph 2.1: Haziganj Fort

b) Sonakanda Fort was built the 17th century at Mughal era. The walls of the fort are thick and pointing by one meter height. There is no mark of any permanent structure or anything similar inside the fort. At present the vacant ground inside the fort is being used as a playground by the local people.



Photograph 2.2: Shonakanda Fort

c) Bandar Shahi Mosque is located in the Bandar Municipality area which was built by Malik Al-Muazzam Baba Saleh. It is a square building measuring 6.20 meter a side in the interior and 9.70 meter in the exterior. There are three entrances in the east of which the central one is wider, measuring 2.20 meter high and 1.37 meter wide



Photograph 2.3: Bandar Shahi Mosque

d) Kadam Rasul Dargah is situated at the Nobiganj Bazar of NCC area. It is believed that it contains a footprint (marked on a stone) of Prophet Mohammad (SM). Lot of followers of Islam used to pay a visit here every day to touch or kiss that footprint for blessings. The main entrance of the



Photograph 2.4: Kadam Rasul Dargah

Kadam Rasul Dargah has a lovely decoration. It's around a three storied building. The whole premise is placed over a very high plinth. The river Sitalakkha is flowing beside the Dargah.

2.2 Connectivity of National, Regional and Local Context of the City

Narayanganj city is connected with Dhaka through three roads, meter gage rail line and the river way of Buriganga and Sitalakkaya. In 1862, steamer service was started and Goalando to Dhaka/ Kalkata route was started via Narayanganj. All sorts of products such as jute and oilseed were exported through Narayanganj port. Dhaka has been enriched influence of light industry of Narayanganj. After time passes Narayanganj has become the centre of apparel industry of Bangladesh. Sonargaon is the most important place of Narayanganj which was very popular for garment products among India. The first ever jute mill of the country - Bawa Jute Mills, is situated in the Kadam Rasul Paurashava now in Narayanganj City Corporation. Narayanganj, as a prime river port, the centre for collection and export of various raw materials from its hinterland and due to its direct linkages with Chittagong it was declared as a port under Sea Custom Act, 1878.

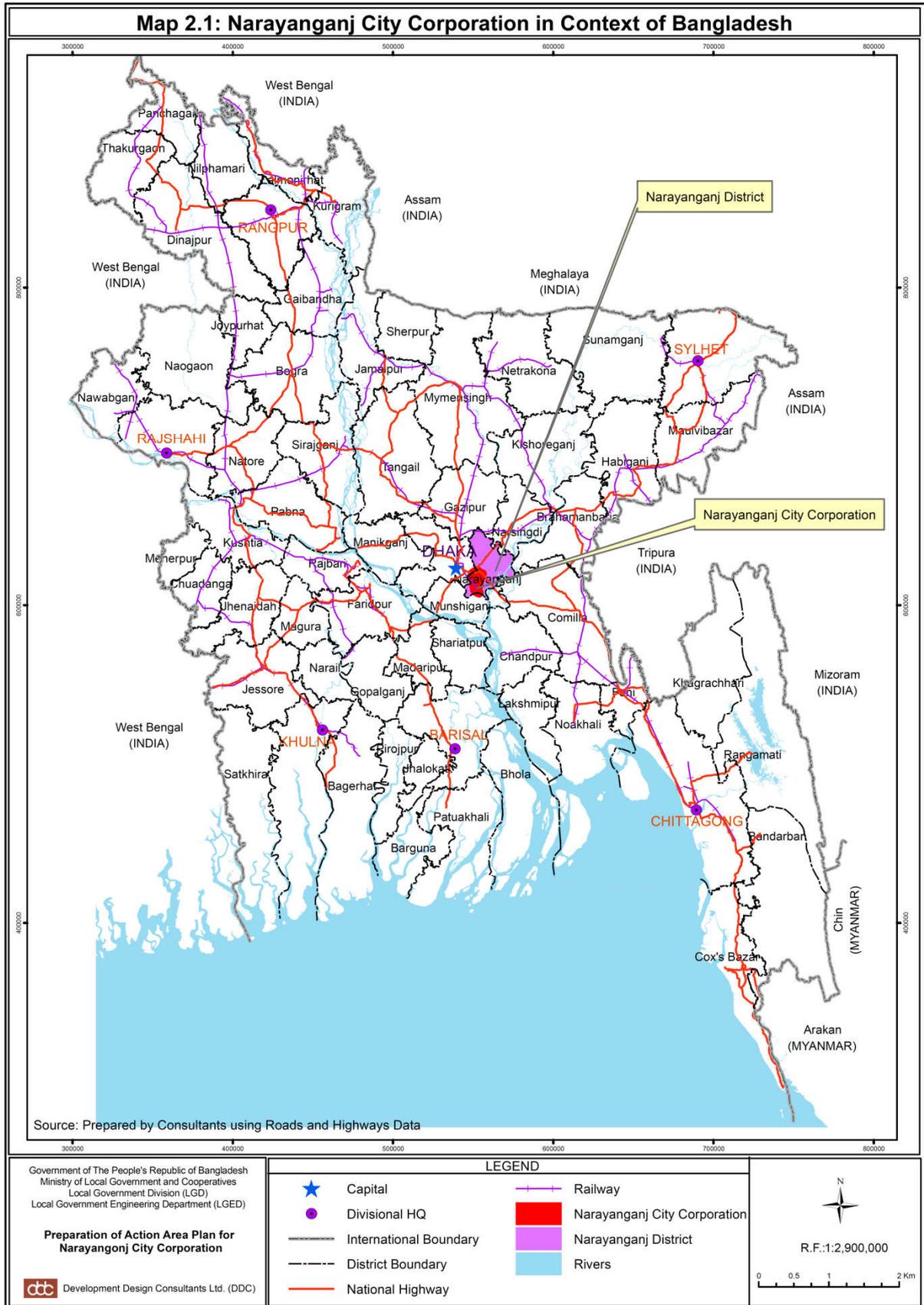
National Importance

Narayanganj is situated near the capital city of Bangladesh which received lots of flavor of the development of Dhaka. Narayanganj is one of the gateways of the Dhaka City. Narayaganj is connected south-western region with other part of Bangladesh. Narayanganj Area is fall into the catchment area of development consider the Dhaka-Chittagong Highway (NH-01) is passed through the Narayanganj City. A gain silo is located on Siddirganj area which is one of the national storage of Bangladesh. Siddhirganj and Haripur Power Stations are two important electricity generation units of the country which gives significant contribution in the National Grid of Bangladesh.

Narayanganj has become one of the important centers of the wholesale trading of all types of commodities, especially, the textile products for its good communication facility. The smooth waterway connection and good road connectivity with other part of the city is influence to become the city largest trading center of Bangladesh. A good steamer services of Narayanganj connected Dhaka and other parts of the country with south-western part.

Historically, Narayanganj was a salt trading center which is continuing till today in a much larger scale. Flour milling and small-scale engineering workshops to meet the local needs are also found in Narayanganj. As a new development, cement manufacturing has claimed a large chunk of land. This trend is expected to continue. A Grain Silo and Narayanganj Dockyard are other important establishments of Narayanganj.

Narayanganj is the terminal station of one of the railway routes of Bangladesh Railway running north-south connecting Narayanganj with Kamalapur through DND Triangle. The railway link connecting Narayanganj with Adamjee EPZ and Siddhirganj Silo is at present lying abandoned. The location of NCC area in context of Bangladesh is shown in map 2.1.



Regional Importance

As stated Narayanganj plays vital role in the field of trade and commerce for more than hundred years that's why it creates employment opportunity of the region. Narayanganj is become an economic hub by the influence of Dhaka and at the same availability of labor from the surrounding area like other upazila of Narayanganj, Munsiganj, Narsindhi, Comilla etc. The city is connected with other district of this division by few numbers of regional roads like Narayanganj Link Road, Panchabati-Munshiganj Road, Madanpur-Madanganj Road and Narayanganj-Demra Road etc.

Narayanganj City Corporation is served by Dhaka-Chittagong Highway (NH-01) at Siddirganj side. Dhaka-Chittagong Highway connects the city with the capital and other cities of the country. MuktiSarani (R-111) creates connection Narayanganj Core area with Dhaka-Chittagong Highway at Sign Board Intersection. Bandar-Madanpur Highway (R-113) creates connection with KadamRasul area and Dhaka-Chittagong Highway at Madanpur point. Demra-Narayanganj Road is connected Siddirganj area with Narayanganj city. Map 2.2 shows the location of NCC area in context of Narayanganj District.

Local Importance

Bangabandhu Road and Nawab Salimullah Road are the two major roads within the city area. Those two roads and SuktiSarani are traverse into Chashara Intersection which is most important intersection of the city. Major commercial activities and other important establishment like Press Club, Narayanganj Club, Nagar Bhaban, Major Commercial establishment etc are situated two sides of Bangabonhu Road. Other major roads of the city are Adamjee Road, Station Road, Esa Kha Road, Shahid Sharowardi Road etc. Pictorial view of Chashara Intersection and Nagar Bhaban are shown in photograph 2.5 and 2.6.



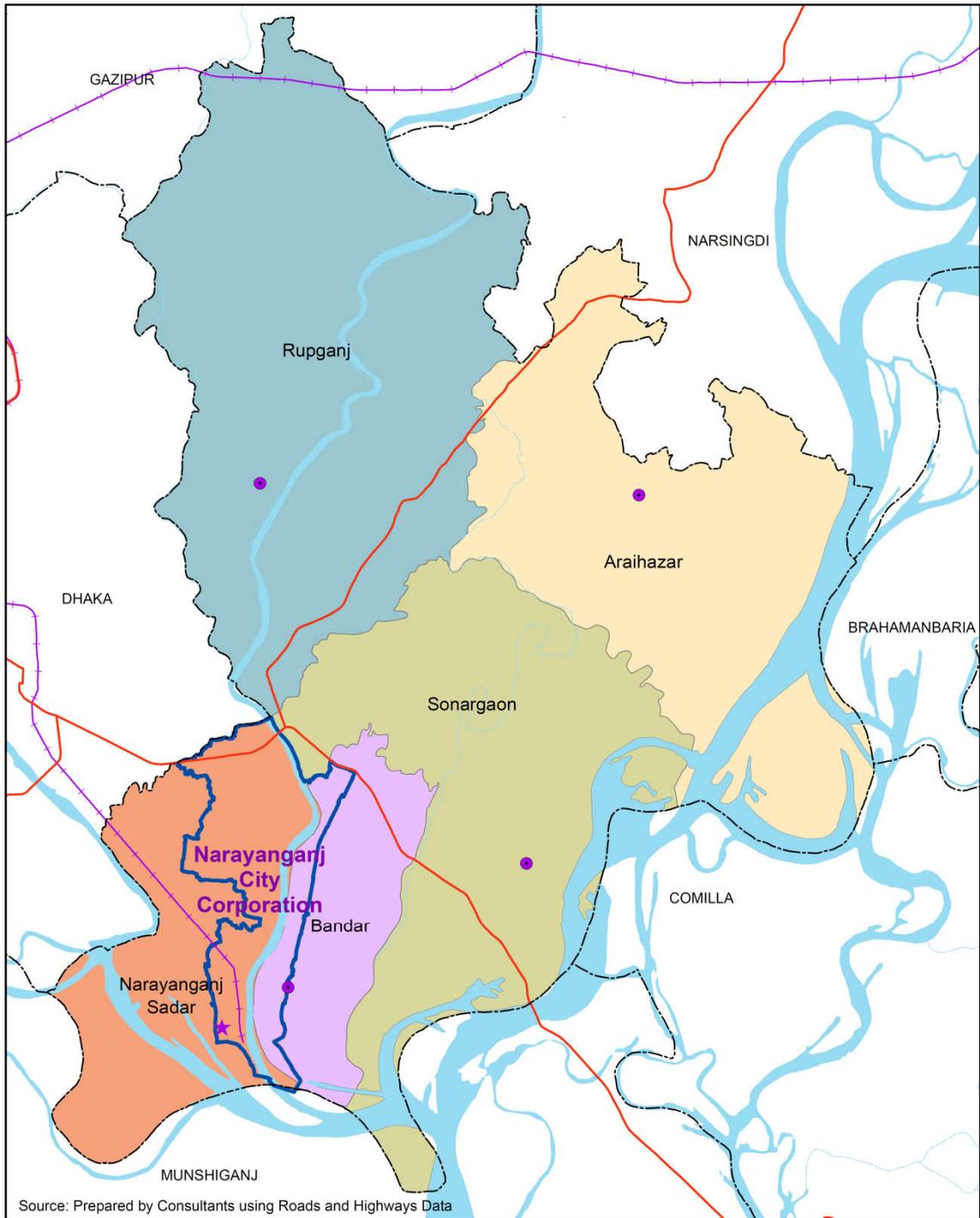
Photograph 2.5: Chashara Intersection



Photograph 2.6: Nagar Bhaban beside Bangabandhu Road

Internal roads of the City are narrow and characterized by congestion and encroachments. Congestions are caused due to overwhelming number of non-motorized transport and land use of the road side structures. Almost all the structures of the important roads are commercial establishments which generate additional traffic and result in congestion (Photo 2.7 and 2.8). Moreover, a very large number of the total traffic is constituted of pedestrian traffic. In absence of proper footpath, pedestrians occupy substantial area of road lanes which slows down the movement of vehicular traffic in the roads. Some major internal road of NCC are Alipara Road, B K Das Road, Chamber Road,

Map 2.2: Narayanganj City Corporation in Context of Narayanganj District



Government of The People's Republic of Bangladesh
 Ministry of Local Government and Cooperatives
 Local Government Division (LGD)
 Local Government Engineering Department (LGED)

**Preparation of Action Area Plan for
 Narayanganj City Corporation**

ddc Development Design Consultants Ltd. (DDC)

LEGEND	
★	District Headquarters
●	Upazila Headquarters
---	District Boundary
---	Upazila Boundary
—	National Highway
—+—	Railway
▭	Narayanganj City Corporation
▭	Rivers

N

R.F.:1:200,000

DelparaPagla Road, Deobhog Pucca Road, Godnail Road, Godnail Bazar Road, Golachipa College Road, Hospital Road, Kanchpur - Demraghat Road, Mission para Road, Mouchak Road, New Khanpur Road, Osman Gani Road, RK Mission Road, S S Shah Road, Shah Suja Road, Sher-E-Bangla Road, Sona Bibi Road, Water Work Road, Willson Road etc.



Photo 2.7: DIT Market at Bangabandhu Road, NCC



Photo 2.8: Road Side Informal Commercial Area

2.3 Topographic and Physical Feature

2.3.1 Topographic Features

Topographic feature is important to know the situation of existing drainage system and it also helps to understand the direction of water flow of the city. In this regard, a detailed topographic survey was carry out covering the whole NCC area in respect of national datum, i.e. MSL, established by SoB. During this survey land levels/spot levels of the total city were taken by Total Station approximately at 10 m intervals and then contour has been generated at 0.3m interval.

A total 47321 nos. spot values were interpolated after collecting spot heights throughout the city area at an average 10m interval. The highest spot value of 13.954 mMSL has been found in Block 4 on the top of ramp of Kanchpur Bridge. The lowest average spot value of -0.561 mMSL has been observed in the Block 6 on the slope of Sitalakkhya River. However, the highest and the lowest spot value do not represent the topographic scenario of the concern area but the mean value can. Statistical summary of the findings of topographic survey are given in Table 2.1 for the whole area.

Table 2.1: Spot Value and Spot Unit

Sl. No.	Spot Unit	Value (mMSL)
1	Total Spot Number	473214
2	Mean (Meter)	4.373
3	Maximum Height (Meter)	13.954
4	Minimum Height (Meter)	-0.561
5	Standard Deviation	1.701
6	Variance	2.893
7	Range	14.515

Source: Topographic Survey, 2016

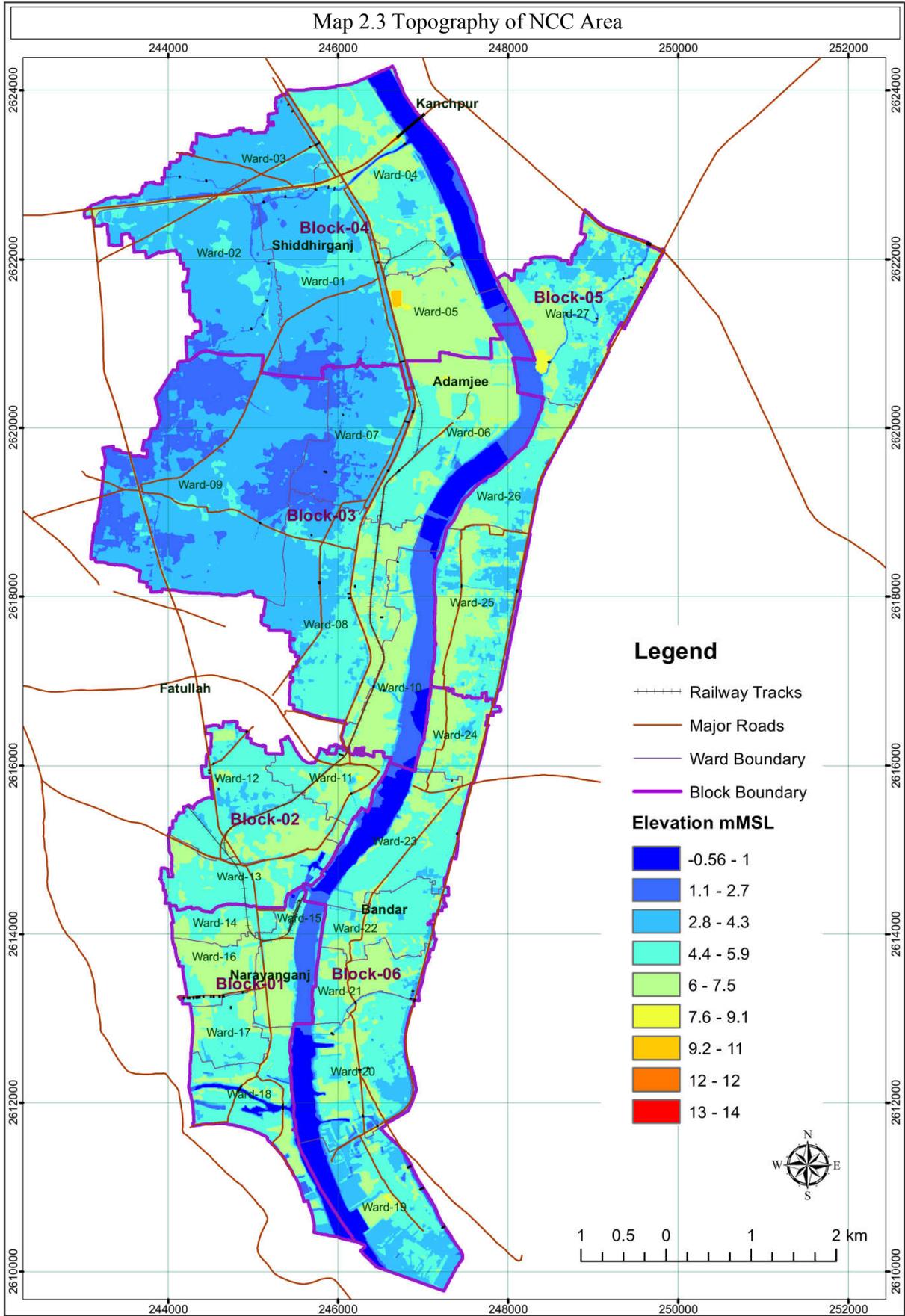
In order to visualize the land undulation in the NCC area detailed topographic maps have been prepared. Map 2.3 represents the surface undulation of the project area through a raster and Map 2.4 presents the contour lines with values.

Block wise elevation data has also been prepared and been presented in Table 2.2. It is revealed that Block 3 is comparatively lower than all other blocks with an average height of 3.71m. Most importantly, it is notable from Map 2.1 and Map 2.2 that, land slope of Block 1, Block 2, Block 3 and Block 4 are to the opposite direction of Sitalakhya River. That means, outfall of the run off of these blocks is Buriganga River, which is located at the South-West of the project area. Block 2 has comparatively higher elevation than other blocks with an average elevation of 5.43m. Block -01, Block-04, Block-05 and Block-06 have average elevation of 5.031m, 4.094m, 5.249m and 4.584m respectively.

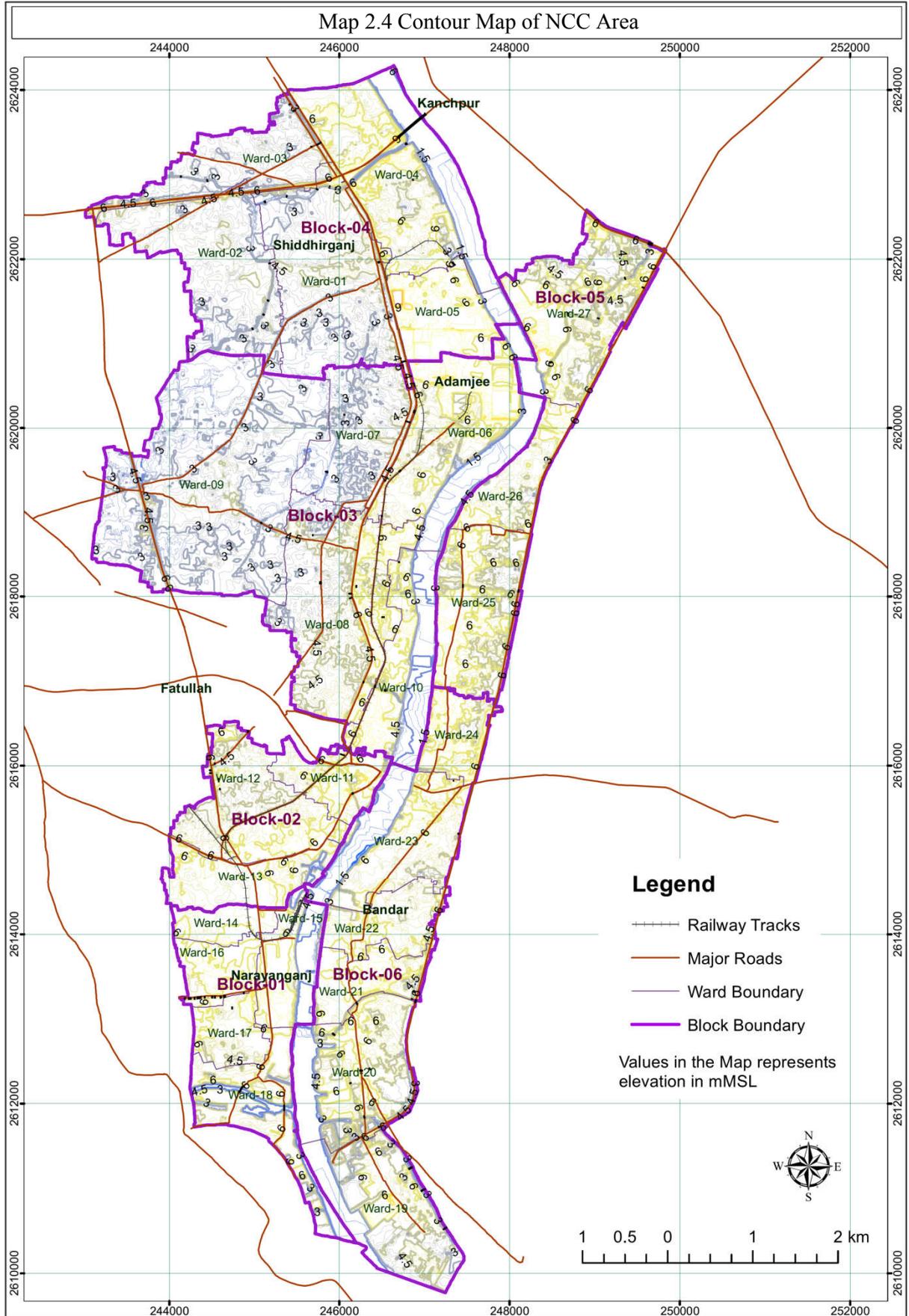
Table 2.2: Block wise spot height values

Values	Block-01	Block-02	Block-03	Block-04	Block-05	Block-06
Maximum Elevation (m, MSL)	8.711	8.802	8.144	13.954	10.115	9.224
Minimum Elevation (m, MSL)	-0.102	-0.292	-0.369	0.151	0.433	-0.561
Average Elevation (m, MSL)	5.031	5.430	3.711	4.093	5.249	4.584
Standard Deviation	1.664	0.788	1.604	1.623	1.212	1.910
Variance	2.769	0.620	2.572	2.633	1.469	3.648

Source: Topographic Survey, 2016



Source: Physical Feature Survey, 2015-16



Source: Physical Feature Survey, 2015-16

2.3.2 Existing Physical Features

A detailed physical feature survey was carried out to know the existing conditions of physical features and infrastructures in the NCC area, data compiled and accordingly necessary maps prepared. These maps provide information on number of structures and their locations, all categories of roads and their condition and right of way, location of utility structures like electric poles, telephone poles, mobile tower, overhead water tank and so. While conducting the survey, ToR provisions have been the guideline.

The survey reveals that there are in total 126421 structures in the NCC area which include structures of residential, commercial, industrial, education, health, administrative, recreational, religious etc., use. Residential structures are found to be highest in number and accounts for about 82.1 percent of total structures. The next highest number goes to commercial structures representing 8.97 percent.

Total Structures	: 126421 Nos.
Total bridge/culvert	: 221Nos.
Total Road Length	: 609.43 Km
Total Water body	: 2543 nos.

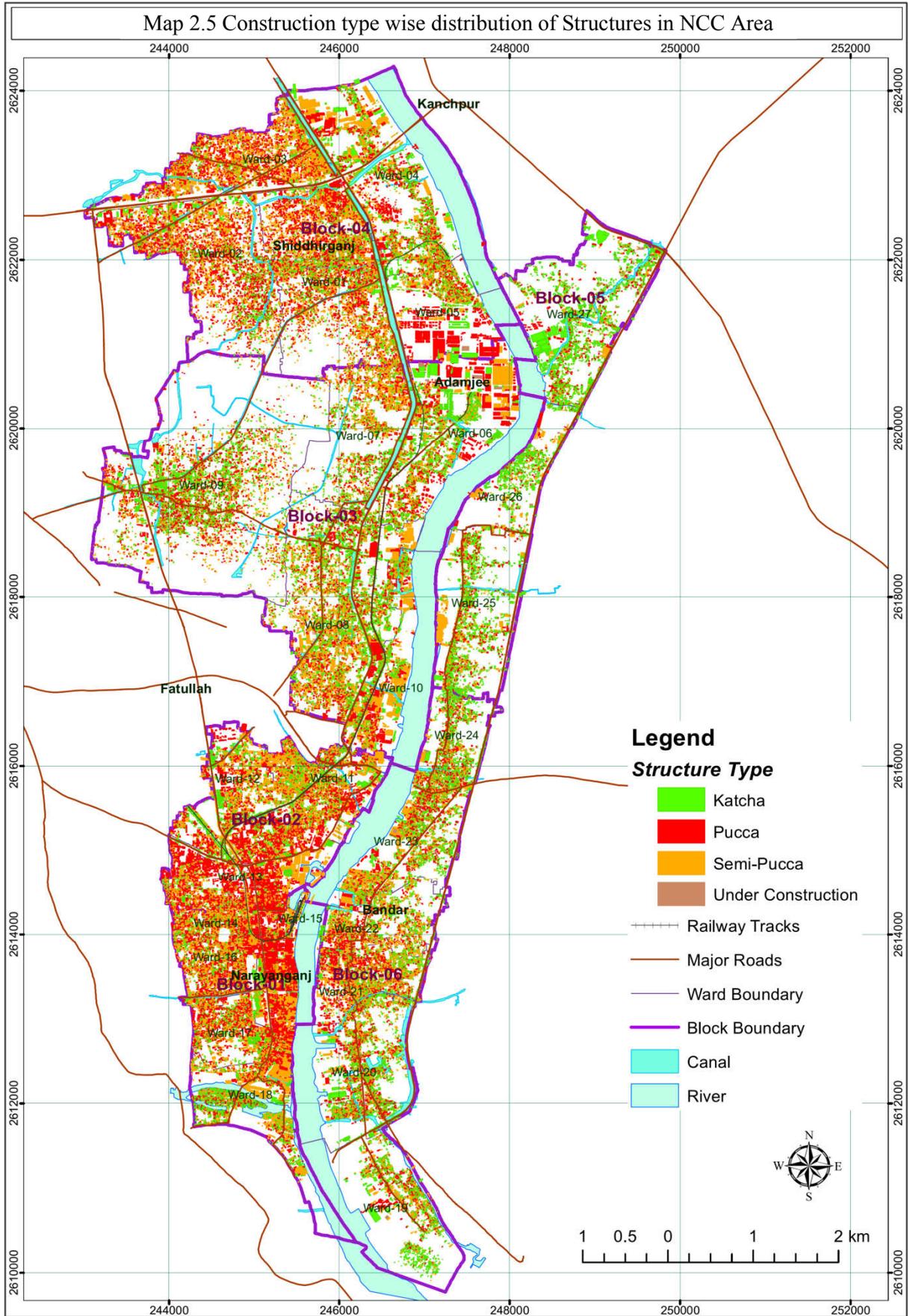
2.3.2.1 Structures

Physical feature survey revealed that number of katcha structures are height in terms of number which is 39.55% following by 36.29% semi-pucca structures and 23.41% pucca structures. Table 2.3 presents construction type wise number of structures in each block. Structure Type distribution has also been shown in Map 2.5.

Table 2.3: Construction type wise number of structures in different blocks

Structure Type	Block-01	Block-02	Block-03	Block-04	Block-05	Block-06	Total
Katcha	4490	4165	14739	8084	7630	10896	50004
Pucca	4954	4409	6116	8169	1258	4684	29590
Semi-Pucca	6587	5765	10624	12571	1795	8531	45873
Under Construction	65	72	169	326	116	206	954
Total	16096	14411	31648	29150	10799	24317	126421
Percentage	12.73	11.40	25.03	23.06	8.54	19.23	100.00

Source: Topographic Survey, 2016



Source: Physical Feature Survey, 2015-16

There are 86.57% structures are single storied structure, two storied structures are 6.52%, three storied structures are 2.95%, four storied structures are 1.77% and five storied structures are 1.12% of the NCC area. Tallest building is 22 storied in NCC area named Tokyo Square.

The average ground coverage area of pucca structures is about 129.21 sqm (1390.8 sqft). For semi-pucca and katcha structures this figure is 74.45 sqm (801.37 sqft) and 44.63 sqm (480.39 sqft) respectively.

Buildings and structures have been categorized into 13 general use categories. Distribution of structures (Block wise) according to these classifications has been presented in Table 2.4 and percentage has been shown in Figure 2.1. Among all structures of NCC area 103811 structures (82.10%) are residential structures. There are 11339 soul commercial structures in NCC area which is about 8.97%. Numbers of industrial structures are also remarkable which 2982 is (2.36%). Number of mixed use structures contributed about 1.97% structures. Distribution of structures as per general structure use in NCC area has been shown by map 2.6.

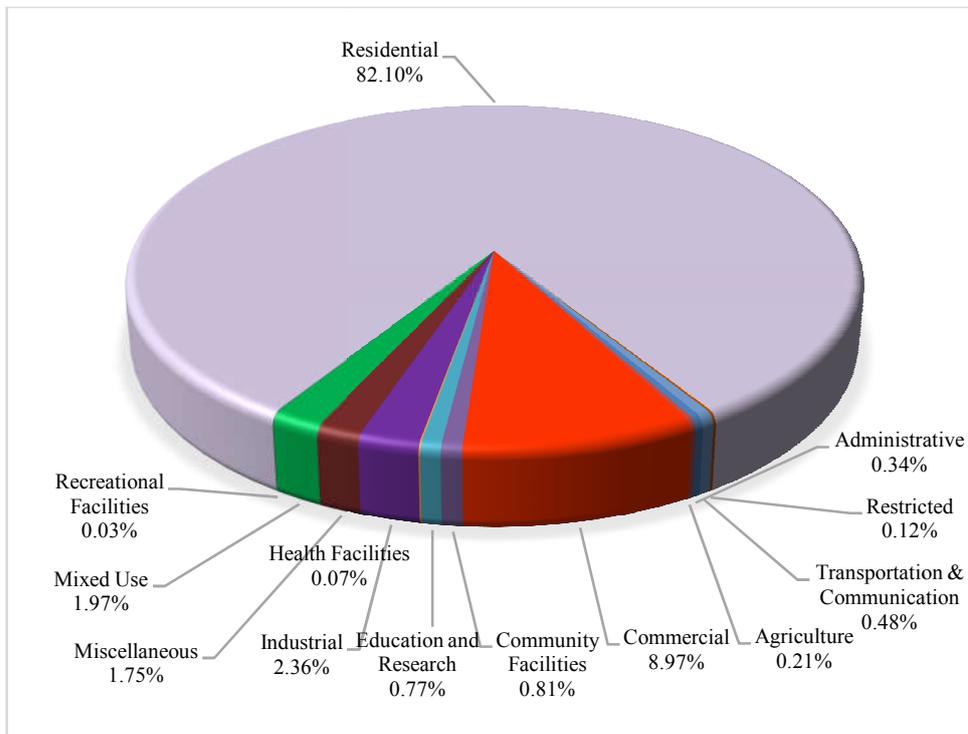
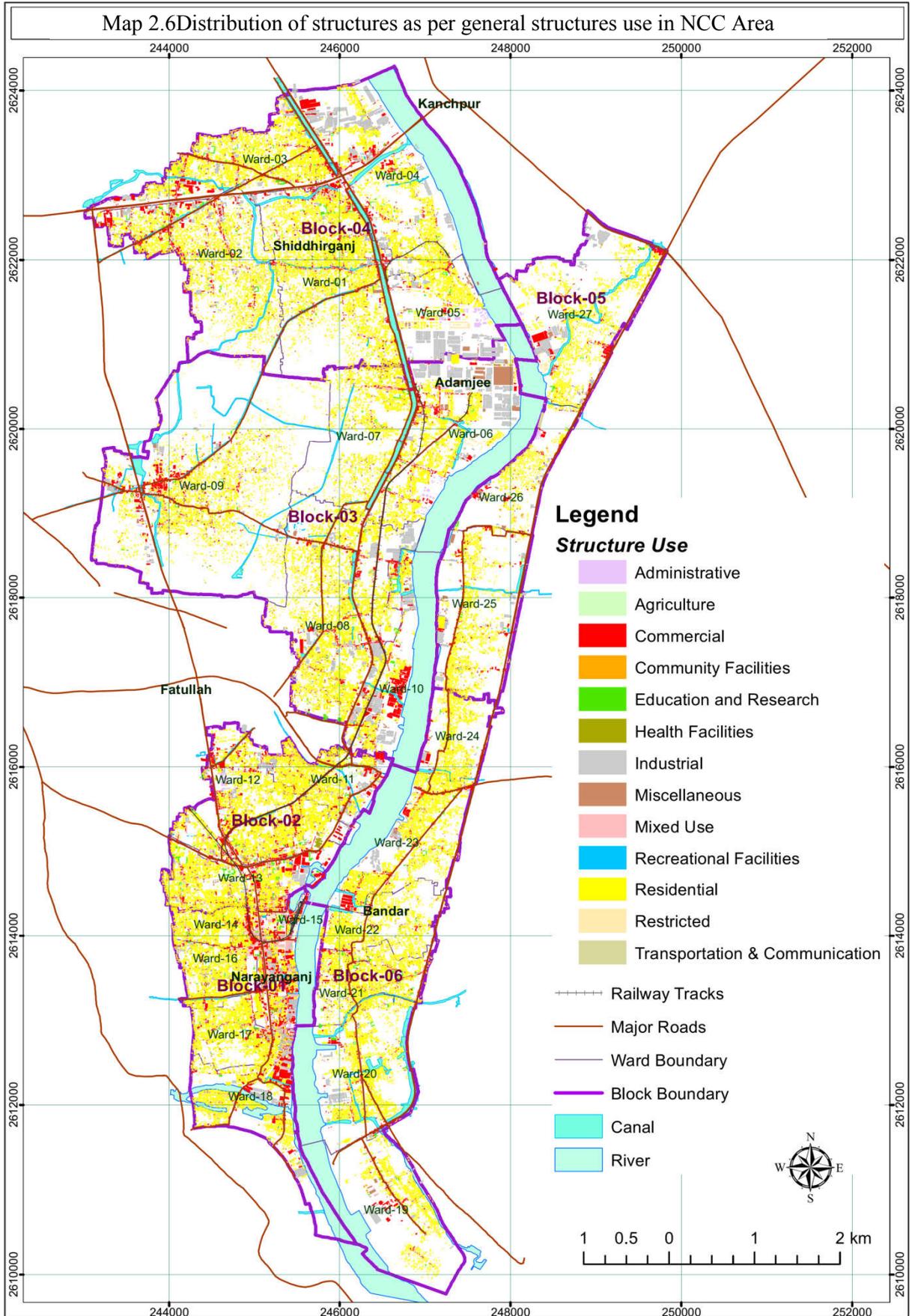


Figure 2.1: Percentage distribution of structure use

Source: Topographic Survey, 2016



Source: Physical Feature Survey, 2015-16

Table 2.4: Block wise sharing of structures as per use category

Structure Use	Block-01	Block-02	Block-03	Block-04	Block-05	Block-06	Grand Total
Administrative	81	60	79	110	23	80	433
Agriculture	17	30	88	71	18	43	267
Commercial	1666	1543	3003	2640	899	1588	11339
Community Facilities	182	141	230	167	103	202	1025
Education and Research	103	147	215	283	50	179	977
Health Facilities	10	34	21	16	1	7	89
Industrial	601	227	691	816	396	251	2982
Miscellaneous	119	312	709	617	146	311	2214
Mixed Use	730	445	458	548	69	247	2497
Recreational Facilities	5	5	19	6	2	2	39
Residential	12481	11345	25987	23657	9016	21325	103811
Restricted	24	13	30	32	48	8	155
Transportation & Communication	93	109	118	187	28	78	613
Grand Total	16112	14411	31648	29150	10799	24321	126441
%	12.743	11.397	25.030	23.054	8.541	19.235	100.000

Source: Topographic Survey, 2016

Above table depicts that Block 3 and Block 4 has highest percentage of structures which are 25.03% and 23.05% respectively followed by 19.24% structures in Block 6.

Structure use data has also been categorized as per structure type. Most of the residential structures are katcha and semi-pucca though about 24% are pucca. Mixed use structures, community facilities, educational and research and miscellaneous structures are mostly pucca.

Residential Structures

According to Construction Type, about 40.54% residential structures are katcha and 35.82% structures are semi-pucca while 23.18% are katcha of NCC area. Most of the residential structures are located in Block 3, 4 and 6.

Commercial Structure

Commercial Structures are found 46.74% katcha, 44.19% semi-pucca and only 8.94% is pucca structures are in NCC area. Block 3 and Block 4 have greater number of commercial structures than other blocks.

Industrial Structure

Most of the industrial structures of NCC area are semi-pucca (44.06%), followed by 32.03% katcha and 23.47% pucca structures. Most industries are located in Block 4, Block 3 and Block 1. Among the major industries there are few cement industries, jute textile industry, knitting industry, hosiery, readymade garments, knitting and dyeing industry, PVC products, re-rolling mills, ship building industry etc. Among the small industries, flour mill (atta, maida and suji) is considerable in number.

Administrative Structure

Different types of govt. and private offices, associations, etc. has been categorized as administrative use. Detailed use of administrative structures depicts that there are Zilla Parishad Office, City Corporation Office, Upazilla head quarter, Paurashava office, Union Parishad office, R&H office,

different utility services providing line agencies, NGOs, Freedom Fighters' Association, Labor Union, Local Clubs, etc. have been found as administrative structures.

Education and Research Institute

There are 977 educational structures in NCC area among which 54.48% pucca, 31.63% semi-pucca and 16.45% katcha structures. Block 3 and Block 4 have higher number of educational structures. A total of 153 primary schools, 83 high schools, 31 colleges, 15 madrasas and 2 universities in NCC area. Moreover, there are 79 kindergartens and 30 informal and non-formal educational institutes have been identified in NCC area.

Health Facilities

There are 89 structures in NCC area with health facilities among which 61.8% are pucca, 31.46% semi-pucca and 6.74% katcha structures. There are 37 different types of govt. and private hospitals and 44 clinics in NCC area. However, there is only one (1) true hospital in NCC area named Narayanganj 200 Beds Hospital in Khanpur, which is located in Block 2. Concentration of health facilities is higher in Block 2.

Community Facilities

Mosque, temple, church, community center, auditorium, mazar, etc. have been categorized as community facilities. A total of 524 mosques have been identified in NCC area, while there are 61 temples, 5 pagodas and only 1 church in the project area.

Recreational Facilities

In NCC area, there are cinema halls, stadium, swimming pool, theme parks, etc. structures can be identified as structures having recreational facilities. Most of the structures under this category are pucca (66.67%).

Mixed Use Structures

NCC area has about 2497 structures with mixed use. Most of these are mixed use of residential and commercial uses. Few other combinations are educational with residential, industrial with residential, etc. Many of mixed use structures are pucca structures with more than one storey accommodating multiple uses. Block 1 has greater number of structures with mixed uses.

Transportation and Communication Structures

Bus terminal, truck terminal, rail station, refueling station, car or rickshaw/van garage, landing station, jetty, ticket counter, etc. have been classified under structure category of transport and communications. Most structures under this category are katcha (63.74%); semi-pucca is 22.43% and pucca is 13.83%.

Restricted Structures

Defense and security structures like ansar camp, BDR, police station, army, etc.; and different key point installations like fire service and civil defense, gas transmission station, power plant, electric sub-station, etc. have been categorized as restricted structure. Among these category, Haripur 412 MW Combined Cycle Power Plant, Siddhirganj Power Plant and Adamjee Power Plant is mentionable.

2.4 Land Use

The use of land of the city has been divided into fifteen broad categories. The categories are Administrative, Agriculture, Commercial, community Facilities, Education and Research, Health Facilities, Industrial, Miscellaneous, Mixed use, Open Space, Recreational Facilities, Residential, Restricted, Transportation and Communication and Water Body. These categories are further subdivided for the benefit of identifying the use categories easily. However, block wise land use analysis is made according to the broad classification. Table 2.5 and Figure 2.2 presents distribution of land area in acre of above mentioned land uses in each block. Map 2.7 shows the block wise distribution of land use of NCC area.

Table 2.5: Block-wise distribution of broad land uses

Land Use	Area in acre							%
	Block-01	Block-02	Block-03	Block-04	Block-05	Block-06	Grand Total	
Administrative	56.83	54.88	90.88	161.80	67.71	93.48	525.59	4.51
Agricultural	11.79	4.37	367.27	68.37	95.33	111.77	658.90	5.66
Commercial	17.12	12.90	35.43	35.24	10.72	63.26	174.68	1.5
Community Facilities	6.45	4.69	15.81	8.62	6.55	13.05	55.18	0.47
Education and Research	7.83	18.68	11.79	14.18	6.70	15.39	74.58	0.64
Health Facilities	0.27	1.95	2.03	0.20	0.00	0.02	4.47	0.04
Industrial	42.50	32.94	187.90	166.40	80.93	75.76	586.43	5.04
Miscellaneous	2.37	16.21	63.85	18.48	15.10	15.15	131.16	1.13
Mixed Use	330.21	340.68	594.24	631.10	151.43	302.55	2350.21	20.19
Open Space	36.55	20.76	183.52	143.47	118.88	84.46	587.64	5.05
Recreational Facilities	4.50	8.08	11.29	3.63	2.99	14.97	45.47	0.39
Residential	271.35	296.50	1033.19	927.48	353.19	686.80	3568.51	30.65
Restricted	4.50	4.15	7.83	21.40	38.30	9.34	85.52	0.73
Transportation and Communication	15.96	6.20	12.18	17.49	8.87	8.38	69.09	0.59
Water body	205.52	94.89	1017.23	539.75	303.99	562.31	2723.68	23.4
Grand Total	1013.75	917.89	3634.46	2757.64	1260.68	2056.70	11641.11	100

Source: Topographic Survey, 2016

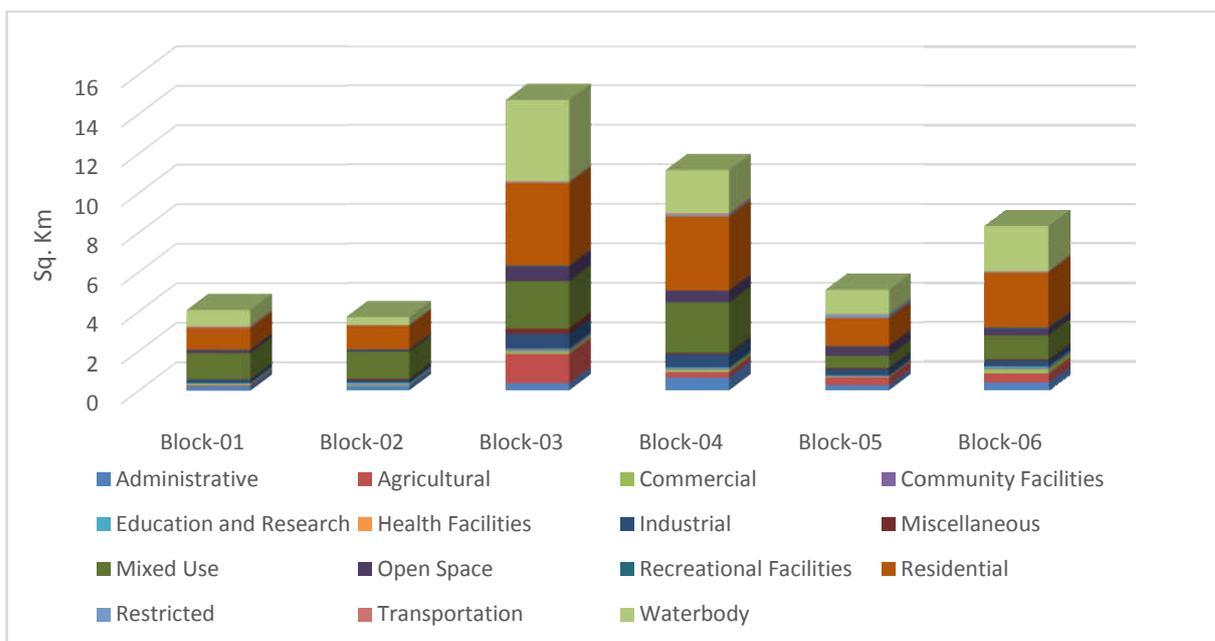
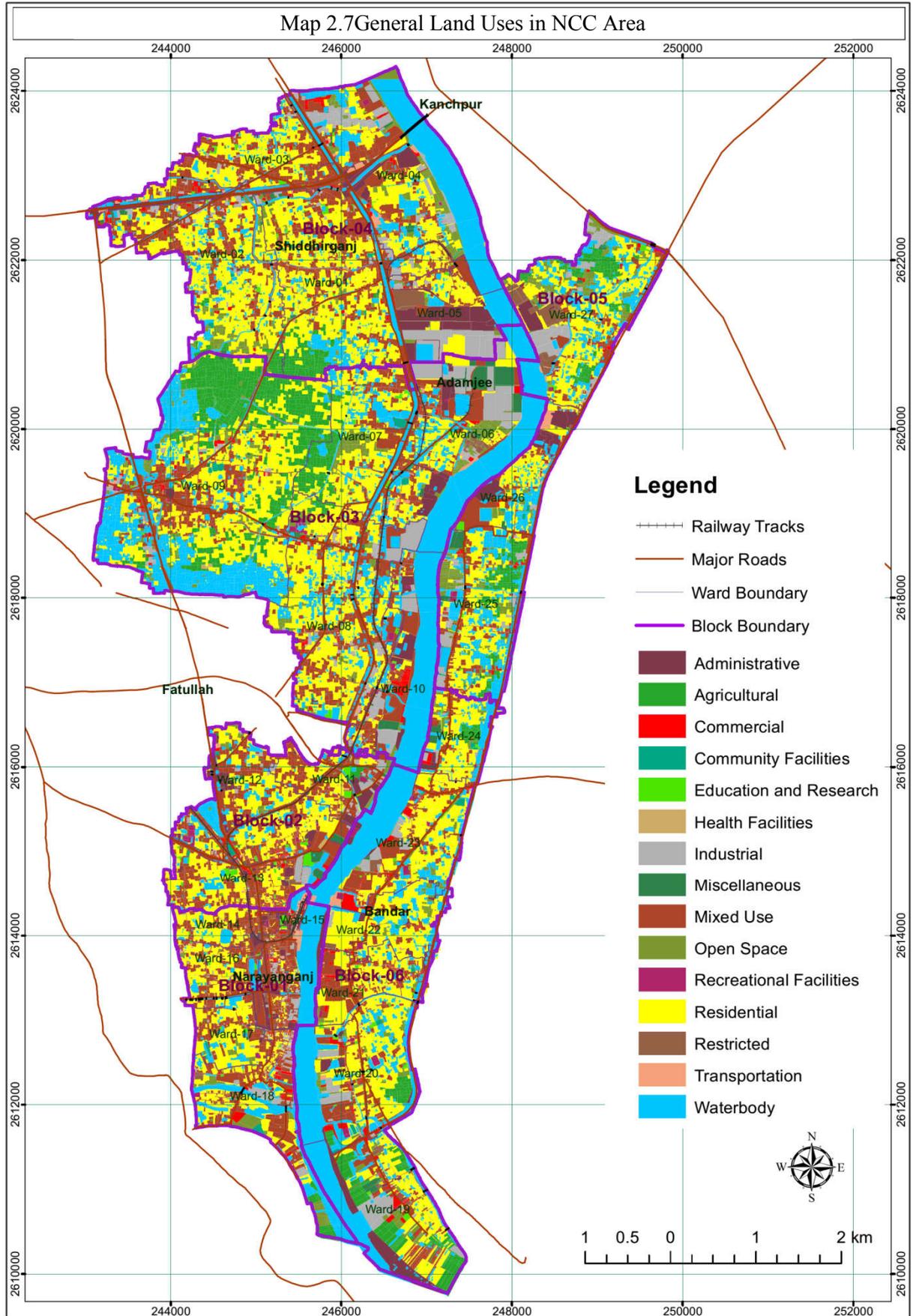


Figure 2.2: Block-wise land use distribution

Source: Topographic Survey, 2016



Source: Physical Feature Suvey, 2016

Figure 2.2 depicts the percentage sharing of different land uses in NCC area. Residential use is dominant in NCC area which is 30.65% of the total area. Being served by Sitalakhya river and a large number of water bodies like canal, pond, ditches, borrow pits and marsh lands, water bodies occupy considerably 23.40% (11.02 sq. km) of the total land area. Next largest area occupying land use is surprisingly mixed use. Not like other areas, NCC has a hoary history of development of industries and commerce. This promotes mixed developments in the city area. Industrial uses occupies 5.04% areas mostly along Sitalakhya river. Very limited agricultural practice can be seen in Bandar and Shiddirganj region. Different types of govt. and non-govt. organizations occupy 4.51% land of the city. Sole commercial use is 1.5%. Open space (mostly vacant land) covers 5.05% of the project area.

2.5 Demography and Socio-Economic Status

Demographical data analysis of any area is a crucial part of any plan preparation process of any area. Any planning decisions have been taken based on the population and economy of any area. Population is also necessary to calculate the demand and future need of the city. This section attempts to analyze the population to calculate future population on the basis of socio-economic data. At a glance demographic information for NCC area is given below in Table 2.6.

Table 2.6: Demographic Information at a Glance

Criteria	Description
Census Population	<ul style="list-style-type: none"> - Total population in 2011 is 709380 with 51.49% male - Population in the Narayanganj Zone is 37.48% with population density of 137 persons per acre - Population in the Siddhirganj Zone is 39.08% with population density of 43 persons per acre - Population in the Kadam Rasul Zone is 23.44% with population density of 50 persons per acre
Age Structure	<ul style="list-style-type: none"> - 38.15% people are within 25 – 49 age range - 21.02% people are within 15 – 29 age range - 11.13% people are within 50 – 65+ age range - 20.52% people are within 5 – 14 age range
Household Size	4.28
Marital Status	49.75% people are married
Educational Status	- Literacy rate is about 57.52%
Religious Status	<ul style="list-style-type: none"> - 91.19% Muslim - 8.71% Hindu

Source: Bangladesh Bureau of Statistics (BBS), 2011

2.6 Drainage and Environmental Issues

2.6.1 Natural Drainage Network

There are a number water bodies in NCC area. Major water channel in Sitalakhya River, and Kashipur River and its length is about 35 kilometer that flowing in north south direction. There are about 55.5 km canals and only one lake named Jimkhana (length 0.619 km) in the project area. Being a low lying

area and having opposite directional slope towards Sitalakhya River, local ponds, ditches and marsh lands act as water reservoir during monsoon. Major natural drainage been shown in Table 2.7.

Table 2.7: Natural Drainage in NCC area

Type of drainage network	Length of drainage network (km)	Major constraints
River	35	i. Encroachments of natural canals ii. Uncontrolled and indiscriminate disposal of solid waste into khals and drains ii. Absence of effective surface drain system
Lake	0.62	
Canal	55.5	
Borrow Pit	8	
Total	99.13	

Source: Physical Feature Survey, 2015-16.

2.6.2 Man-Made Drainage

Drainage network is well distributed in Block 1 and block 2 of NCC area. There are about 207.17 km to total man-made drains consisting of 206.5 km pucca drain and only 0.63km katcha drain. Block 1 has 52.23 km of drains following by 46.72 km in Block 2, 42.11 km in Block 3, 38.37km in Block 6, 21km in Block 4 and 6.75km only in Block 5. Drainage network of NCC has been shown in Table 2.8 and Map 2.8 shows the Drainage Network of NCC area.

Table 2.8:Block-wise drainage length.

Block	Katcha Drain (km)	Pucca Drain (km)	Grand Total (km)
Block-01	0.00	52.23	52.23
Block-02	0.00	46.72	46.72
Block-03	0.68	41.43	42.11
Block-04	0.00	21.00	21.00
Block-05	0.00	6.75	6.75
Block-06	0.00	38.37	38.37
Grand Total	0.68	206.50	207.17

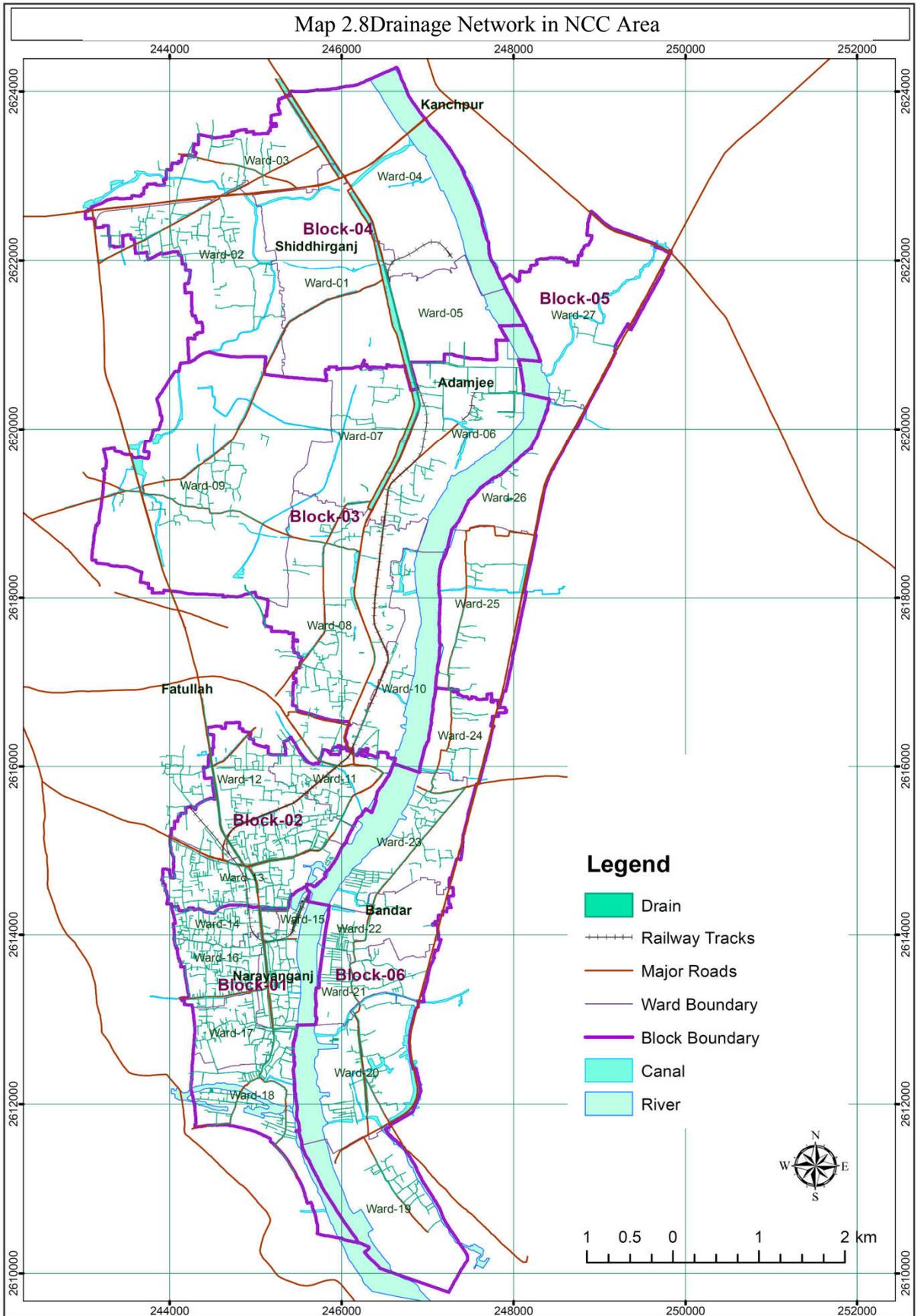
Source: Physical Feature Survey, 2015-16.

2.6.3 Natural Environmental Issues

➤ Geology

Geologically NCC area is located on the edge of the Madhupur Tract and the Holocene floodplain deposits from the aquifers. Geologically it is a terrace from one to ten meters above the adjacent floodplains. Though in its present form it is of Pleistocene age, its origin may be in the late Miocene, when the Bengal Basin was being filled in rapidly. Unlike the Barind Tract it is largely in one piece, with seven small outliers. The major geographic units of the city are: the high land or terrace, the low land or floodplain, depressions and abandoned channels. Low lying swamps and marshes located in and around the area are other major topographic features.

The soils of the Tract have developed largely on Madhupur Clay, which are nutrient poor and somewhat acidic. They are red or brown in color. In most places the changes from the floodplains to the Tract is quite sharp, but in some places the floodplain soils overlies the gently inclining edges. The Madhupur



Source: Drainage Survey, 2016

Tract is extensively dissected, with narrow or broad valleys extending deep into the level landscape and the Drainage pattern is clearly dendrites. The higher level lands are known as Chala and the valleys are called Baid. The valleys are cultivated with Boro rice in the dry season by impounding the streams for irrigation.

➤ **Climate and temperature**

Climate and temperature of NCC area is characterized by the warm, humid summers and cool and dry winters. However, generally the weather is sub-tropical, with a warm climate all year round. The annual average temperature varies maximum 36°C to minimum 12.7°C and the average annual rainfall is 2376 mm.

Monthly precipitation records clearly show a distinct dry and rainy season in according to the statistics of the wind data from the Bangladesh Meteorological Department Climate Division, wind direction changes by month. Nevertheless, the northwest, south, and northeast winds are predominant.

The construction works can be influenced by the climatic condition and meteorological components like humidity, temperature, sudden rainfall, and wind speed. During high winds, there might be possibility of quick spreading of the dust generated from the construction activities. It is very risky to work during rain and in high winds because the possibility of getting injury increases. Furthermore, work under high temperature and excess humidity is extremely difficult, and may create dehydration problem.

➤ **Hydrology**

Surface water

Over the last 150 years there were no major avulsions of the main rivers of Bangladesh. But declining and enlarging of the main rivers occur in a large-scale. The expansion of Narayanganj city was mainly in and around the river Sitalakhya. There are numbers of canals and water body in NCC area which play a vital role containing surface water in case of storm and rain water. Eastern part of the river Sitalakhya in Siddhirganj zone there are a lots of ponds which maintain the ecological balance of the area.

Groundwater

In Narayanganj City, ground water is a very essential source for drinking and other purposes in households and industry. Tube wells are situated nearly 50 to 320 m away from the disposal sites and people of adjacent houses are drinking the water regularly, which is not recommended due to the high probability of ground water contamination.

The ground water basin is completely dependent on the ground water resources while all other sources of fresh water are almost dead or unusable. Recent days Bangladesh has prime concern to sustainably manage its ground water as it is tend to become scarce. In Narayanganj river basin area, surface water withdrawal from adjacent rivers is not a proved feasible option because of high levels of industrial and domestic pollution from unregulated waste disposal. Narayanganj city is dependent primarily on groundwater for the urban water supply. Presently Narayanganj Water and Sanitation Authority

obtain drinking water from groundwater sources. Ground water of Narayanganj city has been drawn down significantly because of overexploitation and also the pressing demand from the urbanization and it is also evident that the rate of water-level drop in the city area is about 2.5 m/year in the recent years.

Aquifer and aquifer properties

The Basin area is characterized by Quaternary alluvial sequences of the Madhupur tract, which is an elevated Pleistocene terrace that surrounds floodplains of the Jamuna, Ganges and Meghna rivers. The primary aquifer of Narayanganj City consists of unconsolidated sediments of the Dupitila Formation, which are overlain by the Madhupur clay, an approximately 48-m-thick Aquitard. Though, aquifers are relatively homogenous in respect of aquifer properties and materials.

Table 2.9: Average thickness of the different hydro-geological layers at Narayanganj basin

Layers	Average Thickness (meter)	Depth (meter)
Top soil	3	0-3
Aquitard - 1	11	3-14
Upper Dupitila Aquifer 1	23	14-37
Aquitard - 2	21	37-58
Upper Dupitila Aquifer 2	97	58-155
Aquitard - 3	16	155-171
Lower Dupitila Aquifer 1	57	171-228
Aquitard - 4	16	228-244

2.7 Municipal Services

2.7.1 Water Supply

Dhaka WASA and DPHE both are working jointly for water supply and sanitation in NCC area. WASA operates in Narayanganj core area and in Kadam Rasul (Block-01, 02, 04, 05, 06) except Siddhirganj (Block-03) through pipe line. In Narayanganj there are 2 water treatment plants located in Sonakanda and Godnail, 8 over head tanks and 30 pump houses. According to BBS 2011, about 51.29% of households depend on piped water, rest of the household depend on tube well or other available sources.

DPHE is responsible in the areas of outside of WASA jurisdiction area. The number of subscribers of Narayanganj WASA is 11,636. There are 434 roadside water taps in Narayanganj. DPHE operates water supply by providing deep tube well, hand tube well, shallow tube well etc. also working by providing sanitary pit latrine.

Perception of the inhabitants of the city regarding the quality of water generally is good. But in dry season the scenario become changed. The affected areas of the city are Don Chamber, Khanpur, Missionpara, Deobhog, Netaiganj, Jamtala and Masdair. Some of city dwellers alleged that water supplied by the WASA was not drinkable at all as it was stinky and had turned yellowish especially in dry season.

2.7.2 Sanitation and Sewerage

There is no formal sewerage disposal system in NCC area. About 11.50% household in NCC had no sanitary facilities. Governments and city leaders tend to favor conventional sewerage systems. Its advantages are lower cost and disadvantages are maintenance and downstream sewerage and treatment. Generally high dense low income housing areas exploit the environment as it is in conjunction with surface drains. These systems are technically and organizationally difficult to operate, and they rarely benefit the poor. Poorly planned and operated conventional sewerage damages the environment and misses the opportunity to recycle valuable nutrients and organics.

There is also lack of manpower in the monitoring and supervision of construction of public toilets. NCC proposed to increase the number of work assistants to improve the conditions. Monitoring of public toilets managed by the private sector, such as toilets in markets and other facilities, is also another issue.

2.7.3 Electricity Supply

The Siddhirganj Power Station, capacity 210 MW diesel fired having 96 numbers Caterpillar Generator sets of 1.2 MW capacities each and the Haripur Power Station, capacity 360 MW natural gas fired these two are the major generation units of the country and providing electricity all over Narayanganj city area.

BPDC is providing electricity extensively all over Narayanganj except remote and rural areas. About 98.73% of households have electricity connection. The electricity is transmitted through poles above ground and in places through underground. DPDC has 1040 numbers of distribution transformers and 139 numbers of High-volt Electric Towers in different location of NCC area.

Although almost every household in NCC core area have the electricity connection but inhabitants of city face irregular load shedding problem. According to DPDC senior officials, the electricity demand of Narayanganj city is 160 Mega Watts (MW), whereas it was receiving around 110 MW as per rational allocation set earlier. To increase the supply in Narayanganj city, DPDC had to curtail power supply in Dhaka city and the adjoining areas, to meet the present demand.

2.7.4 Gas supply

Piped gas supply is available in the city and its surrounding area provided by Titas Gas Transmission & Distribution Company Limited except partial in Block 3 and block 5. Titas gas supply in Narayanganj being used round the year for generator, captive power generation both in public and private sector, CNG filling stations, industry and re-rolling mills, household for cooking purpose, commercial sectors. It mentioned that TGTDC first started commercial operation with the commissioning of a gas supply line to Siddhirganj Thermal Power Station. Gas supply is now available in all the important urban areas and industrial belt of the Narayanganj core area and adjoining area, also covers partially in Kadam Rasul area.

According to the local representative of TGTDC smooth gas supply is hampering due to the system loss and authority is being affecting by losing a significant amount of revenue earning every year. It is

noted that at present system loss as percentage of total supply rising to 6-7 percent which is alarming and above the standard. Authority is working with a view to reducing system loss to 2 percent.

2.7.5 Telephone and internet Services

Bangladesh Tele Communication Company Limited (BTCL) provides terrestrial telephone service to the city dwellers of Narayanganj. Cell phone service is provided by all the private operators of the country. There are 329 numbers of Telephone Pole/Mobile Towers in NCC area. The number of cell phone subscriber and BTCL subscriber in the city area are not available.

Demand for land phone has substantially reduced in recent years owing to widespread introduction of mobile phone, which is handy and easier to acquire. The BTCL service is also easier and rates are cheaper now. To provide better service, the new land phone companies may think of installation of underground cables.

2.7.6 Medical facilities

There are 89 structures in NCC Area with health facilities which are classified as hospital, maternity clinic, private clinic, diagnostic center and private chamber serving the total population of Narayanganj. It had calculated every year average 781197 number of patient treated by these medical centers with 68 numbers of sample size (Municipal survey 2016).

According to BBS 2011 there were 614 numbers of doctors serving against 709380 number of population with only 886 numbers of beds. In Kadam Rasul it was 1 doctor for 99 people. It is calculated that at present in NCC area 717 people against 1 doctor.

As per land use survey 2016, most of the health uses are concentrated in block 01, Block 02 and Block 03. Block 06 has very negligible percentage (0.055%) of health facilities and surprisingly Block 05 has no such uses. People from kadam Rasul zone (Block 05, Block 06) had to come to Narayanganj core area for treatment.

2.8 Solid Waste Management

Solid waste generation within NCC area has been calculated and it is about 0.42 kg/day (2016). The Narayanganj city generates total about 350 tons of garbage every day containing industrial waste, residential waste like food, vegetables, fruits, polyethylene, paper and cloths et cetera. The city corporation authority has the capacity to collect total about 290 tons of garbage every day. The waste collection rate is estimated about 83% in a day and the rest of the garbage is disposed on the landfills and left are unattended or locally dumped on the riverside or canals which results serious environmental degradation and public-health risk to the local inhabitants.

In NCC area Block-03, 04 and 06 have higher waste generation rate which is about 22% (NCC,2016) where solid waste management system need to be incorporate to solve existing problem urgently.

2.9 Traffic and Transportation

2.9.1 Road Network

Narayanganj City Corporation is served by a road network of 609.43 km. As per construction materials point these roads are divided in to katcha, pucca and semi-pucca category. Out of the total, highest 316.15 km roads are pucca (51.88 percent), followed by 210.51 km katcha (34.54 percent) and 82.44 km semi-pucca roads (13.58 percent). Dhaka-Chittagong Highway (N1) passes through the northern part of the City corporation area and carry majority of the motorized traffic to and from the NCC area. Regional Highway R110, named Demra-Narayanganj Road connected with Dhaka-Chittagong Highway is one of the major primary roads that run parallel to the Sitalakhya River. Another spine road is Dhaka-Narayanganj Road (Regional Highway R111) connects the main Narayanganj City with Dhaka through N1.

Type-wise percentage distribution of all roads in NCC area is shown by Figure 2.3 and Block-wise road length distribution has been shown in Table 2.10.

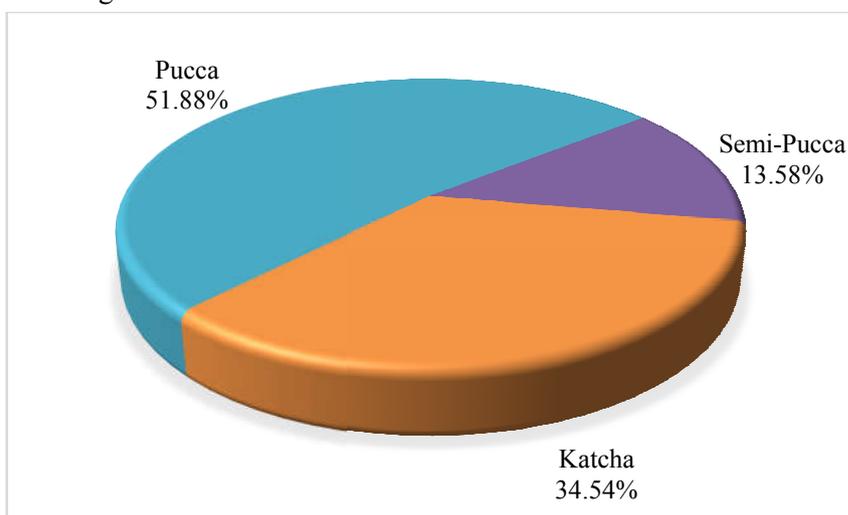


Figure 2.3: Percentage distribution of road types in NCC area

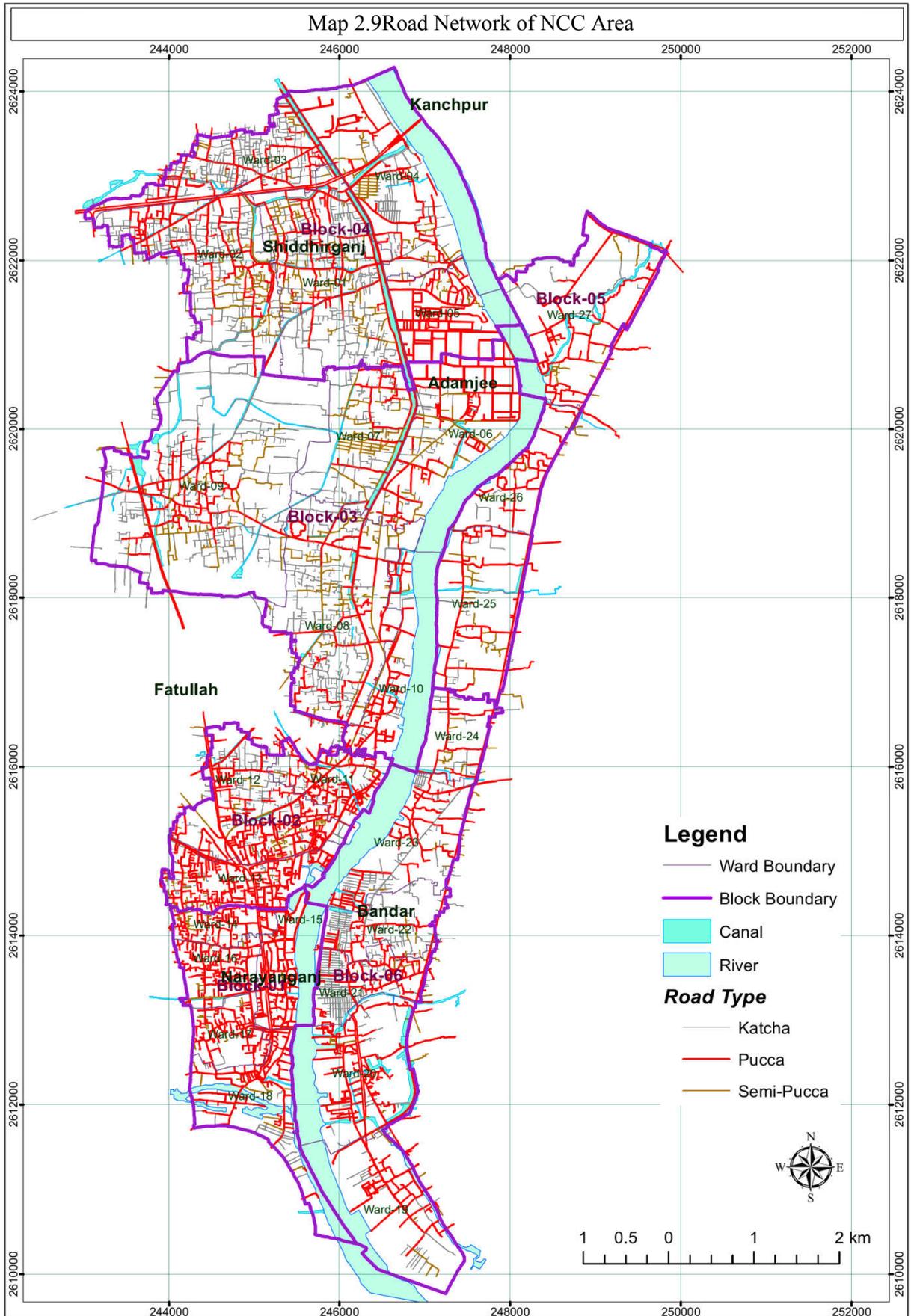
Source: Topographic Survey, 2016

Table 2.10: Block wise road length (km) according to road surface type

Road Type	Block-01	Block-02	Block-03	Block-04	Block-05	Block-06	Total
Katcha	4.44	13.05	70.41	80.53	6.44	35.63	210.51
Pucca	49.99	52.32	58.36	74.87	29.65	50.96	316.15
Semi-Pucca	4.92	6.48	35.62	25.31	5.61	4.83	82.77
Total	59.35	71.86	164.39	180.71	41.70	91.42	609.43

Source: Topographic Survey, 2016

The above figure and table show that Block 4 (Demra region) has maximum road length comprising of 74.87 km of pucca road, 80.53km katcha road and 35.62km of semi-pucca road. Block 3 (Siddhirganj region) contributes second heights road length of total 164.39 km. Northern part of Bandar region, Block-5 has the lowest road length comprising of 29.65 km of pucca road, 6.44 km katcha road and 5.61 km semi-pucca road only. Road network of NCC area is shown in Map 2.9.



Source: Physical Feature Survey, 2015-16

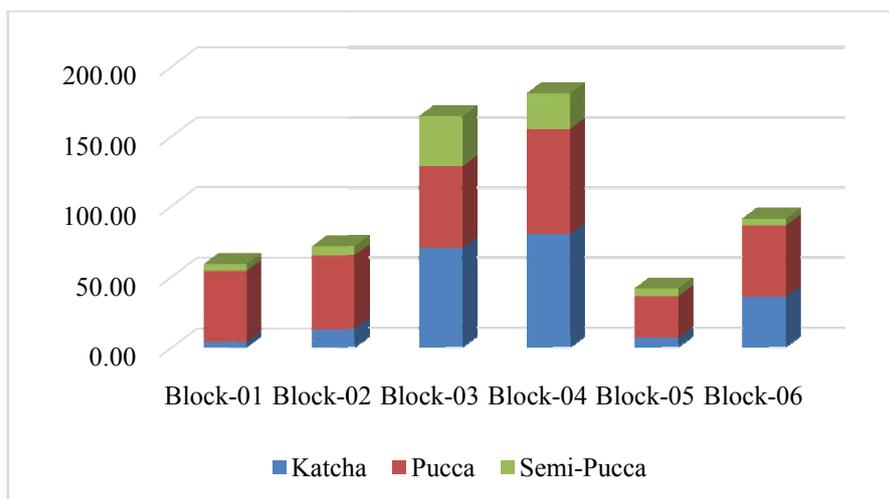


Figure 2.4: Block wise road length (km) according to road surface type

Source: Topographic Survey, 2016

2.10 Economy and Commerce

Industrial sector is the hub of the economy of Narayanganj. It is found that around 3028 numbers of structures are there located in a scattered manner.

Industries of the city have been categorized in line with the category provided by the Department of Environment (DoE). DoE has categorized all the industries on the basis of their impact on environment. In this way all the industries have been categorized in three broad categories. The categories are Green, Orange and Red. Orange category has been further divided into Orange-A and Orange-B.

Most of the industries in Narayanganj are Orange category. It includes dairy farm, food and beverage, poultry, grinding and husking mill, handloom, garments, ship breaking, plastic and rubber, manufacturing and printing, auto mobile repairing works, production of artificial leather goods, salt production, PVC items, brickfield, lime, jute mill etc. About 43.73% of all industries are orange B category. About 10.27% of industries are in red category that includes fertilizer industries, chemical industries, cement, oil factory, iron and steel mill, natural gas, tire and tube industry, paper mill etc. Around 8.88% of industries are in green category, includes assembling, re-packing of goods, jute and cotton products, artificial fibers etc.

Table 2.11 Zone wise industrial land uses in percentage

Zone	Industrial land uses in percentage
Narayanganj	10.06
Siddhirganj	60.22
Kadam Rasul	29.72
Total	100

Source: Land use Survey, 2016

Narayanganj is a city of commercial and industry based. Its economy mostly depends on merchandising yarn and dyeing items. At present it is projected that Narayanganj core area contains 40% of the total population of NCC area. The ranges of community services and employment opportunities have stimulated growth in this area. The city land uses encouraged particularly by commercial and industrial development to serve the region and thus it is generated by increased employment opportunities.

CHAPTER 03:

MAJOR DEVELOPMENT PLAN PROPOSALS OF NCC

3.1 Introduction

In Bangladesh, development activities in the form of schemes are carried out through various agencies under respective ministries. It refers to the sector base development. All schemes to implement the development goals of the government spelt out through five year plans or perspective plans. These are sector wise divided and realized through agencies of each ministry. At city level, various agencies like Power Development Board (PDB), Dhaka Water Supply and Sewerage Authority (DWASA), Department of Public Health Engineering (DPHE), Roads and Highways Department (RHD), Local Government Engineering Department (LGED) etc. are empowered to implement schemes of the respective ministries. Narayanganj City Corporation (NCC) authority has power to implement projects under the functional jurisdiction. The data of schemes being implemented by various agencies were collected; detail list of schemes has given in survey report. In this section, discussions related to some selected schemes that are taken place being implemented by those agencies.

Data of schemes undertaken by the different agencies have been collected through personal contact with the respective agencies. Consultant's also collected future plan and wishes to development of future city of different agencies through a questionnaire format. Those future plan and wishes has given guideline to prepare the project list for the NCC area.

The different agencies are implementing various development schemes in the city have already been mentioned above. Block wise on-going Projects List are being implemented by NCC. Description of selected schemes from the list of each agency has been presented below.

3.1.1 Schemes of Narayanganj City Corporation Authority

NCC Authority is implementing various types of schemes in the different sector. Construction and maintenance of road, drain; installation and maintenance of street light; solid waste management, sewerage management, installation and maintenance of water supply etc are the main functions of NCC Area Authority. List of projects are given below which is implementing by NCC authority.

- Construction of Nagar Bhaban
- Rehabilitation of Road Construction
- Construction of RCC drain
- Construction, maintenance and improvement of CC and RCC Roads of different area of NCC.
- Construction of Community Centre of different location of NCC.
- Aesthetic improvement of Eidgah
- Construction of Prefabrication shed
- Re-excavation of canal from Sonakanda stadium south-south corner to Shitalakhya river
- Construction of a commercial building (3rd floor) at north side of Sunakanda stadium road
- Jimkhana Lake development Project
- Construction of Ali Ahmad Chunka City Library

- Zimkhana Alauddin Khan stadium improvement Project
- Ali AhamdCunka Stadium at Shahid Nagor
- Construction of two commercial complex named: Padma city Plaza-01 and Padma city Plaza

Broad objectives of the Schemes

NCC Authority has already started to implement some important schemes. The projects are already completed 50% of the total works. The main objectives of projects are:

- Construction of Nagar Bhaban to smooth functioning of CC activities
- New roads improve circulation network on the city
- Construction of library and stadium improves living environment of the city at the same increase mental growth of the child

The development projects of NCC area are implemented by NCC. The funding sources are mainly derived from JICA, ADB, World Bank. In addition, government funds on NCC also utilized in the development works of NCC area.

3.1.2 Schemes of Dhaka Power Distribution Company (DPDC) East and West

DPDC East and West are responsible to supply electricity of NCC. Siddhirganj Power Plant and Haripur Power Plant are two power generation sources in Narayanganj Area. Currently, DPDC East and West have not any specific project to development of the electricity supply or distribution quality. Routine work and some replace of electricity related infrastructure works are ongoing by DPDC. The main works are now working by DPDC is:

- Over loaded transformers are being replaced in DIT Road, Chasara, Narayanganj, Nayamati and B.B. Road Tanbazar
- Over loaded transformers are being replaced in DIT Chasara, Narayanganj, Shashongaon, Gedden bazar and B.B.Road

Program

- Replacement of over loaded transformers

Broad objectives of the Schemes

- To upgrade and enhance capacity of electricity distribution network
- To make distribution line more efficient and effective

3.1.3 Schemes of Bangladesh Inland Water Transport Authority (BIWTA)

BIWTA is responsible to construction, maintenance of River Ports, Ghats etc. The present ongoing works of BIWTA is given below.

Program

- Tree Plantation program running (River side)
- Terminal board (Rupayan) continues.
- Construction Walkway from Demra to Saidpur
- River Preservation for water transport

Broad objectives of the Schemes

- Tree plantation helps to protect river bank, it also helps to protect environment of the river bank

Schemes of Dhaka Water Supply and Sewerage Authority

Dhaka Water Supply and Sewerage Authority have running some projects which is essential for the city. The ongoing projects under DWASA are given below.

- Installation of water treatment plant
- Construction and Development of water line
- Installation of Deep tube-well

The objectives of the scheme are:

- Augment the supply of drinking water in the city
- Bring new areas under piped water supply network

3.1.4 Schemes of Local Government Engineering Department (LGED)

LGED has taken up different types of projects in NCC area. The projects are taken by LGED are:

- Construction of various roads
- Construction of Footpath
- Construction of Urban primary health care centre (Bandar)
- Construction of Primary Teachers Training Institute (Sadar)
- Construction of Primary school (5 Upazilla)
- Construction and Maintenance of Sewerage line
- Tube-well installation
- Water block construction
- Installation of Street Lighting System with Ornamental Lighting in Siddhirganj and Kadam Rasul Zone
- Proposed Baburail Khal Improvement Project-3.8 km
- Proposed Siddhirganj Lake improvement Project-5.2 km

The objectives of the Scheme

- Enhance drainage and water retention capacity of the canal through re-excavation
- Protect the side of the canal from erosion through slope protection work

3.2 Public Consultation

Peoples' Participation is an important planning tool in the plan preparation. People participation in the planning and development control process is help planners and decision makers making planning proposals based on the local knowledge, experience and nature. People of the Planning area are the main stakeholder of the plan. If they involve at the time of plan preparation, that plan will be a realistic plan. Consultant team of AAP of NCC has organized few consultations in the different time.



Photo 3.1: Meeting with Honorable Mayor, NCC

The list of consultation has been held on the project are:

- Consultation with Mayor
- Consultation with Ward Councilors
- Consultation with Representatives of Public Agencies
- Block wise consultation with stakeholders

3.2.1 Meeting with Mayor

A meeting has been held with honorable Mayor of NCC at her office on 25th May, 2015. Additional Chief Engineer, LGED and assigned office of the NCC Area Plan Project, Mr. Akhtar Mahmud, Senior Consultant, AAP of NCC, Urban Planner, AAP of NCC-LGED, Urban Planner, NCC, General Manager, Development and Design Consultants Limited and Team Leader, Narayanganj City Corporation AAP were also attended the meeting. Present scenario of NCC, problems of NCC, difficulties faced NCC at the time of project implementation, shortage of manpower etc was discussed on the meeting.



Photo 3.2: Discussion with officials of NCC, Kadam Rasul Regional Office

3.2.2 Consultation with NCC Councilors

Consultation with NCC councilors was taken place at 20 October, 2015, Conference Room, Kadam Rasul Regional Office, NCC. Councilors of Kadam Rasul Zone were the main participants of the consultation.

This was a preliminary formal meeting with mayor and councilors, Chief Executive Officer (CEO), NCC were chair the meeting. Honorable CEO has given importance on the peoples' participation on the time of plan preparation. He also mentioned some problems of NCC like water logging, Traffic Jam, insufficient drainage management system and lack of solid waste management system etc. Team Leader, AAP of NCC described the importance and functions of Action Area Plan and the way how Action Area Plan will implement after the plan preparation. Accordingly the Focus Group Discussion

(FGD) has been arranged inviting all the councilors and officials of the city corporation. NCC official and Councilors of different wards was attend the meeting.

- Identification of CS Khals and Rivers into the Mauza Maps and eradication of encroachment of Khals and Rivers
- Identification of Govt., Semi-govt. and Khal Land and eradication of encroachment from those lands
- All councilors agreed to cooperate with the consultants at the time of Plan preparation and plan implementation stage
- Most of the councilors identified Water logging, Solid waste management, Drainage Problem, encroachment of land, lack of Schools, hospital, lack of utility facilities are the main problem of Kadam Rasul Zone

Second consultation with NCC councilors was taken place at 28 October, 2015, Conference Room, Kadam Rasul Regional Office, NCC. Councilors of Councilors of Narayanganj Sadar and Siddirganj Zone were the main participants of the consultation.

The Consultants arranged FGD with the City Mayor and elected councilors for Narayanganj and Siddirganj Zone of the city corporation. This was a preliminary formal meeting with mayor and councilors. Chief Executive Officer, NCC was chair the meeting. Honorable CEO has given importance on the peoples' participation on the time of plan preparation. He also mentioned some problems of NCC like water logging, Traffic jam, insufficient drainage management system and lack of solid waste management system etc. Team Leader, AAP of NCC described the importance and functions of AAP and the way how AAP will implement after the plan preparation. Accordingly the FGD has been arranged inviting all the councilors and officials of the city corporation. NCC official and Councilors of different wards attended in the meeting.

- Identification of CS Khals and Rivers into the Mauza Maps and eradication of encroachment of Khals and Rivers.
- Identification of Govt., Semi-govt. and Khal Land and eradication of encroachment from those lands.
- All councilors agreed to cooperate with the consultants at the time of Plan preparation and plan implementation stage.
- Most of the councilors identified Water logging, Solid waste management, Drainage Problem, encroachment of land, lack of Schools, hospital, lack of utility facilities are the main problem of Kadam Rasul Zone.



Photo 3.3: Consultation with Councilor of Kadam Rasul Zone

3.2.3 Consultation with Representatives of Public Agencies

Consultation with Representatives of Public Agencies was taken place at 21 October, 2015, Conference Room, Nagar Bhaban, NCC. Representatives of Public Agencies were the main participants of the consultation.

The Consultants arranged a meeting with the representatives with Govt., Semi-Govt. and public agencies have their activities in the NCC area. This meeting was organized by the Consultants, the main objectives of the meeting was the dissemination of Knowledge between different agencies. Honorable Mayor Salina Hayet Ivy was took the chair of the meeting. Honorable Mayor given thanks to all

participant for coming the meeting and at the same she also seek help to the representatives of the agencies to make a sustainable and realistic Action Area Plan. Mr. Md. Nurullah, Additional Chief Engineer, LGED and assigned officer of AAP of NCC also present on the meeting and he was the main speaker of the Meeting. He gave his presentation with the help of power point. Project Context, necessity, concept of Action Area Plan, he also addressed the present project formulation system of Bangladesh. The representative of Govt./Semi-govt./public agencies was given their opinion in the context of NCC AAP.

- All member of the meeting agreed to work together for preparation of a sustainable and realistic Action Area Plan.



Photo 3.4: Consultation with Councilor of Narayanganj and Siddhirganj Zone

3.3 Desired Project Proposal of different Agencies

Consultation with line agencies has been taken place in NCC authority. Representatives of the different line agencies was attended the meeting to share their views and expectation about NCC. They also have shared their problems at the time of implementation of projects. A formatted questionnaire has been supplied to the line agencies to know their present activities, present schemes and the future programs/expected works. The lists of proposed program and expectation for next 5 years are given below.

Table 3.1: List of Proposed Projects of Different Line Agencies

Name of the Organizations	Proposed Program for next 5 years (2016-2020)
Dhaka Power Distribution Company Ltd. (East)	New transmission line will be constructed and the capacity of the substation will be increased under the jurisdiction area of the organization.
Dhaka Power Distribution Company Ltd. (West)	New transmission line will be constructed and the capacity of the substation will be increased under the jurisdiction area of the organization.
BIWTA	i. Construction of Boat Ghat at proposed Sidu Point ii. River dredging will be continuing to achieve the expected navigational clearance.

Name of the Organizations	Proposed Program for next 5 years (2016-2020)
	iii. Construction of 4 nos Boat Ghat at Mirrail and Demra. iv. Construction of New Launch Terminal
BRTC	i. Socio-economic condition of the people will be improved by providing better services for passenger. ii. Trained manpower will be increased by providing training to poor people.
AC Land Office (Fatulla Revenue Circle)	Digital land management system will be introduced to reduce land related conflicts.
DWASA	i. Water will be supplied to every household of the city. ii. New sanitation system will be introduced.
Fire Service and Civil Defense	i. Volunteer training, workshop will be arranged to disseminate knowledge to the general people. ii. New technology and equipment will be imported to up gradation of the facilities.
TITAS Gas Limited	i. Special provision of gas supply will be introduced in the economic zone ii. New gas line will be connected to serve all area of NCC
Local Government Engineering Department (LGED)	i. Construction of roads(Narayanganj Sadar, Bandar, Sonargoan, Rupganj) ii. Construction of bridge(Bandar, Sadar)
Public Health Engineering Department	i. Provide 1(one) tube-well for each person ii. Supply 100% pure drinking water and sanitary latrine iii. Improvement of health care facility

Source: Prepared by the DDC Consultant

3.4 Prospects and Problems of Development Projects

Different line agencies play an important role into the NCC Area jurisdiction. All agencies has their own functions and work jurisdiction. The projects of the different agency indicate some prospects and some prospects of the NCC area. The prospects and problems of NCC area are given below.

Prospects:

- All line agencies are active and efficient in NCC area
- Different sectors agencies are working under the NCC jurisdiction

Major Problems of NCC Area

- Lack of Coordination among different organization
- Duplication of work is vital issue of planning. For example, NCC authority and LGED are responsible for road construction. Few roads are funded by LGED on the other land few roads are funded from NCC own fund. If coordination among two agencies is not established, there is possibility of work duplication
- There is no central sewerage system for NCC Area but responsible organization has not taken any project of sewerage system.

CHAPTER 04

PLANNING PRINCIPALS AND STANDARDS FOR AAP

4.1 Introduction

It is important to propose plans based on some standard and guidelines to ensure well-planned city and smooth services of community facilities and infrastructure. Adequate provisions of community services of proper standard make life in urban area and dispersed settlement easy and help to improve the quality of life. Deficiency or shortage of community facilities may create a lot of problems in social, cultural and economic aspects of life. Space standards for urban community facilities of NCC are followed through the suggested standard of RAJUK for DMDP area.

4.2 Planning standard for Community Facilities for AAP

With a desire of converting the congested and packed Dhaka into a green Dhaka, the consultants of Detailed Area Plan (DAP) provided standards for community facilities at neighborhood level. Space Standards for urban community facilities for private housing projects as per "Private Residential Land Development Project Rules, 2004" and amendment in 2012, is practiced by RAJUK for DMDP area for approving private residential projects.

There has prepared a planning standard in Rangpur City Corporation Master Plan Project which is prepared according to the guideline of DAP. This is the latest standard applicable for City Corporation area in our country. Considering the development prospects of NCC area and being a part DMDP area, standards for the social services and facilities of a Neighborhood development are provided in table 4.1.

Table 4.1: Community Facilities Standard for NCC Area (AAP)

Facility	Home to Facility Distance (Km)		Area Required (Acre)		Population Served		Remarks
	Desired	Max.	Min	Desired	Min	Desired	
Educational							
Nursary School	0.25	0.5	0.2	0.4	2000	5000	• Play group to KG
Primary School	0.25	0.5	1	1.5	1500	5000	• Baby – Std. V • (6 Classes)
High School up to Std. X / Madrasa up to Dakhil	1.0	1.5	1.5	2.5	5000	10000	• Std. VI – Std. X • Dakhil Madrasa
High School up to Std. XII / Madrasa up to Kamil	1.0	1.5	2.0	3.0	5000	15000	• Std. VI – Std. XII • Kamil Madrasa
Vocational Institute	2.0	3.0	2	3	15000	25000	
College	2.0	3.0	3.0	4.0	15000	25000	• Std. XI to Std. XII
University College	-	-	10.0	15.0	-	100000	• Std. XI to • Honors/Masters
Public University	-	-	20.0	50.0	-	100000	• Honors to Masters and • Research up to Ph.D.
Private University	-	-	2.00	5.00			
Community Organizations							
Mosque	0.2	0.3	0.2	0.67	1500	5000	• Must obtain Authority's Permission

Facility	Home to Facility Distance (Km)		Area Required (Acre)		Population Served		Remarks	
	Desired	Max.	Min	Desired	Min	Desired		
							• Based on Muslim Population	
Temple	5.0	-	0.2	0.5	-	-	• Must obtain Authority's Permission • Based on Hindu Population	
Church							•	
Pagoda							•	
Library	1.0	1.5	0.2	0.5	-	-	• Population served depends on Structure Capacity and Collection of Books	
Community Hall	-	-	0.5	1.5	-	50000	• 1 per block • 1 per non-core activity center • Capacity -300 people	
Recreational Facilities								
Cinema Hall	3	-	0.3	0.5	25000	-	•	
Play lot			0.1	0.16	200	500	• Right beside residence •	
Play Ground for young	0.25	0.5	1.5	2.5	3000	5000	• May not be required so frequently where adequate School field is provided	
Play Field for adult/Eidgah	-	-	3.25	5.0	-	-	• 1 per block • Have to accommodate a standard cricket field	
Play Field							•	
Children's Park	0.25	0.5	0.5	1.5	1500	5000	• Must be Within Community	
Community Park	0.5	1.0	2.0	10.0	-	-	• 1 per block	
Water-shed preservation with park settings							• To protect water bodies	
Zoo with park setting							• At regional level	
Adventure track with park setting							• At regional level	
Graveyard/ Crematorium/ Cemetery								
Graveyard	-	-	3	5	30000	50000	• Population of that faith	
Crematorium	3.0	-	1	2	-	50000	• Population of that faith	
Cemetery							• Lump sum area of 5 acre	
Health Care Facilities								
Health Care Centre/Clinic	0.5	1.0	0.3	0.5	5000	10000	• 1 per block • 1 per non-core activity center	
Hospital	-	-	5.0	10.0	-	250000	• Additional hospitals can be promoted to create a treatment hub	
Social Organization								
Police Outpost	-	-	0.2	0.3	-	-	• 1 per non-core activity center • Preferably at large commercial center • 1 at potential crime zone	
Fire Service	Type-A	5	10	0.2	0.5	-	-	• To be placed in residential zone
	Type-B	5	10	0.2	0.3	-	-	

Facility	Home to Facility Distance (Km)		Area Required (Acre)		Population Served		Remarks
	Desired	Max.	Min	Desired	Min	Desired	
							• Near industrial zone
Post Office	-	-	0.1	0.15	-	-	• As per Post Office Rules • Post box may be placed at suitable distance for convenience
Commercial							
Katcha Bazaar	0.75	1.5	0.3	1.0	25000	50000	• 1 per block • 1 per non-core activity center
Grocery shops to serve residential areas	0.1	0.15					• Only daily household necessities will be sold • Should not be placed in road corner
Small Commercial Hub							• 1 per block
Central Business District (CBD)							• As per requirement

Note: 'Home to facility distance' shall precede over 'population served' especially in case of low population density.

Average neighborhood population = 12500

Average area of a single neighborhood = 70 acres

Average block size = 4 neighborhoods

Average block population = 50000

4.3 Standard for Transportation Network and Services

In DAP of DMDP area by RAJUK suggested mainly four categories of roads namely Arterial, Distributor, Collector and Access road for Dhaka Metropolitan Area. Suggested width with classification of road by RAJUK in DAP has been shown in Table 4.2.

Table 4.2: Standard Width of Road

Functional Basis	RoW	Hierarchical Basis
Arterial I	30 m	Primary Road I
Arterial II	27 m	Primary Road II
Distributor I	25 m	Secondary Road I
Distributor II	20 m	Secondary Road II
Collector I	15 m	Tertiary Road I
Collector II	12.5 m	Tertiary Road II
Access I	10 m	Access I
Access II	8 m	Access II

Source: DMPD, Detailed Area Plan, Part-II, Page 74

Roads and Highways Department (RHD) of Bangladesh construct only three types of roads all over Bangladesh namely

- National Highway,
- Regional Highway and
- Zila Road.

On May 12, 2003 Planning Department of Planning Commission under the policy of Ensuring Proper and Coordinated Transport and Communication reclassified the existing roads of the country into following categories for construction, development and maintenance purposes:

- i. National Highway
- ii. Regional Highway
- iii. Zilla Road
- iv. Upazilla Road
- v. Union Road
- vi. Village Road.

However, Dhaka City Corporation (DCC) has classified roads, which are maintained by DCC in four (4) categories based on width.

Table 4.3: Classification of roads under DCC

Road Category	Width
Arterial Road	25 m to 31.30 m
Primary Road	10 m to less than 25m
Collector Road	7 m to less than 10 m
Local Access Road	2m to less than 7 m

Source: DCC

4.3.1 Setting standard for NCC

In order to ensure an efficient traffic movement within the City Corporation area, following road classification, function and standards are being proposed for NCC.

Table 4.4: Proposed Road Classification, Function and Standards for NCC

Road Classification		Road Width	Right of Way	Remarks
Hierarchical	Functional	Meters	Meters	
Urban Highway	National/Regional Link	60-80	Road width + Four times of road height from the Existing Ground Level (EGL)	1. 80 meters at points of a. Flyover for local turning b. Ingress to and egress from Highway 2. Inclusive of major local roads on both sides 3. Variable RoW to accommodate slopes of mound on both sides
Primary Road-NCA	Area Connector	40-50		1. 50 meters at points of a. Flyover for local turning b. Ingress to and egress from Highway 2. Inclusive of separate lane for slow moving vehicles on both sides 3. Variable RoW to accommodate slopes of mound on both sides
Primary Road-CA	Arterial	30-40		Major traffic generation facilities to be connected through service lane
Secondary Road	Distributor	20-24		Major traffic generation facilities to be connected through service lane
Tertiary Road	Collector	14-18		Limited on-road parking considering less traffic volume
Tertiary Road	Access	8-12		Limited on-road parking considering less traffic volume. No Parking in narrow access roads

4.4 Necessity of Academics during Action Area Plan period

For smooth execution of providing urban service it is essential to focus on educational facilities and meet the future demand. It is found that Nursery Schools are less than the required number as well the area covered is negligible as per requirement. There have 152 numbers of Primary School, 85 numbers of High Schools, 29 numbers of Colleges and 2 universities in NCC area and it covers the total area of 28.13 acre; 28.41 acre; 9.75 acre and 1.02 acre respectively.

A projection of required number of academics has been made up to project year 2021. Table 4.5 provides the details of present academic state and recommended standard provision of educational institute of NCC. All the educational institutions mostly occupy land area below the standard requirement and lack of play field and other amenities.

Table 4.5: Required Academics of NCC area

Block No	Existing School		Required School				Shortfall			
			2016		2021		2016		2021	
	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
Primary School	152	28.13	166	166	193	193.00	14	138	41	164.87
High School	85	28.41	83	124.25	97	145.10	-2	96	12	116.69
College	29	9.75	15	45.18	39	116.08	-14	35	10	106.33
University	2	1.02	8	165.67	10	193.46	6	165	8	192.44
Total	268	67.31	271	501.11	338	647.63	3	433.80	70	580.32

Source: Physical Feature Survey, 2016 and Calculated by the DDC Consultant.

4.4.1 Primary School

Demand calculation of primary school has shown in Table 4.6 indicates that the city will need 41 more Primary Schools at the end of the plan period 2021. Out of the total 21 more primary schools are required in block 01, 3 schools in block 02, 12 schools in block 03, 1 more in block 05 and 12 more schools in block 06. For projecting primary school two factors have been taken into consideration. The factors are population and catchment area of each school. The maximum catchment area has been calculated as 0.5 km for a primary school. Estimation has also been made about the number of schools with standard space and number of schools which need physical extension.

Table 4.6: Demand of Primary School of NCC Area

Block No	Existing School		Required School				Shortfall			
			2016		2021		2016		2021	
	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
Block-01	21	2.86	36	35.97	42	42.01	15	33.11	21	39.15
Block-02	27	7.1	26	26.11	30	30.50	-1	19.01	3	23.40
Block-03	25	5.69	32	32.07	37	37.45	7	26.38	12	31.76
Block-04	47	7.81	33	32.68	38	38.16	-14	24.87	-9	30.35
Block-05	8	1.46	8	7.71	9	9.00	0	6.25	1	7.54
Block-06	24	3.23	31	31.13	36	36.35	7	27.90	12	33.12
Total	152	28.15	166	165.67	193	193.46	14	137.52	41	165.31

Source: Physical Feature Survey, 2016 and Calculated by the DDC Consultant.

4.4.2 High School

The city is found to have 85 high schools of which 17 numbers are located in block 3 and 27 numbers are located in block 4. Out of the total high schools only 3 high schools are located in block 5. In block 06 there have 9 high schools and the area occupied by the school calculated as 8.28 acre where the standard should be 23.35 acre of land. In Narayanganj and Siddhirganj area there have found most

of the schools but the occupied area is very less. There it has found lack of playground, small class room and lack of educational amenities.

From demand calculation as presented in Table 4.7 it is found that the city will need 12 more high schools in different locations of NCC area. Block 01 and block 06 needs 7 and 9 more schools to cope the future demand of high school.

Table 4.7: Demand of High School of NCC Area

Block No	Existing School		Required School				Shortfall			
			2016		2021		2016		2021	
	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
Block-01	14	4.73	18	26.98	21	31.50	4	22.25	7	26.77
Block-02	15	2.96	13	19.59	15	22.87	-2	16.63	0	19.91
Block-03	17	7.05	16	24.05	19	28.09	-1	17.00	2	21.04
Block-04	27	7.62	16	24.51	19	28.62	-11	16.89	-8	21.00
Block-05	3	2.46	4	5.78	4	6.75	1	3.32	1	4.29
Block-06	9	8.28	16	23.35	18	27.26	7	15.07	9	18.98
Total	85	33.10	83	124.25	97	145.10	-2	91.15	12	112.00

Source: Physical Feature Survey, 2016 and Calculated by the DDC Consultant.

4.4.3 College and Universities

Narayanganj city is served by 29 colleges; total calculated area is 21.82 acre. Most of the colleges are located in block 02 and in block 04. The city is found to have 2 colleges in block 04 and there also have 5 more colleges in block 01 and 3 in block 03. The present number of colleges serving the whole Narayanganj city but could not cope with the next five years demand of the growing up population of the city. There are needs for more standard colleges to serve people in higher education level. Most of the colleges do not fulfill the standard while location distances of these colleges are very low.

Table 4.8: Demand of College of NCC Area

Block No	Existing College		Required College				Shortfall			
			2016		2021		2016		2021	
	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
Block-01	5	3.68	7	21.58	8	25.20	2	17.90	3	21.52
Block-02	7	4.42	5	15.67	6	18.30	-2	11.25	-1	13.88
Block-03	3	1.97	6	19.24	7	22.47	3	17.27	4	20.50
Block-04	8	2.71	7	19.61	8	22.90	-1	16.90	0	20.19
Block-05	2	3.04	2	4.62	2	5.40	0	1.58	0	2.36
Block-06	4	6	6	18.68	7	21.81	2	12.68	3	15.81
Total	29	21.82	33	99.40	39	116.08	4	77.58	10	94.26

Source: Physical Feature Survey, 2016 and Calculated by the DDC Consultant.

Table 4.8 presents the estimated demand up to project year 2021 and shows the block wise detail information on existing college and projected requirement of the area. It has calculated that 10 more colleges will be need to meet the future demand of college. Among of them 3 more colleges in block 01 and block 06. The area shortfall is more in block 01.

There are 2 universities, 1 medical college and 1 dental college in Narayanganj. These institutions are private and not followed by the standard space requirement. Therefore proposal is being made for

merger of some of these colleges to attain standard. Following measures may improve the college level education throughout the city.

- Area extension is needed to meet the space requirement.
- Honors and post graduate programs should be introduced among existing colleges.
- The Colleges should be equipped with adequate logistics for the introduction of post graduate education along with honors courses.

4.5 Demand Assessment of Community Facilities

4.5.1 Children’s Park and Playground

There should have Community Park and Children Park in every community and block. For healthy lifestyle it is necessary in all age group. In NCC area there exist only 6 numbers of parks. These are not enough for the community people to meet the existing demand as well future demand. Existing 6 parks are located in block 01, 02 and in block 04. Area of these parks is not enough in the context of area standard of community facility. Table 4.9 shows the future demand calculation of park in NCC area. According to the ICGP funded by JICA there proposed 2 new parks in NCC area to ensure the future requirement of community park. AAP consultants have followed up to create a link to incorporate with the designed park and AAP proposal.

Table 4.9: Block wise demand calculation of Park in NCC area

Block	Existing Facility		Required Facility		Required Area		Area Shortfall	
	Number	Area in Acre	2016	2021	2016	2021	2016	2021
Block 01	2	0.40	1	1	53.96	63.01	53.56	62.61
Block 02	2	1.80	1	1	39.17	45.74	37.37	43.94
Block 03	-	-	1	2	48.11	56.18	48.11	56.18
Block 04	2	0.33	1	2	49.02	57.24	48.69	56.91
Block 05	-	-	1	1	11.56	13.50	11.56	13.5
Block 06	-	-	1	1	46.69	54.52	46.69	54.52
Total	6	2.53	6	8	248.51	290.19	245.98	287.66

Source: Physical Feature Survey, 2016 and Calculated by the DDC Consultant.

There have 55 play ground in NCC area and the total area of the playground is not enough as per standard area requirement of the facility. The Table 4.10 shows the demand calculation of playground in NCC area. Most of the playgrounds are located in block 02, 03 and in block 06. Block 05 is lack of playground facility where it is required as 8 numbers of playgrounds but there exist only 2 playgrounds.

Table 4.10: Block wise demand calculation of playground in NCC area

Block	Existing Facility		Required Facility		Required Area		Area Shortfall	
	Number	Area in Acre	2016	2021	2016	2021	2016	2021
Block 01	6	3.34	36	42	89.93	105.02	86.59	101.68
Block 02	10	7.13	26	30	65.29	76.24	58.16	69.11
Block 03	14	6.43	32	37	80.18	93.63	73.75	87.20
Block 04	9	3.40	33	38	81.70	95.41	78.30	92.01
Block 05	2	2.88	8	9	19.26	22.49	16.38	19.61
Block 06	14	12.04	31	36	77.82	90.87	65.78	78.83
Total	55	35.22	166	193	414.18	483.65	378.96	448.43

Source: Physical Feature Survey, 2016 and Calculated by the DDC Consultant.

From the physical feature survey it is found that the city needs more playground as well as recreational facilities. Following observations are derived from the survey findings:

- Play lot for kids is almost absent. Nursery schools are the only place for the growing up young kids.
- Most of the primary school fields are not sufficient for the students.
- Stadiums are not well facilitating by the authority.
- Playfield of full cricket ground size is not open for all.

Consideration for the improvement of community playground and play field:

- More area requirement for the nursery school.
- Ensure safe play lot for young kids through rising awareness of community people.
- Playground with school should open for all.
- Playground should improve in community level.
- To ensure safety and protect from encroachment there should have safety and boundary fence around playground.

4.5.2 Proposal of Community Park in NCC area

Presently a new park is being developing in block 06 in Kadam Rasul zone. NCC is responsible to implement the construction of newly designed park. The name of the scheme of proposed park by ICGP is “Construction of Biological Park with related development works at Sonakanda in Kadam Rasul zone”. The main focus of this park is to preserve the Sonakanda fort and surrounding area of Tribeni khal. This park will be a good recreational facility of the entire city and will protect the water flow of the existing khal as well will ensure healthy environmental condition. The estimated cost of the proposed park is taka 100 Crore.

There is another proposal for park of ICGP funded by JICA located in ward no 18 (Block 01). The name of the scheme is “Construction of Sayedpur Heritage Park with related development works at Shahidnagar in Narayanganj Zone”. The project cost has estimated as 85 core taka. AAP consultants has proposed a drive way along with Sitalakhya river and the park would be along with the drive way.

4.5.3 Demand Assessment of Health Facilities

From survey it has found that in NCC area there have 68 numbers of health facilities which include Govt. hospitals, medical centers, diagnostic centers, clinics, private hospitals and doctors' chamber. Among 68 facilities 25 numbers are hospitals including both government and private, 21 numbers are clinics and 18 medical centers. Most of the health facilities are located in block 02 and in block 03. In block 02 there exist 11 hospitals and 7 clinics, most of them are located along with Nawab Salimullah road. Narayanganj General Hospital and Narayanganj 200 Bed Hospital these two are the major government hospitals serving Narayanganj city area.

None of the hospital and clinic fulfills the standard area requirement and lack of required facilities. However, the facilities of the hospital are seems enough at present but that wouldn't meet the future demand of the next five year. There have established lots of diagnostic center, clinic and medical centers to promote medical facility and ensure treatment opportunity where govt. facility couldn't reach. Most of the hospitals and clinics are agglomerated in and around Chasara, Khanpur.

Following observations are derived from the survey findings:

- Location of medical center and clinics are in a scatter manner.
- Lack of Treatment facilities in Kadam Rasul zone. Most of the people have to go core area of Narayanganj both for check up and medical test. There is no diagnostic center in Kadam Rasul.
- Total floor area is not enough according to the demand.
- Unhygienic condition especially in govt. hospitals and poor management.
- Insufficient number of medical equipment
- Insufficient number of doctor, nurse and medical staff.

A projection of required number of medical facilities has been made up to 2021 in the Table 4.11 and Table 4.12.

Table 4.11: Block wise demand calculation of Hospitals in NCC area

Block No	Existing Hospitals		Required Hospital		Required Area (Acre)		Area Shortfall (Acre)	
	Number	Area (Acre)	2016	2021	2016	2021	2016	2021
Block-1	4	1.46	1	1	7.19	8.40	5.73	6.94
Block-2	12	7.46	1	1	5.22	6.10	-	-
Block-3	3	0.46	1	1	6.41	7.49	5.95	7.03
Block-4	5	0.76	1	1	6.54	7.63	5.78	6.87
Block-5	-	-	1	1	1.54	1.80	1.54	1.80
Block-6	1	0.06	1	1	6.23	7.27	6.17	7.21
Total	25	10.2	6	6	33.13	38.69	22.93	28.49

Source: Physical Feature Survey, 2016 and Calculated by the DDC Consultant.

Table 4.12: Block wise demand calculation of Clinics and Medical Centers in NCC area

Block No	Existing Clinics and Medical Centers		Required Clinic and Medical Centers		Required Area (Acre)		Area Shortfall (Acre)	
	Number	Area (Acre)	2016	2021	2016	2021	2016	2021
Block-1	5	0.17	18	21	8.99	10.50	8.82	10.33
Block-2	10	0.64	13	15	6.53	7.62	5.89	6.98
Block-3	10	1.11	16	19	8.02	9.36	6.91	8.25
Block-4	6	0.44	16	19	8.17	9.54	7.73	9.1
Block-5	3	0.18	4	4	1.93	2.25	1.75	2.07
Block-6	5	0.25	16	18	7.78	9.09	7.53	8.84
Total	39	2.79	83	97	41.42	48.37	38.63	45.57

Source: Physical Feature Survey, 2016 and Calculated by the DDC Consultant.

4.5.4 Proposal of health facilities

Existing number of hospitals and clinics seems enough as per requirement but at the end of the project year it wouldn't meet the requirement of projected population. Allowing future demand following proposal should have taken in consideration.

Table 4.13: List of Proposed Health Facilities need to Improve

Development type	Name of Health Facilities	Location
Fulfill Space Standard	Narayanganj general hospital	Nitaiganj, Block 01
	Narayanganj 200 bed hospital	Khanpur, block 02
	Sumilpara union poribar porikalpona hospital	Siddhirganj, Block 03
Sub-Total	03	
Fulfill Facility Standard	Prime general hospital	Hajiganj, Block 02
	Medistar general hospital	Khanpur, Block 02
	Shajada hospital	Shimrail, Block 04
	Ma o Shishu medical	Jalkundi, Block 03
	Surjer hasi chinnito clinic	Godnail, Block 03
	Jalkuri Community Clinic,	Jalkuri, Taltola. Block 03
	Boktir Kandi Community Clinic	Boktir Kandi, Block 06
	Ataul Taherun private Hospital	Boktar Kandi, Block 06
Sub-Total	08	
Fulfill area and Facility Standard	Bottola Community Clinic	Bondor, Block 05
	Lakhon Khola Govt. Hospital	Bondor, Block 05
	Sonakanda Community Clinic	Sonakanda, Block 06
Sub-Total	03	
Grand Total	15	

Source: Physical Feature Survey, 2016 and Calculated by the DDC Consultant.

4.5.5 Demand Assessment of Community Centers

The project area has lack of community center and no land for it. Only 8 centers are there in Narayanganj. Among them five are located in Kadam Rasul. There have one community center in block 02, block 03 and block 04 except in block 01. According to the population and standard requirement it should be more in number and area. Table4.14 shows the assessed demand of community centers up to project year 2021 for NCC area.

Table 4.14: Block wise Community Centers in NCC area

Block	Existing Community Centers		Required Community Centers (Number)		Required Area (Acre)		Area Shortfall (Acre)	
	Number	Area in Acre	2016	2021	2016	2021	2016	2021
Block 01	-	-	4	4	5.40	6.30	5.40	6.30
Block 02	1	0.075	3	3	3.92	4.57	3.85	4.50
Block 03	1	0.067	3	4	4.81	5.62	4.74	5.55
Block 04	1	0.094	3	4	4.90	5.72	4.81	5.63
Block 05	2	0.2177	1	1	1.16	1.35	0.94	1.13
Block 06	3	0.2141	3	4	4.67	5.45	4.46	5.24
Total	8	0.6678	17	20	24.85	29.02	18.79	22.04

Source: Physical Feature Survey, 2016 and Calculated by the DDC Consultant.

4.5.6 Proposal for Community Centers

a) According to ICGP (Inclusive City Governance Project) JICA has proposed four numbers of community centers in block 3,4,5,6 (ward no-05, 10, 19, 25) and its tentative cost is 16 core taka. NCC is responsible to construct these community centers on authority's own land.

b) There has also a proposal for Cultural Center cum community center for Ward no- 17 (block 01) in ICGP. Its tentative cost has estimated as 3.60 core taka. (Final Report, Project for Developing Inclusive City Governance for City Corporation, LGED, 2014)

c) There should have community center for every ward as well as every block. To meet the existing demand it is proposed a multistoried building for multipurpose use as ward councilor's office, community center, community library, indoor kids' amusement facility, and super shop could be introduced. This multipurpose building has termed as "Neighborhood Center". In ICGP JICA proposed Ward office in every ward and estimated cost is calculated as 54 core taka. It is decided to construct such kind of Neighborhood Center concept through combined meeting with NCC Mayor, Ward councilors, Action Area Plan Consultants experts as because of lack of khas land and limited resources.

CHAPTER 05

DEVELOPMENT CONTROL, ZONING AND MANAGEMENT FOR AAP

5.1 Development Control Techniques

It is very indispensable to have some development controls, guidelines, zoning regulations and land management techniques for the proper development of NCC area. These rules and regulation will help the NCC authority to implement the AAP for NCC area. Addressing the issue, few popular development control techniques are briefly described below.

5.1.1 FAR (Floor Area Ratio)

FAR was developed as a more refined and adaptable measure of intensity than building coverage. Previously “plot ratio” was also practiced for this purpose. This type of measure restricts the buildings height and the floor area, just as limiting housing construction restricts population. It expresses in one measure, instead of several. The mathematical related between volume of building and unit of land. FAR, however, cannot replace more traditional bulk controls entirely. It is not a sufficient height control nor does it regulate the placement of the building on the site. So this technique is mainly used for regulating a building in a site.

5.1.2 Restriction on Number

Within this category a fixed number of residential buildings, commercial buildings or the industrial units are permitted for a given time period. Management of commercial buildings and industrial units come in two shapes: one is restricting the amount of square footage of commercial or industrial structures that can be built within a given time frame and another measure is to restrict height.

5.1.3 Urban Growth Boundaries

Delineating boundaries to restrict growth comes in two major types; one is to permit and limit residential, commercial or industrial development within a given jurisdiction boundary.

These boundaries seek to limit urban growth to specify geographic areas through regulatory restrictions or limitations on infrastructure expansion. Another type is phasing development areas where development approval is deferred until a certain time period or until existing developed areas are substantially developed. Phased development control can slow growth to allow municipalities to budget expenditure for expansion of municipal service to developing areas over a longer period. Slower growth can prevent the overburdening of existing facilities while new one is being constructed. Phasing can also encourage growth near existing built-up areas, helping to reduce sprawl development.

5.2 Zoning technique

Zoning is, of course, the most basic and commonly used land use regulatory tool. Zoning is an action determined through legislation empowering the city authorities/municipalities/development authorities to control:

- The heights to which buildings may be erected
- The area of lots that must be left un-built upon, and
- The uses to which buildings and lots may be put.

Land-Use (Zoning) by-laws build up the Land-Use zones which are set out in the Strategy with various allowed land-utilizes as a part of every zone (a few zones list the utilizations that are disallowed as opposed to the allowed employments). They likewise incorporate procurements representing such things as building stature, mishaps, yard sizes, parcel sizes, part facing, site-plan endorsement criteria and things that might be tended to in site-arranging and other advancement principles for the particular zones built up. Such by-laws are joined by Zoning Maps which graphically demonstrate how the terrains inside the district are zoned.

There are various essential zoning systems that can be utilized which are plot underneath. These methods require supporting strategies in the Strategy.

5.2.1 Pre-Zoning

Pre-zoning is the zoning of area such that the prevalent existing utilization of the area is not predictable with the zone set on the area. It is zoning land for some future use, and in many occasions this includes the zoning of empty area. This is a method for guiding certain sorts of improvement to specific grounds. Case of pre-zoning are the zoning of empty area for business or modern utilize or zoning a urban transitional region for business use in spite of the certainty, for instance, that a part of the zone might be in private use.

In developed groups, this methodology may not generally be proper. For instance, it could bring about various nonconforming uses or the zone put on the area might be excessively unbending and restrain the scope of improvements that could be considered by Council. More adaptability might be accomplished by utilizing distinctive arranging apparatuses. In bigger groups where more advancement is happening, it might be fitting to pre-zone land for such things as modern stops, various unit lodging and institutional employments.

One point of interest of pre-zoning is that all designers, subjects, landowners and board know ahead of time where certain sorts of advancement are going. In the event that completed in an adaptable style, with a scope of allowed uses, it will lessen the requirement for Strategy and by-law amendments and development agreements.

5.2.2 Cumulative Zoning

Another zoning approach that has been utilized broadly in the past and utilized less oftentimes today is combined or stacked zoning. This methodology allows an expanding scope of employments in zones through the movement from private to mechanical. That is, a business zone would allow, for instance, R-1, R-2, and R-3 utilizes starting perfectly fine as business uses or a modern zone would permit R-1, R-2, R-3, C-1, C2, or C-3 utilizes starting all right as mechanical employments. (The expression "starting right" implies that the utilization is allowed and an advancement grant must be issued on the off chance that it meets the various zone necessities).

In numerous cases, uses might be commonly contradictory (substantial mechanical and new private or business utilizes, for instance), which recommends the requirement for fundamentally unrelated zones. Thusly, this strategy is not regularly utilized by city organizers; aside from in ranges where an assortment of various areas utilizes inside a territory reflect conventional acknowledged examples of area improvement.

5.2.3 Zoning with Special Provisions

Zoning with uncommon procurements gives control to utilize with extraordinary prerequisites to look after similarity. At the point when utilizing this approach, an utilization is allowed starting right in a zone yet subject to exceptional procurements. For instance, there are regularly uncommon procurements (or advancement guidelines) in the By-law for visitor homes inside a R-1 (Residential) zone, for example, "no outside changes and no stopping in front or side yards." Other unique procurements may include: stature limitations, buffering, stopping and open air stockpiling, and maintenance of trees, motivator or reward zoning. These extraordinary procurements require supporting policies in the Strategy.

5.2.4 Zoning with Listed (Scheduled) Uses

Zoning with listed uses minimizes nonconformity and limits specific uses to specific sites or areas of the municipality. A common issue, particularly in areas that have never had planning, is that a less than desirable mixture of uses may be present. One way of addressing this, without creating a number of nonconforming uses, is zoning with listed uses. This is a technique by which certain existing uses, for example, apartment buildings or certain commercial or industrial uses are specifically listed as uses permitted in a particular zone. For example, the list of permitted uses in the By-law for a zone might include the use: "Existing Apartment Building (As Listed in Schedule of this By-law)." The attached Schedule would then list these existing apartment buildings by civic address and the list would also include the number of dwelling units in each building. This approach can be used to eliminate the number of non-conforming uses within a zone, the number of spot zoned parcels or it might even be used to eliminate the need for a separate zone for some of these uses.

The advantage is that the listed uses are conforming uses and permitted as-of-right and as such they can expand on their lot in accordance with the other zone requirements such as minimum rear and side yard requirements, unless some restrictions on expansion are placed on the use. This method is applicable in situations where Council does not wish to make long-standing uses non-conforming,

since the long-term intention behind creating non-conforming uses is that they should cease to exist in that location.

5.2.5 Height Zoning and Density Zoning

Height zoning is an instrument, practiced by the city authority to control the height of a building in a certain area. The main purposes include controlling of population density and to facilitate elimination of aviation problems near airports. For instance, Nikunja-2 residential area has a height restriction maximum three storied due to position of the locality in the flight zone.

Density zoning, on the other hand, also control population or activity density in a specified area. It may be imposed by a local authority either to reduce or increase density. Height zoning is also a type of density zoning. Floor Area Raito, Set-back Rules, etc. are common practice in our municipalities to control height of buildings.

Different types of zoning control can be easily illustrated through the following figure.

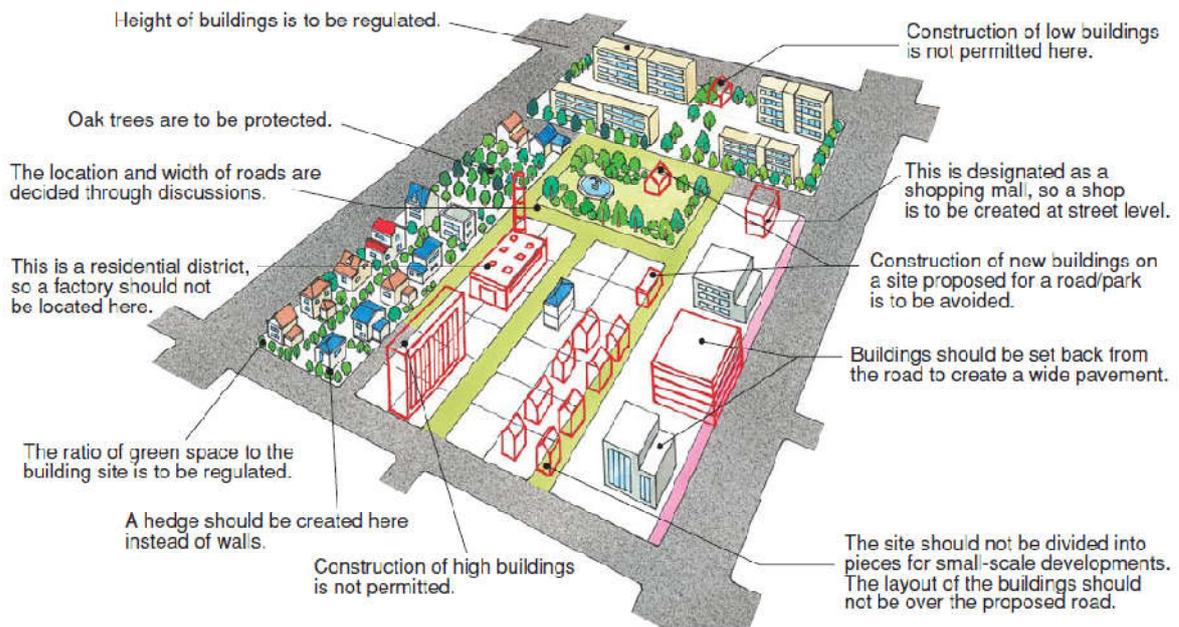


Photo 5.1: Illustration of Development Control incorporating Zoning

5.1 Zoning Regulations

Zoning Regulations (Acts/Laws) and Agencies	Illustration of Relevant section of Acts/Laws	Land use Categories
<p>The Town Improvement Act 1953 (amended 1987) RAJUK</p>	<p>Sections 73 and 74. Section 73(1) As soon as may be after the provisions of the Act comes into force, the [Kartripakkha] shall prepare the Master Plan for the area within its jurisdiction indicating the manner in which it proposes that land should be used and the stages by which any such development should be carried out</p> <p>Section 74 (1) When the [Govt.] approves the Master Plan submitted under Section 73, it shall announce the fact by notification and the publication of such notification, shall be conclusive evidence that Master Plan has been duly made and approved, and thereafter it should be unlawful for any person to use any land for any purposes other than that laid down in Master Plan, unless he has been permitted to do so under Section 75.</p>	<p>Dhaka Structure Plan 1995-2015</p> <ol style="list-style-type: none"> 1. Established Urban Area up to 1989 (Consolidation) 2. Agricultural High value Areas 3. Agricultural Areas 4. Urban fringe Area (Acceleration) 5. New urban land Development Area (Promotion) 6. Proposed Urban Development (Enablement) 7. Proposed Recreation/Public Facilities Areas 8. Main Flood Flow Areas 9. Sub-Flood Flow Areas 10. Watershed Protection Areas 11. Special Areas 12. Cantonment Security Zone <p>Detailed Area Plan (DAP) Land Use:</p> <ol style="list-style-type: none"> 1. Administrative Zone 2. Agricultural Zone 3. Commercial Zone (Business) 4. Flood Flow Zone 5. General Industrial Zone 6. Heavy Industrial Zone 7. Institutional Zone 8. Mixed Use Zone (Commercial-General Industrial) 9. Mixed Use Zone (Residential-Commercial) 10. Mixed Use Zone (Residential-Commercial-General Industrial) 11. Open Space 12. Overlay Zone 13. Proposed Road 14. Rural Settlement Zone 15. Transport & Communication 16. Urban Residential Zone 17. Water Retention Area 18. Water body
<p>The Building Construction Act 1952 (amended 1987) RAJUK</p>	<p>DCC The Building Construction Act 1952 (amended 1987) provides power to the authorities concerned for preventing haphazard construction of buildings/structures and excavation of tanks and cutting of hills, which are likely to interfere with the planning of certain areas. Under this act, govt.</p>	<p>The permission of construction of buildings/structures and excavation of tanks and cutting of hills, depend on the provision of the land use which are earmarked in DAP (permissible/non-permissible/conditional/restricted)</p>

Zoning Regulations (Acts/Laws) and Agencies	Illustration of Relevant section of Acts/Laws	Land use Categories
The Dhaka City Corporation Ordinance 1983 (modified 1992) DCC	Section 108, Under this Act, Master Plan- The corporation may, and if so required by the government shall, draw up a Master Plan for the city which shall, among other matters, provided for- Sub-Section (c) restriction, regulation and prohibitions to be imposed with regards to the development of sites, and the erection and re-erection of buildings within the city.	DCC (North and South) usually comply the earmark land use of DAP. <i>(Dhaka City Corporation (DCC) is empowered to prepare master plan under this act. This is an overlapping with the Town Improvement Act 1953 (amended 1987) under Section 73 and 74.)</i>
The Natural Water Body, Open Space, Park/Playfield Protection Law 2000	The identified river, <i>khal, bill</i> , lake, natural water body and flood flow and sub-flood zones in the master plan must be protected.	The areas must be demarcated and published through gazette notification. The character of the areas cannot be changed to project environment
The National Housing Policy 1993 (revised 1999) BNHA	The strategy of the government will be to act as promoter and facilitator of housing by the private sector while retaining the government's role as a provider to a limited extent. Encourage the private sector's involvement in land development, infrastructure development and construction	According to the policy guidelines, all sorts of settlements should take place in the earmark housing area of DMDP Plan-(1995-16)
The Private Residential Land Development Project Rules 2004; amendment in 2012 and 2015; RAJUK	PLDCs must submit project documents layout plan indicating road, infrastructure and service network. In the layout plan, certain land should be preserved (as indicated in the PRLDPR) for schools, colleges, playgrounds, open space, lakes and other uses etc. The project documents shall be checked the authority and make the report on field verification. according to PRLDPR, Revised-2015 During the implementation stage, the authority will supervise and monitor the projects as per instruction of approval.	The Article 6 of Urban Area Plan (DMDP) is followed for development control of Dhaka. The plan is basically a development control document and each and every individual building for housing, commercial, industrial estates need planning permission from the RAJUK.

Zoning Regulations (Acts/Laws) and Agencies	Illustration of Relevant section of Acts/Laws	Land use Categories
The Civil Aviation Ordinance 1960 & Civil Aviation Rules, 1984	<p>The Civil Aviation Ordinance 1960 was made to make better provisions for the control of manufacture, possessions, use, operation, sale, import and export of aircraft, the control and regulation of air transport Services, and the control and development of aerodromes in the country.</p>	<p>Present legal regulatory framework for civil aviation activities in Bangladesh is the Civil Aviation Rules, 1984 and the Air Navigation Orders issued by the Chairman under this rule. All civil aviation activities in Bangladesh are regulated by the Civil Aviation Rules, 1984 which was made and promulgated by the Govt. in exercise of the powers conferred by sections 4, 5, 7 and 8 of the Civil Aviation Ordinance, through this Act/Rule, the land use of surrounding area and buildings are being controlled. As a result, the buildings/structures need permission regarding height before the approval of buildings/structures form RAJUK.</p>
<p>Bangladesh Environment Conservation Act (BECA) 1995, (Amended in 2010)</p> <p>Department of Environment (DoE)</p>	<p>The main objectives of BECA '95 (amended 2010) are:</p> <ul style="list-style-type: none"> • Conservation and improvement of the environment to Control and mitigation of pollution of the environment. <p>The main strategies of the Act can be summarized as:</p> <ul style="list-style-type: none"> • Declaration of ecologically critical areas and restriction on the operations and processes, which can or cannot be carried/initiated in the ecologically critical areas; • Regulations in respect of vehicles emitting smoke harmful for the environment; • Environmental clearance; • Regulation of the industries and other development activities‘ discharge permits; • Promulgation of standards for quality of air, water, noise and soil for different areas for different purposes; • Promulgation of a standard limit for discharging and emitting waste; and • Formulation and declaration of environmental guidelines 	<p>Enforce designated laws and development plans of DMDP mentioning i) permitted ii) conditional and iii) restricted land use</p>

Zoning Regulations (Acts/Laws) and Agencies	Illustration of Relevant section of Acts/Laws	Land use Categories
Bangladesh Environment Conservation Act (BECA), Amended in 2010	This amendment of the act-2010 introduces new rules & restriction on: a) Ensure proper management of hazardous wastes to prevent environmental pollution and Health Risk, b) No remarked water body cannot be filled up/changed; in case of national interest; it can be done after getting clearance from the respective department; and c) Emitter of any activities/incident will be bound to control emission of environmental Pollutants that exceeds the existing emission standards.	

5.3 Land Management Techniques

“Land management” is defined as an activity on the ground, using appropriate technologies in the respective land use systems. Supply of urban land as a resource not only limiting but also localized and at the same time every activity needs urban land. Therefore land management is required to create healthy growth of towns and cities. One of the greatest challenges to engineers, planners and decision-makers is the assurance of Sustainable Land Management (for both Urban and Rural Lands). This concerns exploration and exploitation of a Nation’s natural and Environmental resources, provision of food, social services, education, health, infrastructure development, transportation (road and railway networks), communication and telecommunication, industrial development, population control and protection of the environment for the accelerated and orderly development of a country and its economic recovery efforts without destroying the environment for the generations to come. Land management aims to secure the legal rights to land, while simultaneously upholding the social and productive functions of land. Problems related to land are very complex. Land has always been the prime resources for planning and development of any area. Land is a resource which is constant and cannot be created. Therefore the importance of optimum usage of land in a developing city is obvious. The main challenge of physical planners is the proper and effective land use planning with the allocation of all the physical and social amenities for existing and the growing population of the area and its hinterlands.

5.3.1 Land Pooling, Readjustment and Redistribution Techniques

Land readjustment is a technique whereby a group of contiguous land parcels in an urban-fringe or in an inner city neighborhood are voluntarily brought together or shared for unified planning, servicing and reallocated with project costs and benefits equitably shared between and among landowners.

There is no acquisition or transfer of ownership involved or no case for paying compensation. A master plan of the area is prepared, laying out the roads and plots for social amenities. The remaining land is reconstituted into final plots for the original owners. The size of the final plot is in proportion

to the size of the original plot, and its location is as close as possible to the original plot. A betterment charge based on the cost of the infrastructure proposed to be laid is levied on the landowners. Infrastructure is then provided utilizing these funds.

The Merits are as Follows

- Infrastructure development and social amenities are provided
- The increment in land value resulting from the development accrues to the original owner whenever the land is sold and developed for urban use. Thus the benefit of development goes to the original owner instead of the development agency
- The original owner is not displaced in the process of land development and continues to enjoy access to the land resource

The Demerits are as Follows

- This method is time consuming, since the procedure prescribed for preparation and implementation of such land pooling or readjustment schemes is complicated
- Betterment charges are assessed at the beginning of the land pooling or readjustment scheme preparation. Due to the inordinate delays in finalizing schemes, the betterment charges levied on finalization of the scheme do not meet the cost of the infrastructure provided

Land Readjustment/Redistribution Techniques (LR) transforms a spontaneously developed area into a planned residential area primarily for the residents of the area. The terms readjustment and redistribution vary only in scale. If the desirable development requires minimum change or shifting of

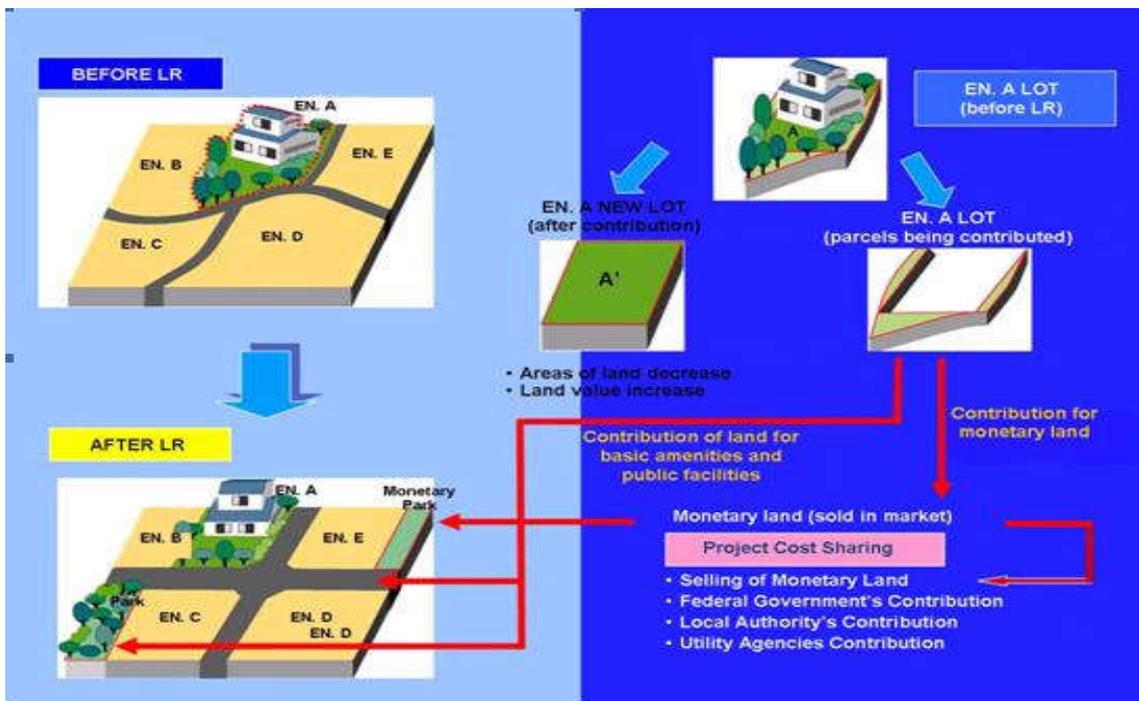


Photo 5.2: Pictorial Presentation of Land Readjustment Concept

the residents, it is connoted as readjustment but in case of massive change or dislocation, it is redistribution.

In LR necessary infrastructure, urban amenities, social services and facilities etc., which is missing or highly inadequate for the proper functioning of the community, are provided utilizing portion of the lands contributed by the residents of the area.

Additional serviced lands for selling at the market rate to meet the cost of development and remaining portion of land parcels are returned to the owners for their residences majority at their own plots and at different locations within the community in case of land readjustment and land redistribution respectively.



Photo5.3: Comparison: Land Acquisition (Upper pair) – Unusable left over plot portions; Land Readjustment (Lower pair) – Usable Smaller plots

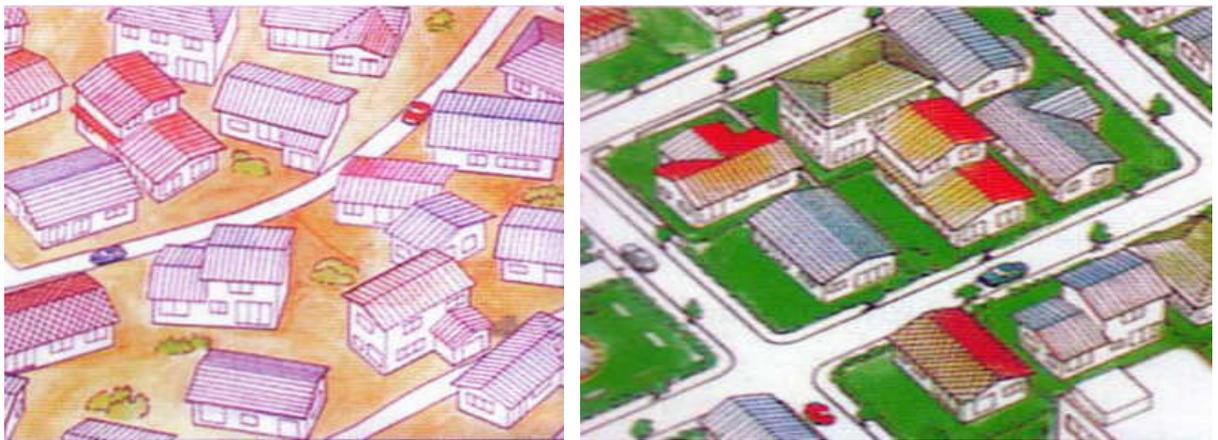




Photo 5.4: Comparison: Land Acquisition (Left pair) – Spontaneous development; Land Readjustment (Right pair) – Planned development

Here negligible seed fund is required from the government's end for the initiation of the project, which also is returned from the benefit of the project. This is a form of participatory project where land owners participate by contributing their land.

5.3.2 Land Acquisition Method

In this technique land is at first brought under government ownership through compulsory acquisition. Then the site is leveled preferably above flood level, intended infrastructures are laid out as per plan, urban amenities, social services and facilities of proper standard are developed in the land, remaining land is subdivided into sellable plots and finally, sold to prospect buyers. Individual plots are developed by the respective owners.

This technique requires huge public investment. Still this technique is preferred by most of the government agencies because of its less complexity in execution. On the contrary, it is disliked by the affected people mainly due to meagerness of the compensation amount of acquired land and property in comparison to current market price that an evicted people ultimately get and the harassment associated with the assessment and receiving of the amount that they face.

Most concern of the urban planners is the loss of community by the evicted people they belonged that provided them with security, fellow feelings and support in need for generations. This problem is even worse when the affected people belong to low income community – the reality in most of the cases. In case of development of 'site and services projects' land development through acquisition evicts the sons of the soil from their ancestral homes, who are in need of government support for development and ironically sells the developed land parcel against profit to higher income and powerful citizens of the society. Spending huge public fund involving so much of government personnel evicting existing

residents from their home making such projects to benefit the already prosperous section of the society does not seem morally unacceptable.

The Merits are listed as Follows:

- Adequate amounts of land for urban uses can be rapidly generated
- There are very few constraints in preparing the master plan
- The benefit of appreciation of land value on its being converted to urban use accrues to the development authority

The demerits of this method are as follows:

- Original owners or farmers don't share this benefit in any manner
- In this method, farmers are essentially thrown off their land
- Unable to wisely invest the money received as compensation for their land. This process adds to familiar urban problems-growth of slums, increase in crime rates, and increased informal-sector economic activity
- The development process is slow. Any person who needs land for urban use has to approach the urban development authority
- Development agencies using the method of bulk land acquisition end up being powerful large-scale land developers, controlling vast urban resources

5.3.3 Rehabilitation Technique

To meet the necessity of the citizen and people living in the vast hinterland large urban scale facilities such as park, city Centre, stadium, water body and water front development etc. are proposed in the plan. Besides, major road and drainage networks are laid out throughout the city requiring massive widening of the existing and construction of new roads and canals. Owing to their location suitability, in spite of meticulous try, involuntary dislocation of families cannot be avoided. Since their contribution directly improve the urban quality of life, it would be only befitting that they are properly rehabilitation in a new site. Such rehabilitation project must include the people already residing in the selected site.

The process starts with the listing of land and fixed property of the evicted families under rehabilitation consideration. Likewise, same information of the families residing in the 'proposed' rehabilitation site is obtained. For both types of families a comprehensive action plan is prepared making provisions for standard infrastructure, urban amenities and social facilities and services in addition to plots. On principle implementation of rehabilitation plan is similar to that of 'site and services' project. But here unlike 'site and services' project the plots are developed for project-evicted and site-existing families only.



Photo 5.5: Phases of Rehabilitation Process:

- 1. Delineation of areas under development and rehabilitation**
- 2. Implement Rehabilitation Project and Rehabilitate evicted population**
- 3. Implement Development at the intended site**

The Rehabilitation technique plays an important role in realizing vital urban facilities at their suitable locations, which otherwise could not be realized without massive public investment and agony of the sons of the soil due to forceful eviction from their homes and community.



CHAPTER 06

LEGAL DOCUMENTS TO SUPPORT THE PROJECT ACTIVITIES FOR AAP

6.1 Introduction

For preparation of Action Area Plan (AAP) and its implementation, legal supports like policies of local government and national act, laws, rules and programmes are needed. These rules and regulations are narrated by the consultant team in view of relevance of the project.

6.2 The Town Improvement Act, 1953 (Amendment 1987)

An act to provide for the development, improvement and expansion of the (Capital of the Republic and Narayanganj and the Tongi Municipalities) certain areas to their vicinity by opening in congested areas, lying out or altering streets, providing open spaces for purposes of ventilation or recreation, demolishing or constructing buildings, acquiring land for the said purposes and for the re-housing of persons displaced by the execution of improvement schemes.

6.2.1 Discontinuance of use of land and alteration or removal of building etc.

- It appears to the “Kartipakkha” that it is convenient in the interest of the public and for the proper planning of the area included in any improvement scheme-
 - (a) that any use of land should be discontinued, or that any conditions should be imposed on the continuance thereof; or
 - (b) that any building or works or factory should be altered or removed,
- The “Kartipakkha” may pass a resolution to the effect and such resolution shall form part of the particulars of the scheme under clause (c) of sub-section (1) of section 45
- The “Kartipakkha” may, frame schemes herein called re-housing schemes) for the construction, maintenance and management of such and so many dwellings and shops as they may consider ought to be provided for persons of the poorer and working classes who-
 - (a) are displaced by the execution of any improvement scheme sanctioned under this Act; or
 - (b) are likely to be displaced by the execution of any improvement scheme which it is intended to frame, or to submit to the Government for sanction under this Act.

6.2.2 Acquisition and Disposal of Land

i) Power to purchase or lease by agreement (Acquisition by Agreement)

The “Kartipakkha” may enter into an agreement with any person for the acquisition from him by purchase, lease, or exchange, of any land or any interest in such land which the Kartipakkha are authorized to acquire.

ii. Power to acquire and disposal of land (Compulsory Acquisition)

- The “Kartipakkha” may, for carrying out the purposes poses of this Act, acquire, by purchase, lease, exchange, or otherwise, any land or interest in land and dispose of, by sale, lease, exchange or otherwise, such land or any interest in such land
- The acquisition of any land or interest inland for the “Kartipakkha” under this section , or for any scheme under this Act, shall be deemed to be an acquisition for a public purpose within the meaning of the Acquisition and Requisition of Immovable Property Ordinance, 1982 and the provisions of the said Ordinance shall apply to all such proceedings.

iii. Disposal of Land (Power to disposal of land)

- The “Kartipakkha” may retain, or may let on hire, lease, sell, exchange otherwise disposal of any land vested in or acquired by them under this Act.
- Whenever the “Kartipakkha” decide to lease or sell any land acquired by them under this Act form any person, they-
 - (a) Shall give notice by advertisement in local newspapers and
 - (b) Shall offer to the said person, or his heirs, executors or administrators, a prior right to take lease or to purchase such land, at a rate to be fixed by the “Kartipakkha”, if the “Kartipakkha” considers that such a right can be given without detriment to the carrying out of the purposes of this Act.
- If in any use two or more persons claim to exercise a right offered under clause 9b) of sub-section (2) to take on lease or to purchase any land, the right shall be exercise by the person who agrees to pay the highest sum for the land, not being less than the rate fixed by the “Kartipakkha” under that clause, to the exclusion of the others.

6.3 Local Government (City Corporation) Act, 2009

▪ **Major Responsibilities of City Corporation**

Town planning: City Corporation has major activity to prepare master plan, site development schemes and execution of site development schemes. On the other hand, the empowerment of City Corporation remains conflict with provision of Town Improvement Act-1953 (Amendment-1998).

Building Construction: City Corporation has an activity to approve building construction and re construction, monitor and control the completion of construction and changes. On the other hand, it is conflict with the Building Construction Act, 1952 (Amendment 1987).

- a. Development:** City Corporation prepares and implements development plans for specific time. Their activities include promotion, improvement, financial aspect, execution of project and supervision. City Corporation promotes and sponsors community development project for the City Corporation area. The City Corporation promote administer execute and implement schemes that are taken for any commercial and business enterprise.
- b. Responsibility for Sanitation:** The City Corporation shall be responsible for the sanitation of the area and also responsible for the control of environmental pollution.

- c. **Removal Collection and Disposal of Refuse:** The City Corporation shall make adequate arrangement for the removal of refuse from all public places such as public street, public latrine, drains and all buildings.
- d. **Birth, Death and Marriages:** City Corporation shall register all birth death and marriages within the jurisdiction of the city corporation. The data must be registered as the by-laws may provide.
- e. **Private Sources of Water Supply:** The City Corporation is responsible to control/regulate and inspect all private sources of water supply within the jurisdiction.
- f. **Drainage:** The City Corporation shall provide an adequate system of public drains and all such drains should be kept clean and emptied with due regard to the help and convenience of the public.
- g. **Public Street:** The City Corporation shall provide and maintain all kinds of public street facilities and other means of public communication according to the comfort and convenience of the inhabitants.
- h. **Streets:** No new street shall be laid out without the previous sanction of the City Corporation and in-conformity with the terms and conditions of such sanction.

6.4 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. To make sustainability of NCC area, the National Environmental Policy 1992 contributes a significant role.

Health Sector

The following environmental issues are important:

- 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 kinds of harmful activities.

6.5 The Environment Conservation Act (ECA), 1995 (Amendment 2010)

Environmental Act, 1995 (Amendment 2010) will protect the environment of NCC Area at the time of preparation and implementation of AAP. Directorate of Environment (DoE) is the enforcement authority of the ECA, 1995. The Act is to provide for the conservation of environment, improvement of environmental standards and control and mitigation of environmental pollution. It is expedient to provide for the conservation, improvement of environmental standard and control and mitigation of the pollution of the environment.

➤ Powers and Functions of the Director General:-

- i) Subject to the provisions of this Act, the Director General may take all such steps as may be deemed reasonable and necessary, for the conservation of environment, improvement of environment and may give necessary direction, in writing, to any person for performing his duties under this Act.
- ii) In particular and without prejudice to the generality of the foregoing power, such measures may include all or any of the following, such as-
 - a. Co-ordinate with any authority or agency having relevance with the objectives of this Act;
 - b. Prevent probable accidents which may cause degradation and pollution of environment, adopt safety measures and determine remedial measure against such accidents and give direction in this regard;
 - c. Advise or in appropriate case, direct the information regarding the environment friendly handling, storage, transportation, import and export of hazardous substance or its components;
 - d. Research and inquire about the information regarding the conservation, improvement and pollution of environment and assist any other authority or agencies in the similar function;
 - e. Examine any place, premises, plants, equipment, manufacture or other processes, ingredients or substances for the purpose of improvement of environment or directions to appropriate authority or person for the prevention, control and mitigation of environmental pollution.
 - f. Collect, publicize and disseminate information regarding environment pollution;
 - g. Advise the Government to reject such manufacturing process, materials and substance as are likely to cause environmental pollution.
 - h. Conduct drinking water quality surveillance programme and submit report and advice, or, in appropriate cases direct, every person to follow the standard of drinking water.
- iii) A direction issues under this section may provide for the closer, prohibition or regulation of any industry, initiative or process and the person shall be bound to comply with such direction, provided that
 - a. The Director general shall , before closing or prohibiting any industry, undertaking or process, send written notice to the owner or occupier of the concerned industry, undertaking or process give reasonable opportunity to make its functioning environmentally sound ; and

- b. The Director General considers it appropriate, he may specify in the notice that if measures are not taken to make the relevant activities environmentally sound pursuant to the notice actions under sub-section (2) of section 4A may be taken.

Provided that, the Director General may, in case of urgency, instantly give necessary direction, if it appears that public life is about to be disrupted due to environmental pollution.

➤ **Declaration of Ecologically Critical Area:-**

- DoE may secure the environmental critical area of NCC to degradation of environment the eco-system of the area has reached or is threatened to reach a critical state, the Government may, by notification in the officials' gazette, declare such area as ecologically critical area
- The Government shall specify, in the notification provided in subsection (1) or any other separate notification, which of the operations or processes shall not be carried or initiated in the ecological critical area.

➤ **Information to the Director General regarding Environment pollution and degradation:-**

- Any person affected or is likely to be affected from the pollution or degradation of environment, may apply to the Director General in the manner prescribed by the rules, for remedying the damage or apprehended damage.
- The Director General may adopt may measure including public hearings for settling an application made under this section.

➤ **Environmental clearance:**

No industrial unit or project shall be established or adopted without obtaining environmental clearance from the Director General, in the manner prescribed by the rules. Provided that, nothing in this section shall apply to participate in class of industries or projects, which the Government may, from time to time, specify for such purpose.

➤ **Cognizance of Offence and claim for compensation:**

No court shall take cognizance or allow any suit for compensation under this Act except on a written report from any other person authorized by the Director General.

Provided that if upon receiving an application, a component court is satisfied that the requested the said Inspector or authorized person in writing to accept a complaint about an offence or a claim for compensation and no action was taken within 60 (sixty) days after such request, and that the complaint or claim deserves to be taken into cognizance for the purposes of trial, then the court may, after giving the Inspector or the authorized person or the Director General a reasonable opportunity of being heard, directly receive the complaints or claim for compensation without such written report, or may, if it considers appropriate, direct the Inspector or the authorized person to investigate into the offence or about the claim.

➤ **Environmental Clearance Procedure:**

It is mandatory to obtain Environmental Clearance for each and every type of industry and project as per Bangladesh Environment Conservation Act, 1995 (Amendment 2010). For the purpose of issuance of Environmental Clearance Certificate, the industrial units and projects shall, in consideration of their site and impact on the environment.

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

6.6 Play field, Open Space, Garden and Natural Tank in Urban Areas Preservation Act, 2000

The act was enacted in 18th September 2000. In short, this Act may be called as National Reservoir Protection Act. The jurisdiction of this Act is covered Metropolitan City, Divisional and District level Cities and all urban areas including Paurashava area. Aim of the Act is to preserve play field, open space, park / garden and natural water reservoir. For the Paurashava premises, Paurashava Authority is empowered for enforcement of this Act. Park, Wetland and Open Space Conservation Act 2002 impose restrictions on changing the class of open space, park and play ground.

According to the section 5 of this Act, any area demarcated as playfield, open space, garden and natural tank should not be changed with other use or it is prohibited for rent, leasing or any other procedure followed by, or handover to anybody for such changes. Again, according to the section 6, approval from concerned authority through application within stipulated time will be needed for any change of the area identified as play field, open space and natural tank.

Punishment for such changes without approval from concerned authority is presented in the section 8. For such unlawful activities, punishment may be 5 years imprisonment or Tk. 50,000 as a penalty or both. For preservation of natural water bodies in the Paurashava, this Act will be the important tool of the Paurashava authority.

6.7 National Land Use Policy, 2001

National Land Use policy was declared by the Government to regulate the national land use properly. To control the use of land resources, valuable agricultural land, and open space and to separate the uses of land from agriculture, residential, commercial, industrial etc. is the view of this policy. The land use plan is to be based on the measures of land productivity, land capability and land suitability, use and requirement of land by agriculture, forestry, industrialization, urbanization and housing. Following are the key topics of the national land use plan:

- Formulation and effective execution of Land Use Plan in order to ensure planned use of land
- 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

- 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 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. The policy emphasizes on the planned and the best use of land, and stressed on the most intensive use of these scarce resources of the country. In absence of execution, the situation in land use and land management is severely being deteriorated.

6.8 National Land Transport Policy, 2004

The National Land Transport Policy was approved by the Cabinet on 26th April 2004. The Purpose of this document is to achieve a wider dissemination of the Policy, particularly amongst the international community involved in the transport sector in Bangladesh. A precondition of development is good infrastructure. A Land Transport Policy is essential to ensure the proper physical and institutional infrastructure transport in order to achieve national development.

➤ Policy Objectives

- To provide a safe and dependable transport service
- Removal of unnecessary control and formulation of laws and regulations conducive to providing service
- Fare control
- Determining the roles of the Government sector and the private sector
- To maintain an economic and environmental balance
- To ensure maximum good utilization of Government funds
- Expansion of the role of transport in the ever increasing economic activities
- Reduction of transport cost of goods for export
- Growth of traffic commensurate with economic development
- Formulation of transport system for Dhaka city (Greater Dhaka)
- Introduction of an integrated transport system
- Creating of awareness regarding better standard of life and safety
- Poverty alleviation

➤ Strategic Policy

Greater private sector participation: Private sector participation in the transport sector will be encouraged more. Where the private sector is involved in infrastructure provision the Government will bring into practice long-term leases with appropriate terms to allow the private sector to recover its investment. But the ownership of road and rail infrastructures, being national assets, will remain with the Government.

The private sector will be positively encouraged to participate in infrastructure development where it brings finance, efficient operating techniques and technological innovation. Guidelines will be

published setting out ways in which the above goals can be achieved. Further active participation of private sector in transport operations will be encouraged where it is beneficial for the public judging from financial or service standards. National Land Transport Policy is view to improve the management of traffic with greater public participation in transportation and also to involve the private sector more in infrastructure, services and maintenance.

➤ **Development of parking policies**

In the construction and operation of parking facilities, participation of the private sectors will be encouraged. A parking policy will be developed consistent with this policy. Participation of the private sector in the following activities will be encouraged:

- Operation of vehicle fitness testing stations
- On-street parking management
- On-street parking enforcement
- High quality (e.g. air conditioned) urban bus services with un-regulated fares
- Vehicle and axle weight testing
- Driver tuition
- Construction and operation of off-street parking facilities
- Urban bus operations, through the development of formal companies and route franchising
- Saloon taxi operations
- Road safety

➤ **Traffic Management**

- There will be requirement for all new developments to undertake a traffic impact assessment (TIA) and to provide all necessary transport facilities consequent on the development
- A comprehensive traffic management plan for Dhaka city will be developed
- New technologies for traffic control will be introduced
- Safety measures will be incorporated in road and traffic management, especially for vulnerable road use

A priority programme for better pedestrian facilities and at-grade crossing facilities will be adopted.

6.9 The National Housing Policy, 1993 (Revised 1999)

The 1999 National Housing Policy prepared by the Ministry of Land has further recommended:

- To increase availability of roads and other basic infrastructures for populations of different income levels, particularly the poor
- To facilitate the purchase of land by the poor in locations which are near the place of work and where communication is easy and inexpensive
- To set up “urban land banks” on khas land, banks of dry rivers

- To set up a system for easy loans through family or community savings, to remove barriers for housing, mainly for poor thorough non-formal micro-credit schemes
- To arrange housing credit programmes through public and private sector. The Government will set up a housing fund and loans will be available to NGOs and credit agencies and financial institutions for distribution to cooperatives, community associations, registered companies, private development agencies for disbursement for low-cost housing through the local government
- To develop housing for authorized urban settler in their present location, and if their land is needed for other purposes, to relocate them elsewhere
- To provide drinking water, sanitation, and welfare services
- To promote participation of residents in maintaining community facilities, social physical infrastructure
- To facilitate provision of sanitation, water and night shelters for pavement dwellers and the homeless.

6.10 Land Development for Private Housing Project Rules, 2004 (Amendment 2012)

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

6.11 The Building Construction Act, 1952 (Amendment 1987)

This act was prepared in 1952 to prevent haphazard construction of building 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.

➤ Building Construction Rules (BC)

The Act in its Section 18 keeps provision for preparation of 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.

➤ **Removal of Unauthorized Building (Section 7)**

The Act empowers the authority to remove any building that has been built violating the above 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.

6.12 Bangladesh National Building Code (BNBC), 2006

The purpose of 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 insofar as they are affected by the construction, alteration, repair, removal, demolish, use or occupancy of buildings, structures or premises, through structural strength, stability, means of egress, safety, from fire and other hazards, sanitation, light and ventilation.

The BNBC deals with such key issues as general building requirements, fire protection, use of building materials, structural design of buildings, construction practices and safety and building services. Besides, the code also deals with historic buildings with respect to their conservation and restoration. The code was formulated in 1993 but given legal status in 2008.

6.13 The Building Construction Rules (BC), 2008

The act in its Section 18 keeps provision for preparation of 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.

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CHAPTER 07

DRAINAGE NETWORK OF NCC AREA

7.1 Introduction

The urbanization, experiencing in developing countries, is faster than any other first world countries. The process in the mega cities of the developing countries grows up with the lack of efficiency in the urban planning and urban infrastructure development which creates serious problems for cities, including proliferation in flood damage and water logging during wet season. Water logging in urban areas is not just associated with the heavy rainfall but also related with the increasing in the buildup areas. Unplanned rapid urbanization restricts the waterways by covering large areas with concrete surface and thus obstructing the natural channels. Due to uncontrolled filling of low lying areas, encroaching of natural canals hampered the planned flood control activities. To mitigate this problem there are different types of methods that are being used all over the world. Among them numerical method is proved to be the best one.

The numerical model is used for drainage improvement of NCC with the DND area. DND area was implemented during 1962-1968 at outskirt agricultural part of Dhaka city. It was like flood-proofed agricultural area surrounded by high embankment. The main purpose of this area was to protect the Dhaka and Narayanganj city from overflowing water of devastating floods. For achieving self-reliance in food grain production DND project was the successful one. Soon after the independence, the area went through a huge unplanned and uncontrolled development which molded its real characteristics. The area is transforming from agricultural land into an unplanned residential area. People encroached and illegally occupied the agricultural land for residential purpose. After the devastating flood of 1988, the situation was turning into a huge problem and more people bought land inside the bank protected area and added to the problems. This unplanned housing and settlement made adverse impacts on the existing drainage system of NCC are especially the DND area. And now the situation is so worsened that even a minor rainfall will generates adverse water logging within DND area.



Photo 7.1: Water logging during monsoon in NCC Area (inside of DND)

(Source: Daily Prothom Alo, 25/08/15)

7.2 Study Area Profile

Narayanganj City Corporation (NCC) area is situated in between the river Buriganga and Sitalakhya and it is in the flood plain of the river Meghna. Buriganga River covers both the south and a part of west and Lakhya River is in the east. The city corporation includes Narayanganj, Kadam Rasul and Siddhirganj area where a major part of DND project included. Almost entire Narayanganj (build up) area is free from annual flooding. Only pockets of peripheral areas which are still low lying and connected with the river through canals or other water bodies become flooded with the rise of water during rainy season. Those areas are free from any settlements and mostly serve as outfall of the existing drainage system or for agriculture in winter.

Settlements areas in the Kadam Rasul zone are also free from annual flooding. These areas are high land or have been raised above the annual flood level for habitation. But a substantial part of Kadam Rasul goes under water due to annual flooding, being low lying agricultural land. The areas are directly linked with the river system by khals or water bodies or low lying agricultural land. The areas also serve as outfall of present drainage network.

Siddhirganj is a flood prone area and water logging in DND is the major problem of this region. Now, DND area is changing from the agro rural to agro-urban area. Urbanization process in this area is randomly progressive but without any proper urban planning. Areas devoted to agriculture and water bodies, are continuously engulfed by urbanization. In 1962, DND project consisted of over 80 percent of agricultural lands which lower down to 25 percent in 2008. In a separate study by JICA, it has been projected that on 2032 there will be 94 percent of urban related area in DND while other minor part will be water bodies or just open spaces.

Land in DND area is generally low lying in the middle and medium high in the periphery. Slope of the land is from northwest to southeast. The elevation of low land is 2.0 - 2.5m and medium high land is 4.0-5.5m. There is hardly any land above 5.5m. The whole DND area is bounded by road-cum-embankments and floodwalls. The major project components were 31.25 km (now 31.00 km) road-cum-flood control embankment, 55.20 km irrigation canal, 45.40 km. drainage canal, 1.00 km intake canal, 216 nos. water control structures and one pump station at Shimrail with 4 pumps (14.52 cumec capacity). As the area is developed for drainage and irrigation, it is supplied irrigation water from December to May and generally is flood free zone. The map 7.1 indicates the location of DND area with Dhaka and NCC area.

7.2.1 Existing Drainage System

Narayanganj had been developed as a business center long ago due to the advantage of waterway transport. Sitalakhya River has been playing the most important role in this regard. A number of jetties, ghats and terminals have been developed along the river-side for loading and unloading of goods and carrying passengers as well 14.43 km of Sitalakhya River is within NCC area. Kashipur River, located at the southern part of NCC area connects Sitalakhya River with Buriganga River. 1.29km of Kashipur River is located within NCC area.

7.2.2 Natural Water Body in NCC Area

There are a number water bodies in NCC area. Major water channel in Sitalakhya River, and Kashipur River and its length is about 35 kilometer that flowing in north south direction. There are about 55.5 km canals and only one lake named Jimkhana (length 0.619 km) in the project area. Being a low lying area and having opposite directional slope towards Sitalakhya River, local ponds, ditches and marsh lands act as water reservoir during monsoon. All Natural channels (rivers, canals), water retention area, large ponds and other specific waterbody should be preserved and re-excavated to smooth flow of water and to minimize water logging problem of NCC area. List of waterbody in NCC area are given annexure K. Summary of natural Water body length and location of NCC area has been represented in Table 7.1 and Map 7.1.

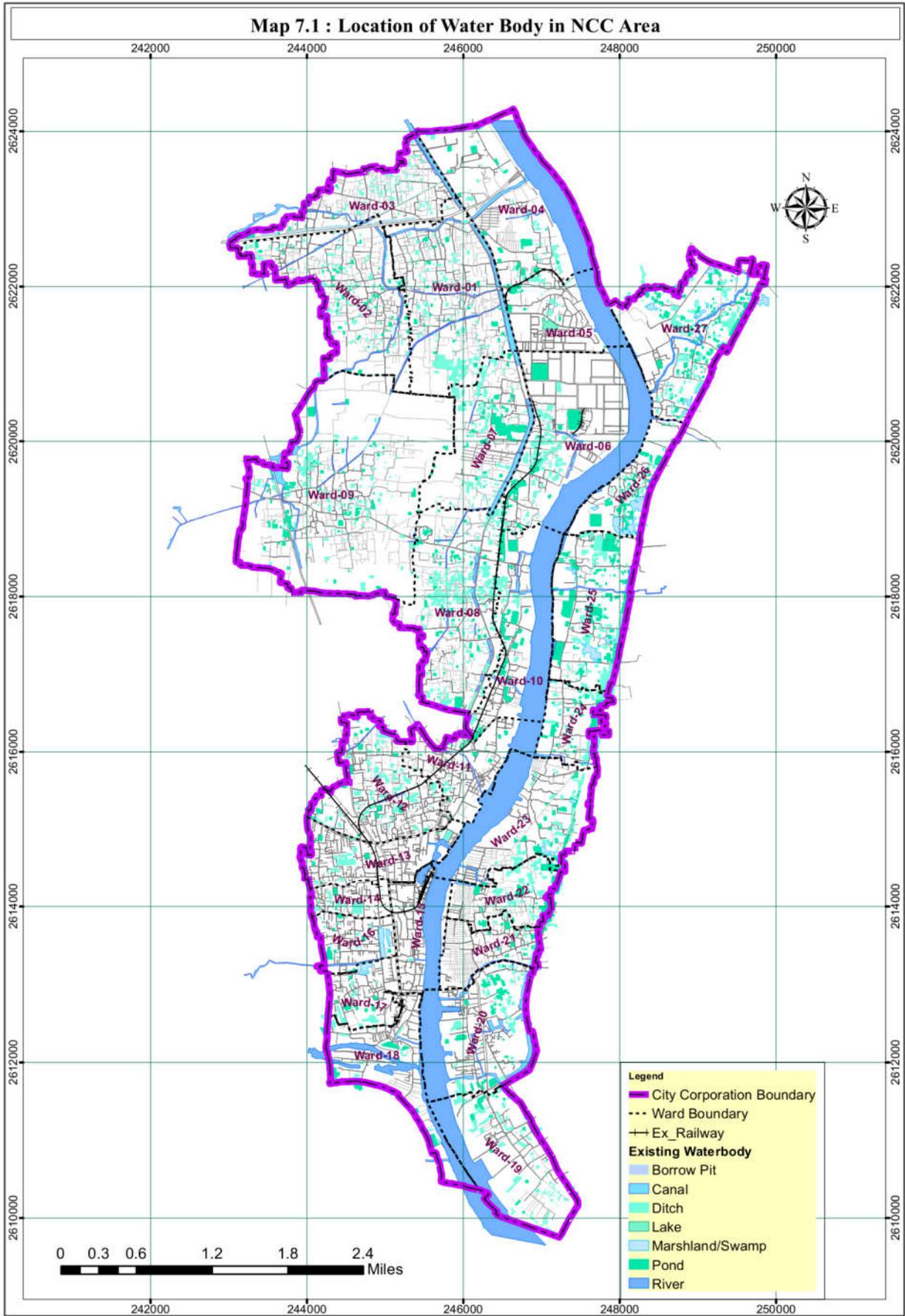
Table 7.1: Length of water body in NCC area

Type of Water body	Length of water body (km)	Major constraints
River	35	1. Encroachments of natural canals 2. Uncontrolled and indiscriminate disposal of solid waste into khals and drains 3. Absence of effective surface drain system
Lake	0.62	
Canal	55.5	
Borrow Pit	8	
Total	99.13	

Source: Physical Feature Survey, 2015-16.

7.3 Application of Numerical Modeling

Aim of the application of numerical modeling tool is to find out the multiple option based improved drainage management in the Narayanganj City Corporation area and reassess the existing drainage condition. To understand drainage system in NCC area MIKE11 of DHI, Water and Environment is being used. MIKE11 is capable to analyze various drainage options and ability to assess the impact of alternative measures for achieving controlled drainage, flooding and irrigation. At the end output would be processed using MIKE11 GIS to develop flood inundation and impact maps in getting the comparative assessment. Computation inside of MIKE11 modeling environment can take place in two steps; one is Rainfall Runoff component by MIKE11 NAM model and another is Hydrodynamic Model or MIKE11 HD. The fundamental function of MIKE11 NAM model is to estimate the runoff generated from rainfall occurring in the basin. The catchments of the rainfall runoff model are delineated according to the topographic barriers or watershed boundaries, roads and river networks. The NAM validation can be done by real time data set for proper assessment. On the other hand, MIKE11 HD works from NAM model output together with components of channel bathymetry, flood cell topography, location of infrastructures, resistance of channel bed-form; etc. The performance of the HD model can be evaluated with known point observed water level of the river.



Source: Physical Feature Survey, 2015-16

7.3.1 Rainfall Runoff (NAM) Model

Rainfall Runoff Model (NAM) has been developed to assess the contribution of runoff generated from rainfall within DND area using MIKE11 NAM. DND area is divided into 19 drainage sub catchments (derived from the digital elevation model. These 19 sub-catchments have been schematized and validated through field investigation. Mean Areal Rainfall (MAR) and Mean Areal Evaporation (MAE) for the year 2007-2008 have been used in this model. Rainfall stations of Dhaka and Shimrail are used for MAR calculation. Evaporation data of Dhaka station is used for the NAM model. Rainfall Runoff Model has been calibrated and validated for the period of 2007-2008. Model parameters are initially considered from a previously developed model by IWM named North Central Regional Model (NCRM) which covers the DND and the peripheral river system. Then the NAM model has been calibrated and verified against observed groundwater level of NCC area including surrounding like DND areas.

7.3.2 Hydrodynamic Model (HD)

Drainage part of Hydrodynamic Model consisting of all the main drainage canals is separately developed to examine the capacity of the existing drainage system for conveying the design runoff generated from different catchments. Largely, all the main, secondary and other existing drainage canals have been schematized in the model for representing the present situation of the area which has further been modified during option development. MDC-1, MDC-2, Pagla Canal, Fatulla Canal, SD-1, SD-2 and SD-3, Shampur Canal (secondary drainage or SD-4), SD-5, SD-6 have been used for setting up the base model. All irrigation borrow pits, like DL- 1(Demra Left), DL-2, DL-3, DL-4, NR-1 (Narayanganj Right), NR-2, and Kangsho Nadi have been used during option development. The flow direction is shown in Map 4.2. The result of Rainfall Runoff Model of the drainage sub-catchments have been incorporated as lateral inflow (pointed/distributed) to the existing canals. Cross section data at every 300 m interval, collected under this study, have been used in the HD model. Peripheral hydrodynamic model has been set up with peripheral river system. The peripheral HD model has also been coupled to examine the external river water level. Cross section data of BWDB has been used in the MIKE11 HD model simulation. Like the NAM model Hydrodynamic model has also been calibrated and validated for the year of 2007-2008. The model has been calibrated and validated against observed water level at specific 7 locations. Similarly hydrodynamic model of external river system has also been calibrated and validated against observed water level of 31 years for the period of 1976-2007 from collected BWDB data series. Table 7.2 shows the Sub catchments area within DND.

Table 7.2: Sub catchments of the DND Area

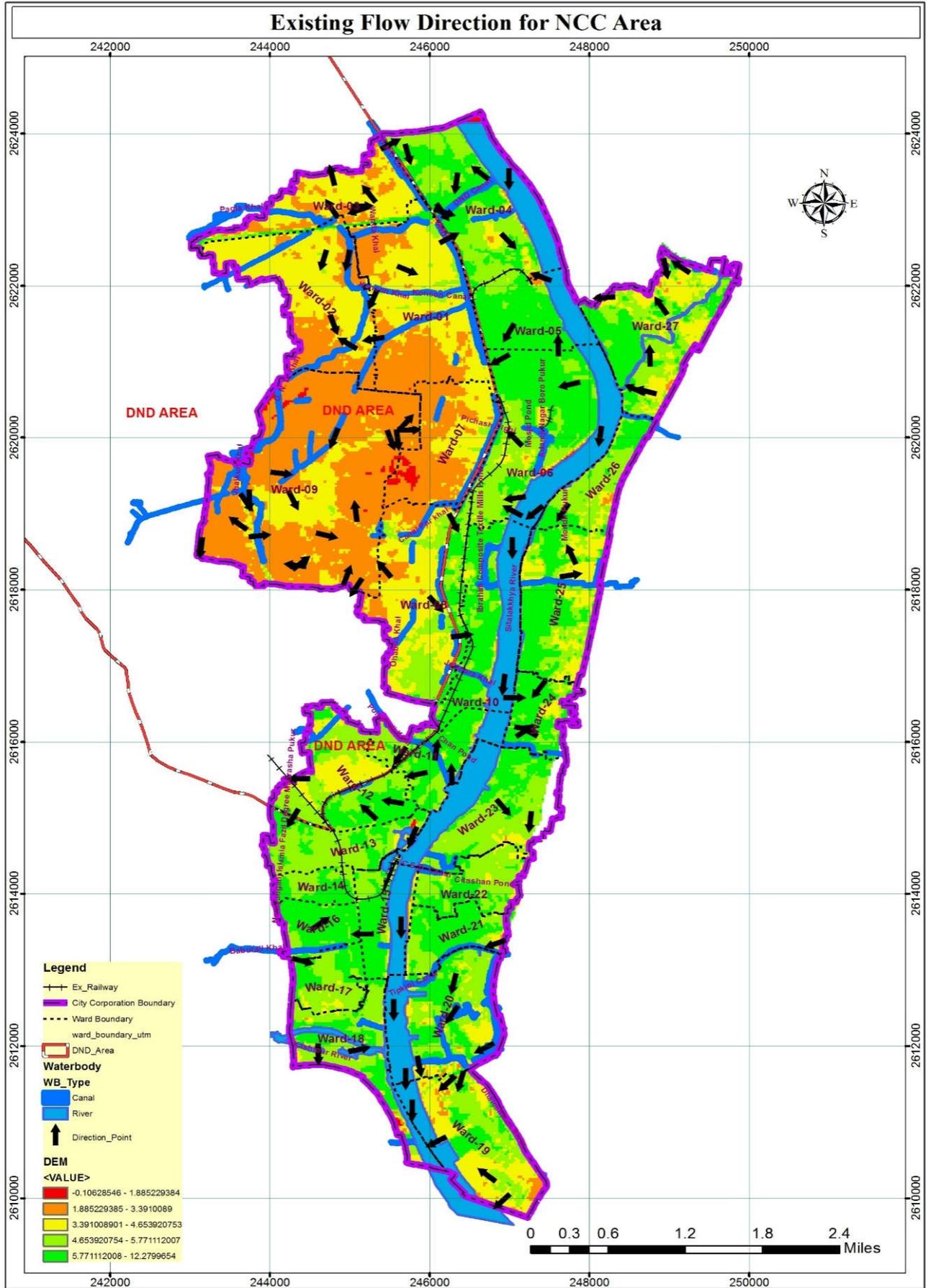
Sl. No.	Drainage Catchment	Drainage Canal	Area in Ha
1	C-1	SDC4/Shampur Canal	710
2	C-2	SDC-3	455
3	C-3	MDC-2	250
4	C-4	SDC-2 Dogair Canal	279
5	C-5	SDC-1	190
6	C-6	MDC-2	178
7	C-7	MDC-1	85
8	C-8	Kangsho River (KN)	31

Sl. No.	Drainage Catchment	Drainage Canal	Area in Ha
9	C-9	SDC-5	574
10	C-10	MDC-1	825
11	C-11	Fatulla Canal (FK)	383
12	C-12	Do	196
13	C-13	Do	81
14	C-14	Pagla Canal (PK)	276
15	C-15	Do	229
16	C-16	Pagla Branch (PB)	156
17	C-17	MDC-2	538
18	C-18	MDC-1	226
19	C-19	MDC-1	160
Total Catchment Area in Ha			5822

Note: MDC – Main Drainage Canal, SDC–Secondary Drainage Canal

Source: *International Journal of Scientific & Engineering Research, Volume 4, Issue 10, October-2013*

Map 7.2: Existing Flow Direction of Narayanganj City Corporation Area



Source: Topographic Survey, 2016

7.4 Estimation of design drainage events

7.4.1 Successive rainfall analysis

Maximum of successive rainfall obtained from the processed data at selected rainfall stations have been calculated from 1 day, 2 day, 3 day, 5 day and 10 day data. MAR has been estimated using Thiessen Polygon method, where relative area ratio for Shimrail and Dhaka has been considered as 82% and 18% respectively due to proximity of study area. Monthly distribution of areal rainfall pattern shows that average annual rainfall in the Narayanganj City Corporation area is 2,083 mm while the maximum rainfall occurs during the month of September with historical average of 325 mm. Historical rainfall of 820 mm has been found as maximum rainfall occurred during September, 2004 from BMD.

7.4.2 Probability of design storm

Probability analysis has been carried out on the yearly maximum data for 1-day, 2-day, 3-day, 5-day and 10-day consecutive rainfall. Probable design rainfall for successive duration and return period has been estimated using Gumbel-Chow method (EV Type-I) and the results are given in Table 7.3.

Table 7.3: Comparative Statistics Showing Different Design Rainfall Events in MM

Return Period	1 day	2 day	3 day	5 day	10 day
2	117.73	167.23	200.87	231.94	310.26
2.33	125.27	179.63	214.37	247.83	328.65
3	136.79	198.58	235.01	272.13	356.75
5	158.03	233.5	273.02	316.89	408.53
10	184.71	277.38	320.8	373.14	473.59
50	243.44	373.96	425.94	496.93	616.78
100	268.26	414.79	470.38	549.27	677.31
500	325.64	509.13	573.1	670.2	817.2

Source: *International Journal of Scientific & Engineering Research, Volume 4, Issue 10, October-2013*

As per existing BWDB practice, 2 day consecutive rainfall with 5 year return period is usually considered as design rainfall event. Therefore, 2-day consecutive rainfall event with 5 year return period have been estimated as 234 mm. Enumerated design event is also very close to the estimate as provided in different study report 239 mm and 245 mm (JICA, 1992 and JICA, 1987 respectively). The difference found is due to the use of only one station by JICA for their study, while the mean of two stations is used in this study. Considering the coverage of a drainage area, the value structure, regulator and pump station is important factors. To be in the safer side, this study has considered the design rainfall amounting to 245 mm. So, rainfall data of BMD has been used in all analyses.

7.5 Rainfall Runoff Data

Calibrated drainage model has been simulated using design drainage event (extreme event) of specific return period derived from probability analysis. Catchment parameters have been used and considered

with respect to prevailing and future land use considering fully urbanized in the MIKE11 NAM model. The Rainfall Runoff model of MIKE11 has been simulated for the selected rainfall event of 2005 for generating runoff from rainfall for each catchment within the study area. This runoff has been used as lateral inflow for the drainage as well as irrigation borrow pit canal to be converted as drainage canal for option development inside the DND area to simulate the hydrodynamic model. Using 2-day 5-year event of rainfall for 2005, the runoff generated by the Rainfall Runoff model is presented in Table 7.3 where the domestic and industrial effluents are not considered. Domestic and industrial effluents have been considered during option development for drainage improvements. It has been found that the total area has to drain out around 99 MCM of surface runoff for the design event during the wet season spread over 5 months period (av. 7.64 cumec). Catchment number ten (C-10) contributes the highest proportion (14.04 MCM av. 1.03 cumec) while catchment number eight (C-8) discharges the lowest (0.53 MCM av. 0.04 cumec).

7.6 Hydrodynamic Model Simulation

The hydrodynamic model has been simulated for the estimated design period of 2005 considering drainage and a part of the irrigation borrow pit canal for whole DND area. From the simulation it is found that, the highest peak discharge (98 cumec) is occurred during mid-September. In addition, several other peaks are found in July and August. The next peak values are 65 and 60 cusec. The hydrodynamic model has generated this discharge assuming fully urbanized DND area in 2032 (predict). This model result is the basis for developing different options for drainage solution in the DND area. A number of command areas (as per land topography) have been planned to drain out the accumulated drainage volume (rainfall runoff, industrial and domestic effluents), which consists of variable proportion of different drainage catchments. These command areas facilitate the option development process. A possible formation of four command areas consisting of nineteen catchments can be treated as one option with four drainage outlet that discharges the internal drainage volume in the peripheral river system. Accumulated drainage volume for each of the possible combination of command areas has been investigated thoroughly to determine the best option. 3.5 Peripheral DND area Flood levels with 100 year return period at different locations have been derived from the Peripheral River Model. At every 500 m interval, water level data have been extracted to enumerate the extreme design event for 100 year return period. This design event has been estimated from the annual maximum series using the Gumbel Chow method (EV Type-I).

7.7 Identification of Problems Concerning Drainage

In City Corporation area acute drainage problem is generated in several parts of Narayanganj town and the DND area. In this chapter of drainage case study discussions will be limited to the problems experienced in Narayanganj town. Even the drainage problem of Narayanganj town is localized resulting from storm rainfall and is temporary in nature. The areas that suffer from drainage problem due to rainfall run-off are:

- Chashara-Mission Para-Khanpur area
- Talla and Nagar Khanpur area
- Galachipa-Masdair area
- Tolaram college-Jamtala-Masdair area

Chashara–Mission Para–Khanpur Area:

This area covers the northern boundary of Narayanganj and is spread over both the sides of Nawab Salimullah Road. North Chashara, Mission Para, Dawn Chamber, Bank Colony, Masjid Khanpur mahallas are included in it. This area is suffering from drainage problem only for the last 4-5 years. During this period some new construction works has seriously blocked the existing drainage system. In fact, this drainage system has become totally ineffective due to filling up of several water bodies and illegal encroachment of the existing khals. Moreover, the area is not adequately covered by road side drains. The links between different water bodies have been filled up and water cannot pass from one water body to other and reach the canal leading to outfall directly. As a result the area becomes inundated and rain water stands from several hours to 1/2 days depending on the duration of rainfall.

Talla and Nagar Khanpur Area:

Talla and Nagar Khanpur area extends from Isha khan road in the south to Chashara–Adamjee Nagar railway track in the north and Ganje Ali Khan canal in the west. The reason for drainage congestion in the area is absence of effective road side drain, filling up link channels to Ganje Ali Khan canal which used to drain out rainfall run-off to Shitalakhya River. About 2000 households are affected in this area. The duration of inundation caused by the drainage problem varies from several hours to 2/3 days.

Deobhog Area:

The area is one of the fastest growing areas of Narayanganj town which 20/30 years back was characterized by low lying marshy land with scattered high spots here and there. This low lying marshy area was connected with Buriganga River by Deobhog khal. With increasing demand for buildable land much of the area has been raised above annual flood level, the land filling being carried out in most haphazard way on piece-meal basis. No consideration was made about the drainage system. As a result, the rainfall run-off is impeded and cannot reach the outfall through the canal. On the other hand the canal itself has been encroached upon and cannot drain out the heavy rainfall run-off. About 2500 households are affected in this area.

Galachipa–Masdair Area:

It is one of the densely populated areas of Narayanganj town and extends from Bangabandhu Road in the east to Masdair area beyond Sher-e-Bangla Road in the west. This area has been developed in an elongated manner on both sides of college road. Main drainage has been through Boalia khal running east-west at the southern boundary of the area. A substantial rainfall run-off from this area used to be discharged into now filled up low lying areas situated in the northern boundary of the north-western part (this area is now part of Tolaram College–Jamtala–Masdair drainage congestion area). Due to uncontrolled development and short-sightedness regarding drainage necessity the inhabitants of the area has constructed houses and other establishments on top of drainage channel. On the other hand encroachment on Boalia khal and use of the khal as solid waste dumping ground has substantially reduced the discharge capacity of the khal. As a result this area gets submerged during heavy rainfall period affecting 1200 households.

Tolaram College–Jamtala–Masdair Area:

This is a part of western boundary of NCC area. It extends from railway tract in the east near Narayanganj Mahila College to BSCIC industrial area via Tolaram College and surrounding area in the west. In the past the area was sparsely developed and settlements were found in strips only along the Narayanganj-Narayanganj Road. The low lying areas south of settlements used to be the outfall of the rainfall run-off which ultimately used to reach Buriganga River in the west. During the last decade the area has experienced very rapid development. As usual, the uncontrolled conversion of the low lying area through landfill has resulted in the destruction of natural drainage system. On the other hand no systematic attempt has been made to construct drains to channelize rainfall run-off to outfall. As a result a vast area including the Narayanganj central Eidgah goes under water for several hours to several days depending on the intensity of rainfall. A part of the area is outside the Narayanganj municipal jurisdiction area and the number of households affected is about 3500.

7.7 Main Causes of Drainage Congestion

Main causes of drainage congestion in NCC and DND area are described below.

- Uncontrolled conversion of low lying areas to urban land through landfill
- Encroachments of natural canals
- Absence of effective surface drain system
- Uncontrolled and indiscriminate disposal of solid waste into khals and drains
- Lack of proper operation and maintenance of drainage system
- Lack of awareness of people about the need and function of drainage system

7.8 Option Development

7.8.1 Formulation of Technical Options:

Future scenario for the year 2032 (25 years from this study begins as on 2007) has been taken into consideration while developing options for the DND area. Detailed Area Plan (DAP) by RAJUK has considered that the DND area will be fully urbanized (5 cumec for domestic and 3.42 cumec for industrial with population density 225 per acre) in the year 2030. This study has assumed the same scenario for option development as recommended in DAP for DND area.

7.8.2 Drainage Options

For this study three options are developed as per DAP report up to year of 2030 with population projection 225 per acre. The options are- Option-1: Two pump stations at Shimrail (46.11 cumec) and Adamjinagar (28.58 cumec), Option-2: Three pump stations at Shimrail (41.06 cumec), Adamjinagar(25.45 cumec) and Pagla (8.19 cumec), and Option-3: Four pump stations at Shimrail (38.41 cumec), Adamjinagar (30.21 cumec), Pagla (2.82 cumec) and Fatulla (3.25 cumec).

7.8.3 Comparison of Options

All the three options have been analyzed to identify the positive and negative points. Option-1 has a strong positive point that is drainage systems leading to Shimrail and Adamji nagar follow the existing drainage slope and flow direction but has the strongest negative point of having longest drainage travel path to pump stations. On the other side, Option-3 has the best drainage distribution and shorter drainage paths but drainage slope and flow direction toward Pagla and Fatulla pump stations are adverse. For Option-2, drainage distribution is moderate with adverse slope and flow direction toward Pagla Pump Station.

7.9 Multi-Criteria Analysis for Selecting the Best Option

DND was designed for agro based production. Now RAJUK is increasing to develop and giving premising to control unplanned development. But there are no guidelines on how they develop the site. In this situation, a systematic guideline is given below:

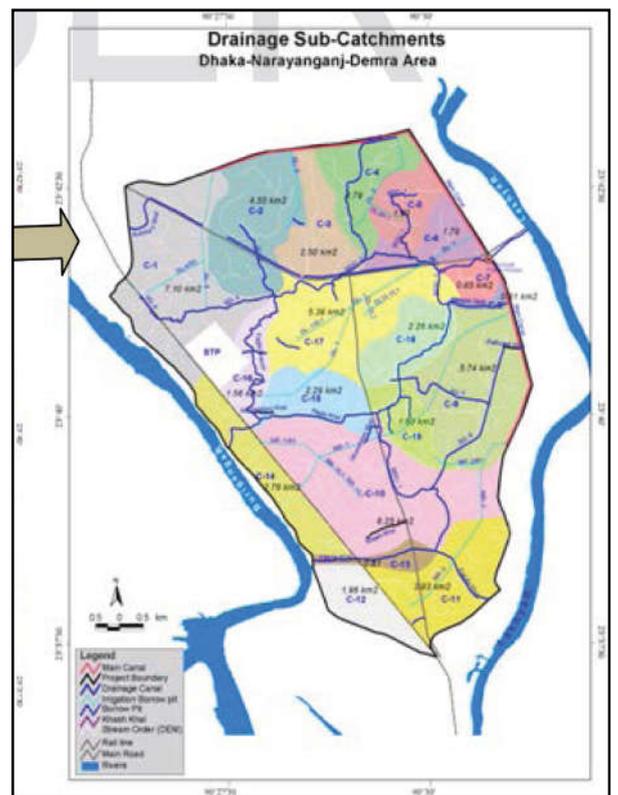
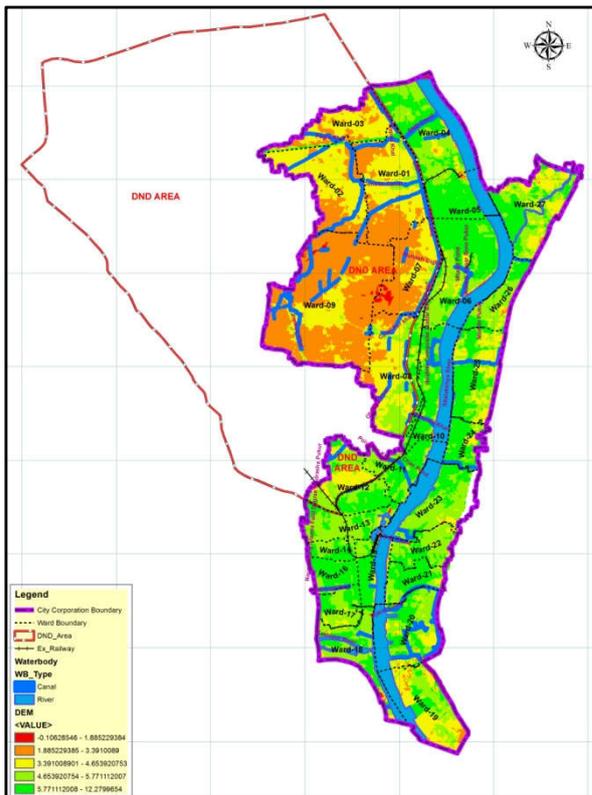
Step 01: To ensure man made primary and secondary drainages beside the main roads of this area to remove the water logging (See Map 7.4, Table 7.4 and annexure A). The cross sections of natural and manmade drainages are given in annexure A.

Step 02: Improve the existing natural canal by re-excavation. Missing link, water retention pond identification, and improvement according to the CS and RS mauza map if possible (See Map 7.4, Table 7.5 and annexure A).

Step 03: Before development land level must be raised up to 06 m from the mean sea level.

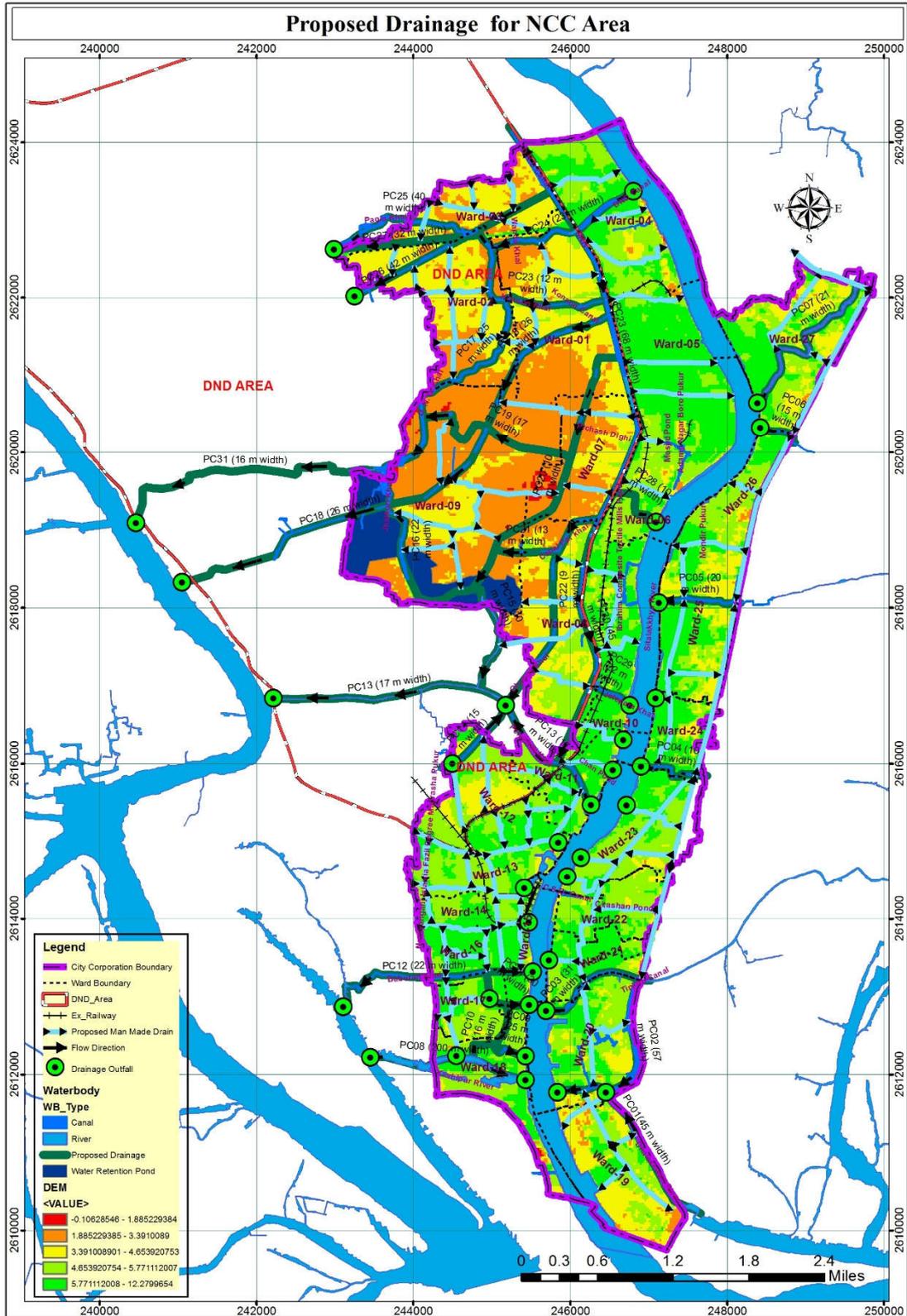
Step 04: One more drainage outfall will be needed in Sitalakhya or Buriganga River according to the elucidation. To control negative water flow during rainy season switch gate must needed at the end of the outfall. So that during dry season the rain water can pass to the river and during rainy season the water cannot enter in the embankment.

Step 05: The water pumps must active up to full development of DND area. Actually the area ensure flood free by raising land level. If it is possible embankment and water pumps are not necessary in that time.



Map 7.3: Sub Catchments of drainage system Within DND area.

Source: Topographic Survey, 2016



Map 7.4: Proposed Drainage Plan of Narayanganj City Corporation Area

Source: Topographic Survey, 2016

Table 7.4: Proposed Man Made Drainage for NCC Area

Id No.	Drainage Type	Length (m)	Id No.	Drainage Type	Length (m)
DM 01	Primary Drain	810	DM 39	Secondary Drain	630
DM 03	Primary Drain	1155	DM 40	Secondary Drain	479
DM 08	Primary Drain	1216	DM 42	Secondary Drain	102
DM 09	Primary Drain	1506	DM 43	Secondary Drain	769
DM 10	Primary Drain	2471	DM 44	Secondary Drain	468
DM 13	Primary Drain	2248	DM 45	Secondary Drain	865
DM 17	Primary Drain	2277	DM 46	Secondary Drain	527
DM 18	Primary Drain	997	DM 47	Secondary Drain	426
DM 21	Primary Drain	2085	DM 48	Secondary Drain	548
DM 24	Primary Drain	1159	DM 49	Secondary Drain	592
DM 29	Primary Drain	1173	DM 50	Secondary Drain	490
DM 30	Primary Drain	973	DM 51	Secondary Drain	697
DM 31	Primary Drain	1080	DM 52	Secondary Drain	969
DM 38	Primary Drain	853	DM 53	Secondary Drain	648
DM 41	Primary Drain	1665	DM 54	Secondary Drain	336
DM 55	Primary Drain	1340	DM 58	Secondary Drain	989
DM 56	Primary Drain	1196	DM 59	Secondary Drain	1326
DM 57	Primary Drain	1010	DM 60	Secondary Drain	728
DM 62	Primary Drain	584	DM 61	Secondary Drain	917
DM 63	Primary Drain	831	DM 64	Secondary Drain	538
DM 65	Primary Drain	420	DM 66	Secondary Drain	367
DM 70	Primary Drain	1142	DM 67	Secondary Drain	508
DM 80	Primary Drain	1490	DM 68	Secondary Drain	425
DM 81	Primary Drain	1449	DM 69	Secondary Drain	326
DM 86	Primary Drain	1184	DM 71	Secondary Drain	931
Total		32314	DM 72	Secondary Drain	584
DM 02	Secondary Drain	341	DM 73	Secondary Drain	869
DM 04	Secondary Drain	478	DM 74	Secondary Drain	675
DM 05	Secondary Drain	739	DM 75	Secondary Drain	549
DM 06	Secondary Drain	1365	DM 76	Secondary Drain	445
DM 07	Secondary Drain	622	DM 77	Secondary Drain	654
DM 11	Secondary Drain	1497	DM 78	Secondary Drain	1134
DM 12	Secondary Drain	829	DM 79	Secondary Drain	635
DM 14	Secondary Drain	2230	DM 82	Secondary Drain	561
DM 15	Secondary Drain	676	DM 83	Secondary Drain	956
DM 16	Secondary Drain	203	DM 84	Secondary Drain	769
DM 19	Secondary Drain	640	DM 85	Secondary Drain	682
DM 20	Secondary Drain	500	DM 87	Secondary Drain	825
DM 22	Secondary Drain	268	DM 88	Secondary Drain	355
DM 23	Secondary Drain	1309	DM 89	Secondary Drain	838
DM 25	Secondary Drain	863	DM 90	Secondary Drain	754
DM 26	Secondary Drain	479	DM 91	Secondary Drain	911
DM 27	Secondary Drain	623	DM 92	Secondary Drain	1289
DM 28	Secondary Drain	379	DM 93	Secondary Drain	1123
DM 32	Secondary Drain	660	DM 94	Secondary Drain	560
DM 33	Secondary Drain	409	DM 95	Secondary Drain	492
DM 34	Secondary Drain	327	DM 96	Secondary Drain	725
DM 35	Secondary Drain	632	Total		49646
DM 36	Secondary Drain	1136	Gross Total		81960
DM 37	Secondary Drain	455			

Source: Prepared by DDC Consultants Team

Table 7.5: Proposed Natural Drainage for NCC Area

ID_No	Name	Existing Width (M)	RS Width (M)	CS Width (M)	Proposed Width (M)	Proposed Width
PC03	Tipkini Khal (Kadamrasul)	20	21	31	31	PC03 (31 m width)
PC04	Kadam Rasul	9	10	9	10	PC04 (10 m width)
PC05	Kadam Rasul	20	12	13	20	PC05 (20 m width)
PC06	Kadam Rasul	7	15	10	15	PC06 (15 m width)
PC01	Dhaleswari Branch (Kadam Rasul)	44	45	28	45	PC01(45 m width)
PC07	Sitalakhya Branch (Kadam Rasul)	20	12	21	21	PC07 (21 m width)
PC02	KadamRasul	48	57	0	57	PC02 (57 m width)
PC08	Kashipur River (Narayanganj)	77	84	224	200	PC08 (200 m width)
PC13	Polykhali Khal (DND)	17	13	17	17	PC13 (17 m width)
PC14	DND Khal	9	15	0	15	PC14 (15 m width)
PC12	Baburail Khal (Narayanganj)	18	21	22	22	PC12 (22 m width)
PC29	Jelapara Khal (Narayanganj)	14	22	18	22	PC29 (22 m width)
PC22	Par Khal (DND)	9	9	0	9	PC22 (9 m width)
PC21	DND Khal	4	13	0	13	PC21 (13 m width)
PC17	WAPDA Khal (DND)	15	25	10	25	PC17 (25 m width)
PC24	WAPDA Khal (DND)	21	23	0	23	PC24 (23 m width)
PC26	DND Khal	18	42	0	42	PC26 (42 m width)
PC23	DND Khal	60	68	0	68	PC23 (68 m width)
PC19	DND Khal	15	17	0	17	PC19 (17 m width)
PC16	Jimkhana Khal (DND)	22	15	0	22	PC16 (22 m width)
PC20	DND Khal	8	10	0	10	PC20 (10 m width)
PC18	DND Khal	13	26	0	26	PC18 (26 m width)
PC23	Konsol Khal (DND)	4	11	12	12	PC23 (12 m width)
PC25	Pagla Khal (DND)	19	40	0	40	PC25 (40 m width)
PC30	DND Khal	35	45	0	45	PC30 (45 m width)
PC27	DND Khal	0	30	32	32	PC27 (32 m width)
PC15	DND Khal	0	10	0	10	PC15 (10 m width)
PC31	DND Khal	6	16	0	16	PC31 (16 m width)
PC11	Narayanganj	0	20	30	30	PC11 (30 m width)
PC09	Narayanganj	18	20	25	25	PC09 (25 m width)
PC10	Narayanganj	0	16	15	16	PC10 (16 m width)
PC28	Narayanganj	0	0	10	10	PC28 (10 m width)

Source: Prepared by DDC Consultants Team, 2016

7.10 Conclusion

Application of numerical modeling to mitigate water logging provides better understanding before applying it to the real world system. As the land pattern has changed for DND area so characterization of water-logging turns into complex interaction with prolonged flooding scenario. In this study, applied flow numerical simulation, combined with drainage theory and hydrography, a water logging and flooding numerical model is established, which can calculate the depth, area and ratio of water-logging. The option based drainage model results of NCC and DND area provide technological support for the water-logging forecasting, assessment and flood and water logging control plan. According to numerical model outputs the model shows that, installment of 4 pump stations at Shimrail (38.41 cumec discharge from drainage command area of 2994 ha), Adamjinagar (30.21 cumec, command area 2355 ha), Pagla (2.82 cumec, command area 220 ha) and Fatulla (3.25 cumec command area 253 ha) provide the best suitable option with the design rainfall (245 mm) for 2 day 5 year return period. The 1-D mathematical model also provided design discharge of the re-structured canal system for four command areas of the pump stations at every reach and design section with parameters of drainage system. Moreover, the results of the model are proved practical to determine flood depth by area and inundation maps for different options as well as impacts of pump failure in any case. Thus using the numerical model helps lot to find a better choice to improve drainage condition for long troubled water logging problems at DND area for economically, environmentally and socially acceptable planning for future.

CHAPTER 08

ACTION AREA PLAN FOR DIFFERENT BLOCKS

8.1 Introduction

Action Area Plan (AAP) is a new planning practice of Bangladesh. The AAP is guided by the development policies and proposals of higher level plans such as Structure Plan (SP) and Urban Area Plan (UAP) etc. AAP provides guidelines for development where action will be expected in the short term and covers individual parts of a city or town within a variable time frame. It comprises high priority projects and schemes that can be implemented in a relatively short time period in an intensive manner.

8.2 Approach and Methodology

AAP do not initially cover the entire SP area. While all sub-areas will eventually require Detailed Area Plan (DAP), only the UAP need to be dealt with initially. The aim of AAP is to prevent haphazard urban development and ensures livable environment in the urban area.

AAP has been directed to the situations of local area and linked to the specific problems and issues of the area has been identified after discussion with and participatory process of all the ‘Actors’ and beneficiaries of envisaged development in the area. A programme of prospective facilities and uses has been detailed out indicating target populations, service levels, financing mechanism and implementations schedules. After this programme has been set, preliminary proposals of alternatives for meeting the area’s needs and demands has been prepared. Alternatives have also been evaluated according to the criteria for prioritizing projects. A final plan for integrated development of the area has then been prepared based on the selected alternatives and their compatibility. Stakeholder’s consultation has been held on different time of plan preparation stage to ensure the people’s participation in Planning Projects. According to views and wish of stakeholders and local representatives different types of projects are proposed in AAP. Summary of the wishes of stakeholders are given below.

Wish list of Stakeholders

- Waste water treatment plant
- Low income housing in Paikpara Area
- Resettlement zone for affected people due to development activities
- Recreational Area development project in extension area (Jimkhana)
- Sitalakhya River Front Development Project
- Redevelopment of historic sites
- Establish hygienic waste dumping ground
- Intersection Improvement
- Drainage Network Improvement
- Land Readjustment
- Industrial development /Industry and commerce

8.3 Project Proposals

AAP is developed in combination of the different types of project in NCC area. AAP proposals are prepared to follow the guidelines of higher level plan (Dhaka Metropolitan Development Plan: SP, UAP and DAP). The main objectives of AAP have to indentify projects which solve immediate problems of the NCC area. The Consultant Team proposed a list of projects, design and cost estimation into the AAP. Different sector of the urban area has been considered to prepare the project proposals. The list of schemes is given below.

8.3.1 Housing Proposal

Different types of land development techniques like land readjustment/redistribution, urban renewal, low cost housing etc. are used to mitigate housing problem of any city. In recent time, introducing land readjustment and low cost housing need to expand in wide scale to developed a planned and balance residential area.

Land Readjustment/Redistribution Technique (LR)

LR may apply for planned development in different areas of NCC particularly at Kadam Rasul and Siddhirganj area. The process of LD is stated in this section. But at this moment the project is not designed although it is very important and tax-up in practice LR Techniques transforms a spontaneously developed area into a planned residential area primarily for the residents of the area. The terms readjustment and redistribution vary only in scale. If the desirable development requires minimum change or shifting of the residents, it is connoted as readjustment but in case of massive change or dislocation, it is redistribution.

In LR necessary infrastructure, urban amenities, social services and facilities etc., which is missing or highly inadequate for the proper functioning of the community, are provided utilizing a portion of the lands contributed by the residents of the area; developed some additional serviced lands for selling at the market rate to meet the cost of development and remaining portion of land parcels are returned to the owners for their residences majority at their own plots and at different locations within the community in case of land readjustment and land redistribution respectively.

Here negligible seed fund is required from the government's end for the initiation of the project, which too is returned from the benefit of the project. This is a form of participatory project where land owners participate by contributing their land. The Consultant team has selected some area for planned housing by using LR techniques; those are Deobogh, Payandi, Noyadda Kaitakhali, Laskman khola and Bandor area to develop a better living environment of the city. Though preparation of housing area by using LR techniques is time consuming and critical, it is not possible to prepare a plan of any housing area within the AAP project time period. Here the process of LR techniques is given to take future initiative by the NCC authority.

- Activities of Readjustment and Redistribution Process

Since both readjustment and redistribution projects involve dislocation of the residents upon their agreement with the authority, the process for both the approaches are the same only except that in the

former people of rehabilitation site too to be consulted. The process is comprised of several sub tasks under different main tasks.

Task 1: Initial Activities

- Project Initiation
- Government approval
- Team Selection (In-house/Consultant)
- Location Selection
- Seed fund arrangement
- Office and logistics arrangement

Task 2: Preliminary Activities

- Start dialogues with the community to be evicted
(also with residents of project site in case of rehabilitation process)
- Finalize work plan
- Finalize Criteria for considering for the plot/flat

Task 3: Data/Information Collection and Verification

- Collection of land and property ownership information and finalize through necessary verification
- Documentation of the property condition
- Finalize the process and legal documentation for giving property to the authority for development and later receiving the serviced plot/flat

Task 4: Develop Planning Options and Finalize Plan

- Based on the information develop planning options for rehabilitation/redistribution
- Develop tentative layout and graphical presentation of the housing
- Furnish options to the affected people (also owners of the rehabilitation site) and explain various issues raised by them
- Carry out prolonged exchange of dialogue with the stakeholders
- Make logical changes and finalize the agreed plan

Task 5: Translate Plan into Design and Select Constructor

- Translate the plan into architectural, engineering, landscape designs; making working documents, specifications, cost estimation and contract documents for selecting constructor to realize the project
- Determine the appropriate phasing of the project to restrict problem associated with eviction to a tolerable limit
- Select quality constructor, preferably a number of them, to carry out the works efficiently, smoothly and in time

Task 6: Execute the project

- Execute the project strictly adhering to the plan and specification.

Task 7: Sell Serviced Plots, Handing over Plots to Land Contributors, Realize Fund

- Carry out selling of the serviced plot at prevailing market value
- Carry out the execution as per the quality and time frame set forth in the Action Plan
- Start handing over the plots to the owners in phases
- Realize seed fund from the price of serviced plots sold out at market value

Housing Development Approach for Low Income Families:

In spite of contribution to effective functioning of a city, earning of low income families is too meager to own a house. They are compelled to live as squatters in shanties and slums in inhuman conditions. In NCC areas, the condition of slums and squatters living is deplorable like other cities. Although almost all low income enclaves in Narayanganj city are belonged to industrial area. Low income people are large in the areas, slums are also created haphazardly with low quality of living environment and high congested area.

The main obstacle to acceptable housing provision for low income squatter settlements is lack of secure land tenure. In absence of tenure security low income people do not improve their shelters and surroundings fearing any time eviction at authority's will. However, their living condition may be improved through upgrading programs. Another obstacle to acceptable housing provision is affordability of low income people. Techniques must touch this reality while developing solution for this important section of the urban population.

- **Low Income Settlement Upgrading Program:**

Conceptual Approach:

Prior deciding to undertake up-gradation program for low income settlement, authority must decide that even if squatter in nature the people will not be evicted from the area for a prolonged period say 10 years. The program will incorporate four fields of intervention:

- Procedural policy for housing provision on rental basis and rent realization
- Provision of Infrastructure and other residential service facilities, and also children's play area, open space for socialization and various community meeting
- Strategies for cost recovery in order to provide the financial basis for the sustained expansion of the program
- Encouragement of local participation in the planning, implementation, maintenance and institutional arrangement

The outcome of the program will depend on spatial conditions such as size, shape, topography as well as the degree of participation of the community into the process and adherence to set policies, rules procedures by the personnel entrusted with the implementation.

In NCC, slum up-gradation is operating under UGIIP project. Up-gradation should incorporate all of the above four fields under a set layout keeping adequate toddler's play area and community open spaces. Considering the low population density and crowding of single storey katcha structures such

improvement seems quite possible for a qualified planner. Various NGO operated awareness building programs may be arranged on community open spaces covering important issues. In spite of low income, this approach will improve their bondage and bring in a qualitative change in their social life. A low income settlement up-gradation project has been proposed in Paikpara area.

- Housing for Low Income Families:

Provision of housing for low income people has many conflicting considerations. Majority low income people are in-migrants, who come to the larger cities for want of job. They physically reside in their work place though in heart they belong to their home village. One study on the low income slum dwellers at Mirpur, Dhaka in 2010 revealed that more than 85 percent respondent wished to return to their home village if they would have a job there. After retirement of a worker, new worker takes his place and the former returns amidst their home community where he belongs. His rental abode near work place too is occupied by his replacement. The system repeats itself in time. Furnishes issues, recommended interventions and underlying reasons are shown in tabular form.

Issues, Recommended Interventions and Underlying Reasons

Issues	Intervention	Reason
<ul style="list-style-type: none"> • Provision of housing is a basic human right. 	<ul style="list-style-type: none"> • Improved living condition. 	<ul style="list-style-type: none"> • They have their home back in their villages.
<ul style="list-style-type: none"> • Majority member of low income work force is in-migrants. 	<ul style="list-style-type: none"> • Provision of rental housing at proximity to work place. 	<ul style="list-style-type: none"> • It is neither possible nor desirable to provide permanent housing to all work-force coming to the city.
<ul style="list-style-type: none"> • Unit rent they pay for housing is as high as a mid to high mid income family. 	<ul style="list-style-type: none"> • Size of the accommodation to be decided as per their monthly paying capacity. 	<ul style="list-style-type: none"> • They do not have savings to compensate.
<ul style="list-style-type: none"> • Low income people will return to their home community as soon as they can. 	<ul style="list-style-type: none"> • Seed fund may be provided for making such rental houses. 	<ul style="list-style-type: none"> • Since rentable project must be stated with own fund.
<ul style="list-style-type: none"> • New worker will replace the former who too will need shelter at proximity to work. 	<ul style="list-style-type: none"> • Employers may construct such houses at their own initiative and rent may be realized from salary at source. 	<ul style="list-style-type: none"> • This will benefit the employer in terms of better and higher productivity of the employee due to additional working time and safe and worry free environment
<ul style="list-style-type: none"> • Providing housing for every person coming to the city for work spending public money will not be justified considering other deserving persons throughout the country. 	<ul style="list-style-type: none"> • Toddlers' play area, space for pre-schooling, gathering, meeting and socializing may be provided at the ground floor. 	<ul style="list-style-type: none"> • The children of low income families have the basic human rights for grooming, schooling, health coverage etc. • These people do not need place for car park.

8.3.2 Transport Proposals

Road network of Narayanganj city is comprised of mostly narrow lanes, collector/distributor roads and arterial roads. Narayanganj has only 5 percent roads of its total area. This is inadequate to serve the present population of the city. The road network covers almost 400 km of length in which 200 km is primary, 110 km is secondary, 50 km is feeder and 40 km is narrow respectively with few alternative connector roads.

In Narayanganj, no road hierarchy was maintained for road network development. Due to the absence of urban planning practice in NCC area, most of the roads were constructed without following any specific guidelines. As a result, traffic congestion at intersections is most common phenomena for Narayanganj city. Moreover, road connectivity at DND and Kadam Rasul area is very limited. If standard for road hierarchy recommended by Detailed Area Plan (DAP) has been followed in Narayanganj city at the time of road construction, the city will be more planned and congestion free.

Road widening is an important approach to establish road hierarchy in Narayanganj city to improve traffic situation. In addition, road widening ensures the following benefits to build transport infrastructure of the city.

Connectivity Improvement:

Road connectivity of DND area is very limited and existing roads are narrow and in poorer condition. Narayanganj- Dhaka link road is connected with Narayanganj- Shiddhirganj road with narrow roads at different intersection such as Jalkuri, Bhuigarh, Shibu Market and Stadium. It can be recommended to widen the existing roads in the range of 40 feet to 60 feet in order to meet the traffic demand of the area.

Traffic Attraction of different Land Use:

A good number of industries such as knit garments, re-rolling mills, pharmaceuticals and godowns are located in DND area. The owners of the industries transport their products using the narrow roads with high risk. Local people are also using the roads for their daily communication. Road widening project will attract new traffic in the said area through different land uses.

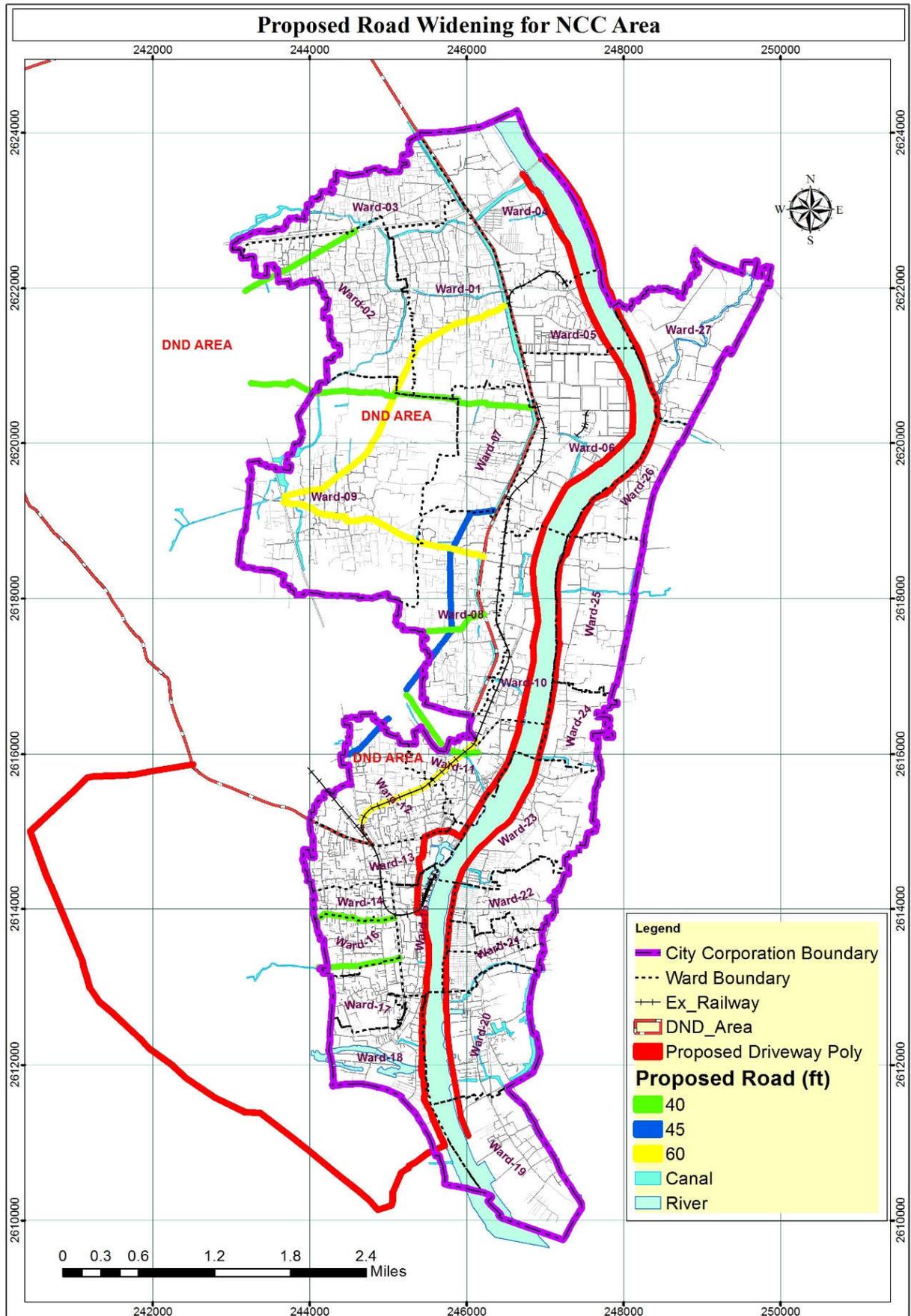
Future Development Opportunity:

Road widening project will create future development opportunity in the redevelopment area. People will settle and set up industries for better connectivity in the DND area. Future planned development will be accelerated for providing better accessibility. List of Proposed Roads of the NCC areas are given in table 8.1 and Map 8.1 shows the location of the Roads.

Table 8.1: List of Road Proposals (Widening)

Road Id	Road_Name	Proposed Type	Road width (ft)	Length (m)
PW 01	Bhuigar- Mauchak Road	Widening	40	1608
PW 02	Jalkuri-Siddirganj Road	Widening	60	4112
PW 03	Stadium to Tatkhana Bus Station Mor	Widening	40	3785
PW 04	Fakir Road - Haji Kalimullah Sarak - Model School Road	Widening	45	3513
PW 05	Jalkuri to Dakeshwari Road	Widening	60	2696
PW 06	Kadamtali - College Road	Widening	40	934
PW 07	Chasara- Hajiganj Road	Widening	60	1824
PW 08	Shibu Market- Hajiganj Road	Widening	40	1276
PW 09	Metro to 1 No. Railgate	Widening	60	962
PW 10	Ali Ahmed Chunka Road	Widening	40	1188
PW 11	Baburail Road	Widening	40	1046
Sub Total				22944
PD 01	Sitalakkhay River Drive Way	New Road	62	24835
PD 02	Sitalakkhay River Drive Way	New Road	40	13502
Sub Total				38337
Gross Total				61281

Source: Proposed list by DDC Consultant.



Map 8.1: Proposal of Road Infrastructure Development

8.3.2.1 Recommendations for Traffic Management System

8.3.2.1.1 Recommendations for Roadway Transport System

- It is necessary to build bridge over the Sitalakhya River to ensure harmonious development both part of the city. Furthermore, embankments cum road along the both side of the river should be constructed to ease the traffic condition of the city
- Public transport should be introduced from Netaiganj to DC office and Chittagong road to Panchabati as these two roads attract most of the traffic of the city
- Dhaka Structure Plan has proposed construction of Ring roads around the Dhaka city. The ring roads are proposed at about 10km, 15km and 20 km radius from the center of Dhaka. The main objectives of the ring roads are to relieve the city from the cross traffic within the city
- Restriction on freights/Containers movement within city is essential to reduce the traffic congestion and keep the passenger's traffic movement efficient. Illegal truck terminal at Netaiganj should be removed to improve the traffic situation of the business hub and Panchabati truck terminal should be improved with proper facilities for the truck drivers
- Road Network development is essential to cater the growing demand and support the different infrastructures such as industries, special economic zone, Adamjee export economic zone and so on. Future transport infrastructure should be built through public private partnership to reduce the pressure on government and local government
- If necessary, underpass and overpass should be introduced in the major intersection like Chasara and 2 no. Rail Gate to ensure smooth flow of vehicle. At the same, lane should be separated for motorized and non-motorized vehicle
- Common utility tunnel/duct like storm sewer, electricity line, water supply line, gas line, telephone line, main sewerage line etc. may be incorporated in major roads to ensure efficient management of utility services as well as avoiding the hazards, created due to frequent road cutting for maintenance of utility lines
- Land use planning should be integrated with the transport planning for ensuring better urban development and maintaining the transport infrastructure with the land use categories such as residential, commercial, industrial and mixed uses.

8.3.2.1.2 Recommendations for Railway Transport System

- More efficient mode of transport like LRT/Monorail should be launched to provide better internal transport services and modes of choice. Netaiganj to DC Office and Chittagong road to Panchabati are the main corridors for the city traffic
- Everyday about 81.25% traffic flows from Narayanganj to Dhaka city for different purposes such as business related work (35.31%), office (18.97) and so on. It is necessary to link with MRT line from Narayanganj to Dhaka for providing efficient and smart public transport service. Strategic Transport Plan suggests that MRT 02 line will connect Narayanganj with the capital city Dhaka and Gazipur as well.

8.3.2.1.3 Recommendations for Non-Motorized Transport

- Road hierarchy should be established to optimize use of the existing road network. Non-motorized transport such as rickshaw should be limited to the local roads or access road and arterial road might be assigned for high speed motor vehicles

- Pedestrian walkways should be improved to provide better facilities to the pedestrian. Moreover, pedestrian ways should be separated from motorways by steel fencing embedded with green creepers
- By-cycle lane should be provided near the community neighborhood to facilitate the green transport. Comprehensive Green Transport Policy should be prepared to develop the green transport network

8.3.2.1.4 Recommendations for Waterway Transport System

- Water ways should be improved to carry the different goods from Narayanganj to other part of the country. Existing launch service to Munshiganj, Chandpur and Matlab needs to improve to attract more traffic and reduce the pressure on road transport. Narayanganj city can be incorporated with Dhaka circular waterways project to attract passengers and goods through the water transport.

8.3.2.2 Travel Demand Management (TDM) Method

Travel Demand Management is essential for Narayanganj to reduce traffic problem and provide better transport services for the city dwellers. Three basic categories which are mentioned in Strategic Transport Plan are given below.

- i. Reduction in the need to travel;
- ii. Rescheduling the time of travel; and
- iii. Use of more efficient modes of travel.

8.3.2.3 Co-ordination among the authorities

Co-ordination and co-operation among different transport associated organization is necessary to provide better transport services to the city dwellers. BRTA, NCC, Bangladesh Policy, BIWTA and Bangladesh Railway can work closely to address transport services in Narayanganj city. There should be a clear rules and regulations between authorities on their plan development and implementation.

8.3.2.4 Recommendations for Future Transportation Planning

Narayanganj is an industrial and commercial hub in Bangladesh. The economy of the city consists of diversified manufacturing industries such as cement, steel, ship building, power plant, pharmaceuticals, textile, hosiery and so on. Moreover, some agricultural processing industries such as wheat, salt, lentil etc. keep significant role in the city economy. Furthermore, about 80 % knit garment industries are situated in the city. BSCIC industrial town is adjacent to the Narayanganj city. It is clearly observed that freight transport has significant impact along with passenger's transport demand.

Comprehensive and efficient transportation systems are required to keep the city moving and livable for the city dwellers. Bangladesh Government promulgated 7th Five Year Plan 2016-2020 and gave more attention on transport and communication sector for nation economic growth above 7 percent. In addition, Bangladesh adopted United Nations Sustainable Development Goals which declare as follows.

“By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, like women, children, persons with disabilities and older persons.”

To consider the international commitments, government plan and local demand, the transport development goal has been set as below: **“Safe, affordable, universal and sustainable multi-modal transport systems for all citizens.”**

8.3.3 Development Proposals

Different types of development projects have been under taken to improve the present condition of NCC area. The projects are proposed based on the discussion with the Honorable Mayor, Councilors and other stakeholders of NCC. Most of the projects are taken for transport, drainage, environment, social services sectors. As per honorable Mayor’s wish location of 2 bridges are given here. Location of the bridges is given by NCC officials. Sayedpur Bridge is already included in the Annual Development Programme (ADP), 2016-2017 and its detail design, approach roads and costs are finalized and land acquisition process started in field. Here it should be mansion that specific location for any public toilet is not selected in AAP, it should be established in public places like park, bazaars, bus terminals, truck terminals etc on the basis of demand and necessity of population. The list of development Project proposals are given in the table 8.2.

Table 8.2: List of Development Proposals for NCC Area

Type	Mouza name	Location at Plot level	Area (acre)
Jimkhana Cultural park	Narayanganj_006_03	701-710	38.5
	Narayanganj_006_04	1270-1275	
	Narayanganj_006_05	1774-75	
	Narayanganj_006_06	1901-1908	
Station Area Redevelopment	Narayanganj_006_02	357-399	13.8
	Narayanganj_006_03	695,995	
2no rail gate Intersection development	Narayanganj_006_03	607-08,714	2.35
	Narayanganj_006_04	1228,1234-36	
Proposed Waste Dumping Yard 01	Sayedpur	77-80,83-91	15.4
Proposed Park 01	Sayedpur	37,49	1.7
Proposed Low Cost Housing	Paikpara (M)	302-04,312	3.3
Haziganj fort redevelopment	Haziganj (M)	33-37,401-404,241-247	24.7
Chasara Intersection Development	Kanapur	82,83,90-94,839,842-45	4.6
Proposed Dumping Yard 02	Jalkundi	91-93,103-117,679-728	24.47
Proposed College	Khorda Ghoshpara	849	0.56
Proposed Community Center	Khorda Ghoshpara	505, 563	0.06
Proposed Park 02	LakshmanKhola	153-199	10.1
Proposed Dumping Yard 03	Sonapur	41,42,53,191,194,195,205,208,210	2.1
Proposed Sayedpur Bridge	Madaniganj		
Proposed Bandar Bridge	Narayanganj_006_03		
Ward Councilor’s Complex	One per ward		

Source: Proposed by the DDC Consultant.

8.4 Block-Wise Project Proposals

8.4.1 AAP for Block No. 01

Demography:

Block-01 consists of five wards named Ward No. 14, 15, 16, 17 and 18. It is situated on the southern part of the Narayanganj. Ward 15 and 18 are situated beside the Sitalakhya River. This area is characterized as highly developed and core area of the city.

Table 8.3: Population, area and density of Block 01

Block No.	Ward	Population			Area (acre)	Density/Acre 2011
		2011	2016	2021		
Block-01	Ward-14	29431	34368	40133	111.7	308
	Ward-15	24096	28138	32858	249.3	113
	Ward-16	34496	40282	47039	154.3	261
	Ward-17	35518	41476	48433	151.3	274
	Ward-18	30484	35597	41568	351.8	101
Sub-Total		154025	179861	210031	1018.4	177

Source: BBS, 2011 and projected by the Consultant.

Present population of the block is 154025 (2011) and it will be 179861 in the year 2016, 210031 in 2021. Density of population is 177 persons per acre.

Proposed Transport:

Three roads have been proposed for widening to increase smooth function of the road network. List of Road proposal of Block 1 are given in Table 8.4.

Table 8.4: List of Road Widening Proposals of Block 01

Road Id	Road_Name	Proposed Type	Road width (ft)	Length (m)
PW 09	Metro to 1 No. Railgate	Widening	60	354.25
PW 10	Ali Ahmed Chunka Road	Widening	40	1154.88
PW 11	Baburail Road	Widening	40	1011.99
Total				2521.12

Source: Proposed by the DDC Consultant.

Proposed Drain:

In Block 01, five natural drainage channels have been proposed to mitigate drainage problem of block 01. Among the 5 channels, 3 channels are already exists with lots of blockage and narrow width. Two new channels have been proposed based on the CS and RS mauza maps. The Buriganga River and Sitalakhya River have been functioned as outfall of the drainage channels.

Table 8.5: Proposed Drainage for Block 01

ID_No	Name	Existing_Width (M)	RS_Width (M)	CS_Width (M)	Proposed Width(M)	Length (M)
PC08	Kashipur River (Narayanganj)	77	84	224	200	1248
PC12	Baburail Khal (Narayanganj)	18	21	22	22	1307
PC11	Narayanganj	0	20	30	30	880
PC09	Narayanganj	18	20	25	25	986
PC10	Narayanganj	0	16	15	16	573
Total						4994

Source: Proposed by the DDC Consultant.

Development Proposal:

Block-01 is a highly developed and the core area of NCC. Availability of land and accessibility makes this area a development focus area. Most of the development proposals are identified in this area. A cultural park (Jimkhana Cultural park) on 38.5 acres of land, a Station area redevelopment on 13.8 acres of land, 2 No. rail gate node development on 2.35 acres of land, a waste dumping yard on 15.4 acres of land, a park on 1.7 acre of land and a Low cost housing on 3.3 acres of land are proposed for block no. 01. All of these services are located in the ward no. 15, 16, 17 and 18. Existing services should be developed to make it useable. Here it should be mention that the works Jimkhana Cultural Park is already started and construction works are going smoothly. A comprehensive list of various project has been developed to make the city environmental friendly and livable. The consultant team reviews the proposals of the “VITTI (National Consultant)” and proposed to incorporate detail design of 2 no. rail gate intersection development into the AAP. The details of the projects are given below. Detail designs with estimated cost of Station Area Redevelopment Project and Waste Dumping project have been incorporated in the chapter 10 of this report.

Table 8.6: Development Proposals

Type	Ward No.	Mouza name	Location at Plot level	Area acre)
Jimkhana Cultural park	Ward No. 15 & 16	Narayanganj_006_03 Narayanganj_006_04 Narayanganj_006_05 Narayanganj_006_06	701-710, 1270-1275, 1774-75, 1901-1908	38.5
Station Area Redevelopment	Ward No. 15	Narayanganj_006_02 Narayanganj_006_03	357-399 695, 995	13.8
2no rail gate intersection development	Ward No. 15	Narayanganj_006_03 Narayanganj_006_04	607-08,714 1228,1234-36	2.35
Proposed Waste Dumping Yard 01	Ward No. 18	Sayedpur	77-80,83-91	15.4
Proposed park 01	Ward No. 18	Sayedpur	37,49	1.7
Proposed Low Cost Housing	Ward No. 17	Paikpara (M)	302-04,312	3.3

Source: Proposed by the DDC Consultant.

Description of the Project: Development of Cultural Park into a City level at Jimkhana area

Programs Include:

- I. Rickshaw dropping and pedestrian entry, Pedestrian Circulation
- II. Parking and Vehicular circulation
- III. Curve Waterfront (Facilitating walking along and also informal seating)
- IV. Children's Park with Pleasant Rides
- V. Boating Facility (Paddle/oar driven)
- VI. Convention Centre
- VII. Exhibition Space
- VIII. Civic centre for CIVIC Reception
- IX. Charukola – ART institute
- X. Heritage & handicraft Mall (with traditional items like Delhi hut)
- XI. Sports facilities
- XII. Restaurant and snacks facilities

Objective of the Project:

- I. Provide the city with recreational and cultural facilities for all age groups of people
- II. Improve the present degraded environment
- III. Save the valuable land from land grabbers and then improve the area as an open space cum retention area of rainfall runoff
- IV. Improve the functional character of the area

Implementation Authority: NCC in association with Bangladesh Railway (BR).



Photo 8.1: Proposed Design of Jimkhana Cultural Park

Source: “VITTI (National Consultant)”, 2011

Description of the Project: 2no Railway Gate (Intersection) Development



Photo 8.2: Existing Condition of 2no. Railgate

Source: “VITTI (National Consultant)”, 2011



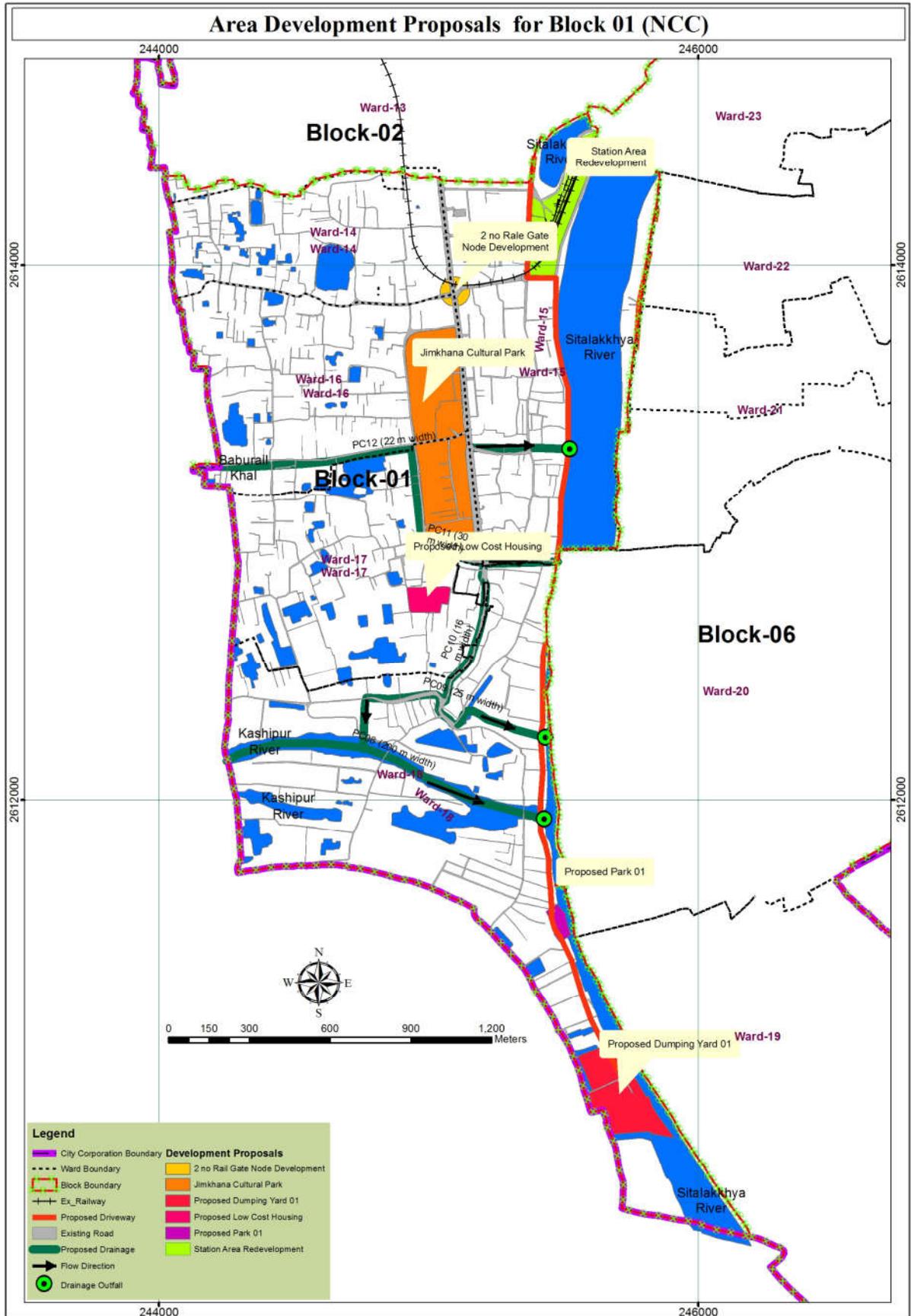
Photo 8.3 Proposed Road Widening and Overpass at 2no. Railgate Intersection

Source: "VITTI (National Consultant)", 2011



Photo 8.4: Proposed View of Railway gate Intersection

Source: "VITTI (National Consultant)", 2011



Map 8.2: Proposed Projects of Block-01

8.4.2 AAP for Block No. 02

Demography:

Block No. 02 consists of Ward 11, 12 and 13. It is situated on the south-western part of the Narayanganj. Ward No. 11 and Ward No. 13 is situated beside the Sitalakhya River. This area is characterized by highly developed and core area of the city. Major parts of this Block fall in DND area (mainly ward no. 11 and 13).

Table 8.7: Population, Area and Density of Block 02

Block No.	Ward	Population			Area (acre)	Density/Acre 2011
		2011	2016	2021		
Block-02	Ward-11	24550	28668	33477	193.2	148
	Ward-12	40187	46928	54800	449.2	104
	Ward-13	47079	54976	64198	278.9	197
Total		1,11,816	1,30,572	1,52,475	921.3	142

Source: BBS, 2011 and projected by the Consultant

Present population of the block is 1,11,816 (2011) and it will be 1,30,572 in the year 2016, 1,52,475 in 2021. Density of population is 142 persons per acre.

Proposed Transport:

Four roads have been proposed for widening to increase smooth function of the road network. List of Road proposal of Block 2 are given in Table 8.8.

Table 8.8: List of Road Widening Proposals of Block 02

Road Id	Road_Name	Proposed Type	Road width (ft)	Length (m)
PW 04	Fakir Road - Haji Kalimullah Sarak - Model School Road	Widening	45	608.75
PW 07	Chasara- Hajiganj Road	Widening	60	1823.68
PW 08	Shibu Market- Hajiganj Road	Widening	40	421.21
PW 09	Metro to 1 No. Railgate	Widening	60	608.17
Total				3461.81

Source: Proposed by the DDC Consultant

Drainage Proposal:

In Block 02, three natural drainage channels have been proposed to mitigate drainage problem of Block 01. These drainage channels are already exist with lots of blockage and narrow width. The Buriganga River and Sitalakhya River have been functioned as outfall of the drainage channels.

Table 8.9: Drainage Proposal of Block 02

ID_No	Name	Existing Width (M)	RS_Width (M)	CS_Width (M)	Proposed Width(M)	Length (M)
PC13	Polykhali Khal (DND)	17	13	17	17	1034
PC14	DND Khal	9	15	0	15	683
PC30	DND Khal	35	45	0	45	146
Total						1863

Source: Proposed by the DDC Consultant

Development Proposal:

Block-02 is also highly developed and the core area of NCC. Availability of land and accessibility makes this area a development focus area. Haziganj Fort, an important historical site of NCC area is situated in this block. The Consultant team has proposed to redevelopment of this fort to preserved heritage site as well as to make new recreation spot for the NCC area. Chasara intersection is the main intersection of the NCC area. Chasara intersection makes communication with various areas of the city. “VITTI (National Consultant)” has already developed a detail design of the Chasara intersection development to decrease the congestion of NCC area. The consultant team reviews the proposals of the “VITTI (National Consultant)” and proposed to incorporate detail design of Chasara intersection development into the AAP. The details of the projects are given below. Detail designs with estimated cost of Haziganj fort redevelopment project have been incorporated in the chapter 11 of this report.

Table 8.10: Development Proposals of Redevelopment and Intersection

Type	Ward No.	Mouza name	Plot No.	Area (acre)
Haziganj fort redevelopment	Ward No. 11	Haziganj (M)	33-37, 401-404, 241-247	24.7
Chasara Intersection Development	Ward No. 12	Kanapur	82, 83, 90-94, 839, 842-845	4.6

Source: Proposed by the DDC Consultant.

Description of the Project: Chasara Intersection Development



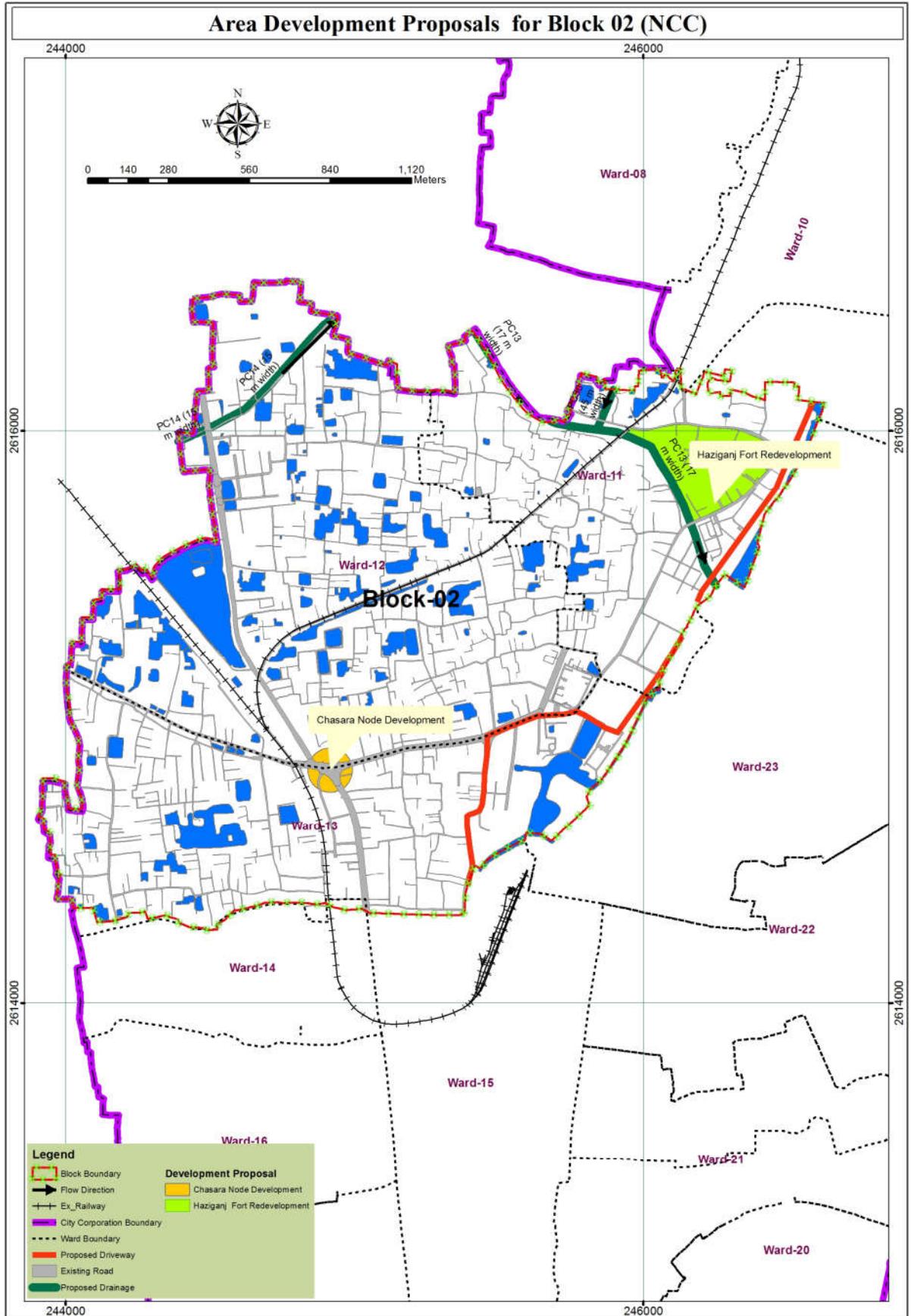
Photo 8.5: Existing Condition of Chasara Intersection

Source: "VITTI (National Consultant)", 2011



Photo 8.6: Proposed Concept Vision (VIA DUCT width 36 feet)

Source: "VITTI (National Consultant)", 2011



Map 8.3: Proposed Projects of Block 02

8.4.3 AAP for Block-03

Demography:

Major part of the Block 03 falls in Siddhirganj region and DND area. Block 03 consists of Ward 06, 07, 08, 09 and 10. Ward 06 and Ward 10 are situated beside the Sitalakhya River and high population density is observed within these blocks. Major part of this Block falls in DND area (mainly ward no. 07, 08, 09).

Table 8.11: Population, Area and Density of Block 03

Block No.	Ward	Population			Area (acre)	Density/Acre 2011
		2011	2016	2021		
Block-03	Ward-06	25100	29310	34227	702.9	42
	Ward-07	21888	25559	29847	402.1	64
	Ward-08	42703	49867	58232	756.2	66
	Ward-09	27138	31690	37006	1401	23
	Ward-10	20489	23926	27939	398.3	60
Sub-Total		137318	160352	187251	3660.5	44

Source: BBS, 2011 and projected by the Consultant.

Present population of the block is 137318 (2011) and it will be 160352 in the year 2016, 187251 in 2021. Density of population is 44 persons per acre. Ward 08 is comparatively a higher densely area.

Proposed Transport:

Four roads have been proposed for widening to increase smooth function of the road network. List of Road proposal of Block 2 are given in Table 8.12.

Table 8.12: List of Road Widening Proposals of Block 03

Road Id	Road_Name	Proposed Type	Road width (ft)	Length (m)
PW 02	Jalkuri-Siddhirganj Road	Widening	60	2232.61
PW 03	Stadium to Tatkhana Bus Station Mor	Widening	40	874.58
PW 04	Fakir Road - Haji Kalimullah Sarak - Model School Road	Widening	45	2383.36
PW 05	Jalkuri to Dakeshwari Road	Widening	60	2696.19
PW 06	Kadamtali - College Road	Widening	40	2203.09
Total				10389.83

Source: Proposed by the DDC Consultant.

Drainage Proposal:

According to the Digital Elevated Model (DEM), Block No.03 can be divided into two parts. One is DND part and the opposite side of the DND (Sitalakhya river side). In DND part, the land is very low and sloppy towards the Buriganga River. One natural drainage channel is available in this side but in

some places is blocked and narrow. It cannot carry sufficient water during rainy season. So flood and water logging is common scenario in this region. In this case, improvement of the natural canal is the main solution to solve the problem.

On the other hand, the high land beside the Sitalakhya River can made flood free by the construction of some man made primary drains that will be connected with the Sitalakhya River. See the drainage plan for detailed.

Table 8.13: Proposed Drainage for Block 03

ID_No	Name	Existing_ Width (M)	RS_Width (M)	CS_Width (M)	Proposed Width(M)	Length (M)
PC04	Kadamrasul	9	10	9	10	5
PC05	Kadamrasul	20	12	13	20	13
PC29	JelaparaKhal (narayanganj)	14	22	18	22	579
PC22	Par Khal (DND)	9	9	0	9	2395
PC21	DND Khal	4	13	0	13	810
PC17	WabdaKhal (DND)	15	25	10	25	1059
PC23	DND Khal	60	68	0	68	1456
PC19	DND Khal	15	17	0	17	2349
PC16	Jimkhana Khal (DND)	22	15	0	22	1873
PC20	DND Khal	8	10	0	10	3111
PC18	DND Khal	13	26	0	26	2611
PC30	DND Khal	35	45	0	45	2848
PC15	DND Khal	0	10	0	10	1112
PC28	Narayanganj	0	0	10	10	875
Total						21096

Source: Proposed by the DDC Consultant.

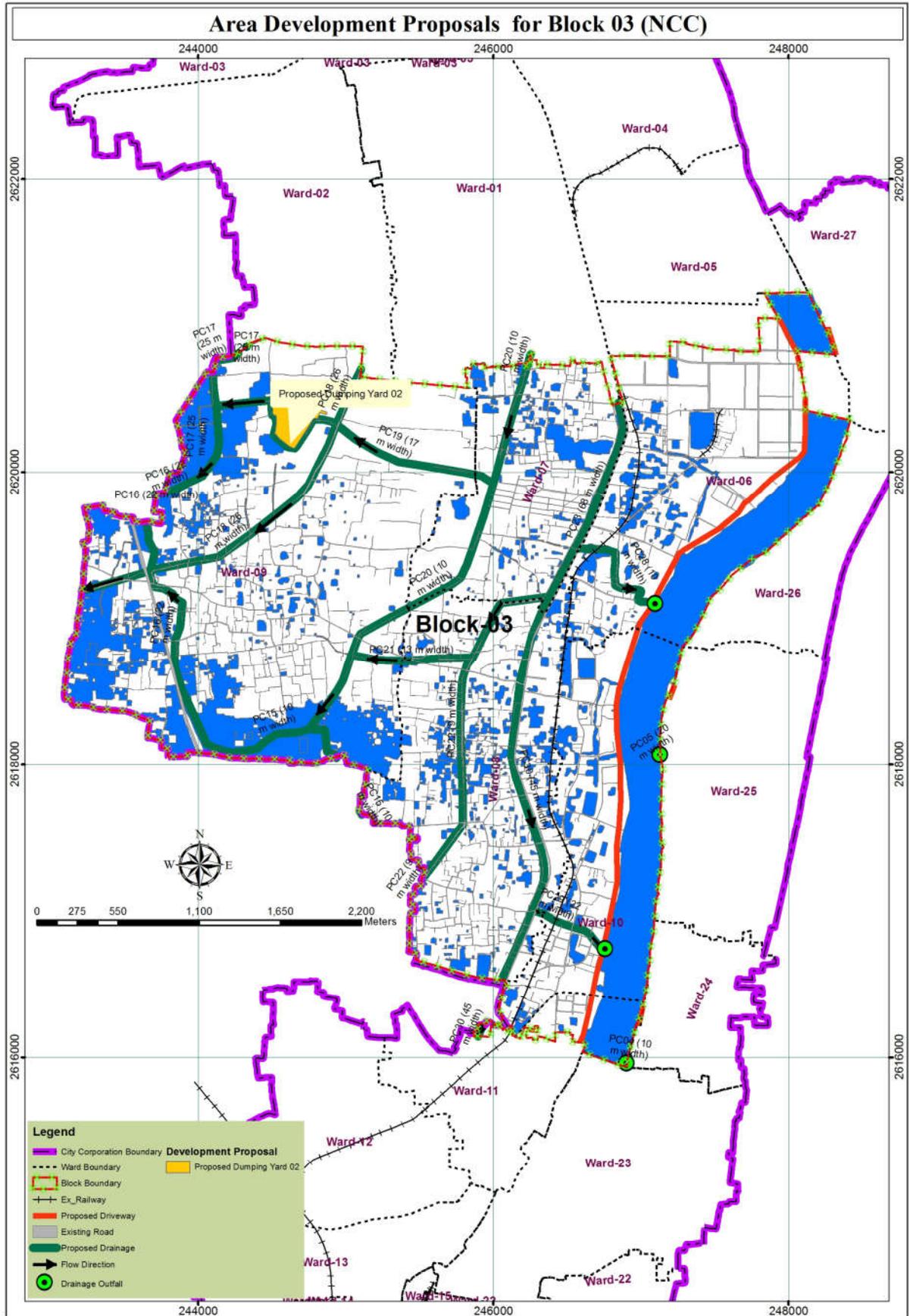
Development Proposal:

A waste dumping yard has been proposed in Ward no. 09. About 24.4 acres of land will be used in Jalkundi mauza for this purpose. It must be environmental friendly with proper treatment system (ETP).

Table 8.14: Development Proposal for Dumping Yard

Type	Ward No.	Mauza name	Plot No.	Area (acre)
Proposed Dumping Yard 02	Ward No. 09	Jalkundi	91-93,103-117,679-728	24.47

Source: Proposed by the DDC Consultant.



Map 8.4: Proposed Projects of Block-03

8.4.4 Action Area Plan for Block-04

Demography:

Block-04 is located in Siddhirganj zone and northern part of NCC area which comprises with five wards named Ward No. 01, 02, 03, 04 and 05. Among the five wards, ward-04 and ward-05 are situated adjacent to the Sitalakhya River. Total area of this block is about 2763.3 acre. Total population of this block is 163403 (2016), and the figure will be observed as 190810 in 2021. Ward no-03 has highest population density (114 person/ acre) and ward no. 04 has lowest population density (36 person/ acre) among the five wards of block-04. The following table shows the population, area and density of block-04.

Table 8.15: Population, Area and Density of Block-04

Block No.	Ward	Population			Area (acre)	Density/Acre 2011
		2011	2016	2021		
Block-04	Ward-01	36592	42730	49897	723.1	59
	Ward-02	25585	29877	34888	602.7	50
	Ward-03	35947	41977	49018	366.8	114
	Ward-04	23385	27308	31888	759.4	36
	Ward-05	18421	21511	25119	308.3	70
Sub-Total		139930	163403	190810	2760.3	59

Source: BBS, 2011 and projected by the Consultant.

Proposed Transport:

Four roads have been proposed for widening to increase smooth function of the road network. List of Road proposal of Block 2 are given in Table 8.15.

Table 8.16: List of Road Widening Proposals of Block 04

Road Id	Road_Name	Proposed Type	Road width (ft)	Length (m)
PW 01	Bhuigar- Mauchak Road	Widening	40	1132.89
PW 02	Jalkuri-Siddhirganj Road	Widening	60	1878.93
PW 06	Kadamtali - College Road	Widening	40	690.97
Sub Total				3702.79

Source: Proposed by the DDC Consultant.

Drainage Proposal:

Nine drainage channels have been proposed in this block. All these drainages are exists within DND area except one and the flow direction is towards Buriganga River. Flow direction of Wapda khal is towards Sitalakhya River. Total length of the drainage system in this block is around 17.6 km.

Table 8.17: Proposed Drainage for Block 04

ID_No	Name of the khal	Existing Width (M)	RS_Width (M)	CS_Width (M)	Proposed Width(M)	Length (M)
PC17	WAPDA Khal (DND)	15	25	10	25	2782
PC24	WAPDA Khal (DND)	21	23	0	23	2082
PC26	DND Khal	18	42	0	42	2446
PC23	DND Khal	60	68	0	68	3812
PC20	DND Khal	8	10	0	10	692
PC18	DND Khal	13	26	0	26	1880
PC23	Konsol Khal (DND)	4	11	12	12	1332
PC25	Pagla Khal (DND)	19	40	0	40	813
PC27	DND Khal	0	30	32	32	1743
Total						17582

Source: Proposed by the DDC Consultant.

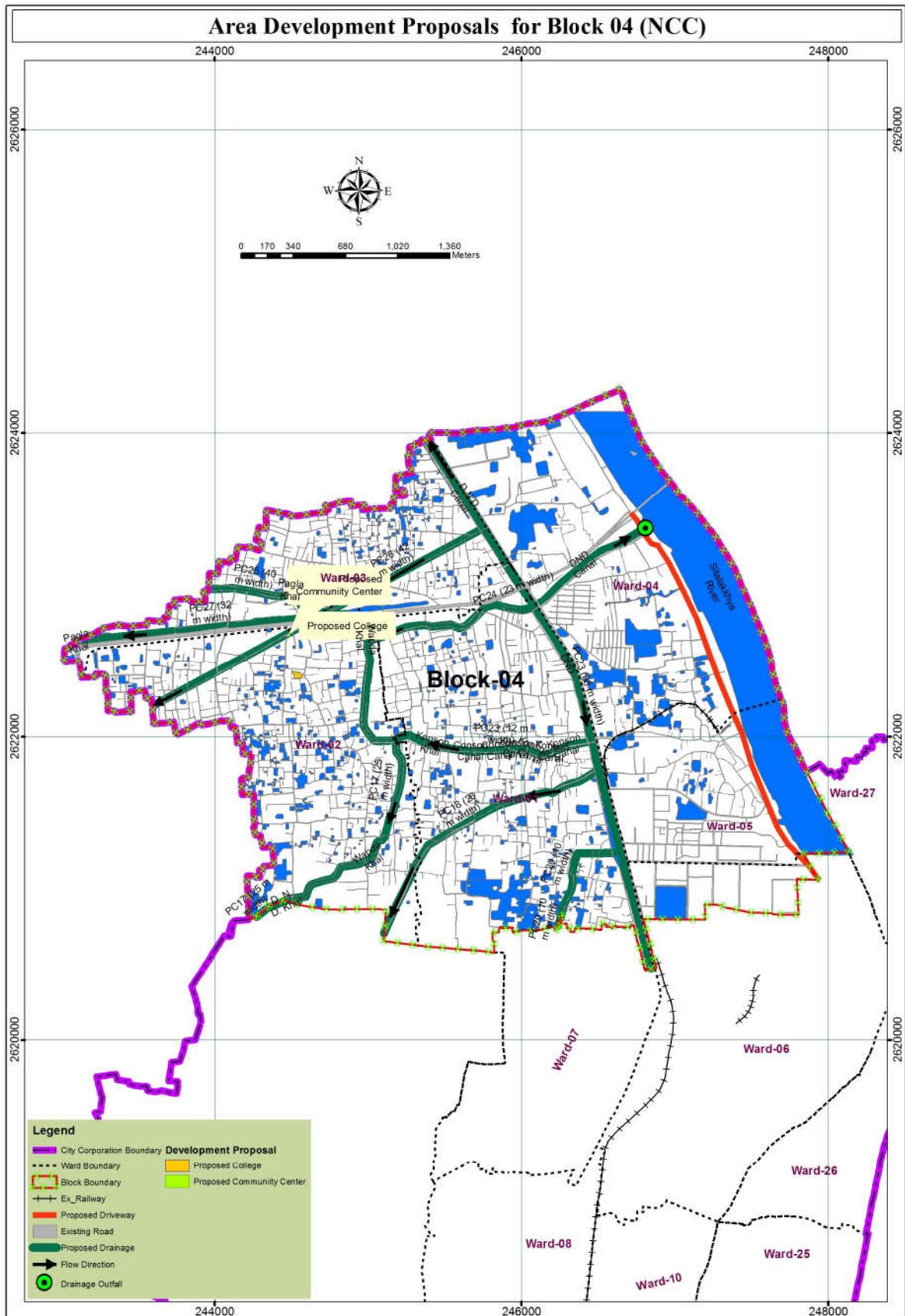
Development Proposals:

A College and a community center have been proposed in Ward no. 2 (Lakshman khola Mouza). Its area is about 0.6 acres. The community center will be a multi-purpose building serving as digital center, training center, councilor's office and shopping complex. Since there is no College in Block-04, a college will be built on plot 849.

Table 8.18: Development Proposals at Mauza level

Type	Ward No.	Mauza name	Plot No.	Area (acre)
Proposed College	Ward No. 02	Khorda Ghoshpara	849	0.56
Proposed Community Center	Ward No. 02	Khorda Ghoshpara	505, 563	0.06

Source: Proposed by the DDC Consultant.



Map 8.5: Proposed Projects of Block-04

8.4.5 AAP for Block-05

Demography:

Block-05 plays a very significant role in maintaining the ecological balance of the NCC area. It is located in the eastern part of NCC area (Bandor zone) which comprises only three wards named Ward 25, 26 and 27. All of the wards are situated on the bank of the Sitalakhya River. Total area of this block is about 1249 acre. Total population of this block is 38,526 (2016) and the figure will be projected as 44,987 in 2021. Population density within the wards of this block is almost same. The following table shows the population, area and density of block-05.

Table 8.19: Population, Area and Density of Block 05

Block No.	Ward	Population			Area (acre)	Density/Acre 2011
		2011	2016	2021		
Block-05	Ward-25	12636	14756	17231	452.4	33
	Ward-26	6812	7955	9289	220.7	36
	Ward-27	13543	15815	18467	575.9	27
Sub-Total		32991	38526	44987	1249	31

Source: BBS, 2011 and projected by the Consultant

Drainage Proposals:

Three drainages channels have been proposed in this block. The flow direction of these drainage channels are towards Buriganga River. Total length of the drainage system in this region is 3.9 km.

Table 8.20: Proposed Drainage of Block 05

ID_No	Name	Existing_ Width (M)	RS_Width (M)	CS_Width (M)	Proposed Width(M)	Length (M)
PC05	Kadamrasul	20	12	13	20	1017
PC06	Kadamrasul	7	15	10	15	434
PC07	Sitalakhya Branch (Kadamrasul)	20	12	21	21	2496
Total						3947

Source: Proposed by the DDC Consultant.

Development Proposals:

A park has been proposed in Ward no. 25 (Lakshman khola mouza). Its area is about 10.1 acres. It will be used as a recreational hub for people of Block 05.

Table 8.21: Development Proposal

Type	Ward No.	Mouza name	Plot No.	Area (acre)
Proposed Park 02	Ward No. 25	Lakshman Khola	153-199	10.1

Source: Proposed by the DDC Consultant.

8.4.6 Action Area Plan of Block-06

Demography:

Block-06 is also located at the eastern part (Bandar zone) of NCC area beside the Sitalakhya River. Natural water bodies like ponds are also observed in this block. This block comprises with six wards named Ward 19, 20, 21, 22, 23 and 24. All of the wards are situated on the bank of the Sitalakhya River. Total area of this block is about 2077.8 acre. Total population of this block is 1, 55, 639 (2016) and the figure will be observed as 181747 in 2021. Ward no-22 has highest population density (157 person/ acre) and ward 19 has lowest population density (29 person/ acre) among the six wards of block-06. The following table shows the population, area and density of block-06.

Table 8.22: Population, Area and Density of Block 06

Block No.	Ward	Population			Area (acre)	Density/Acre 2011
		2011	2016	2021		
Block-06	Ward-19	11822	13805	16121	478.3	29
	Ward-20	17694	20642	24105	515.1	40
	Ward-21	22176	25896	30240	200.6	129
	Ward-22	30728	35882	41901	228.4	157
	Ward-23	30572	35700	41688	476.4	75
	Ward-24	20308	23714	27692	179	132
Sub-Total		133300	155639	181747	2077.8	75

Source: BBS, 2011 and projected by the Consultant

Drainage Proposals:

Five drainages have been proposed in this block. A branch of the Buriganga River flows beside the block. But the slope of this side is towards the Sitalakhya River. Total length of the drainage system in this block is about 6.4 km.

Table 8.23: Drainage Proposal of Block 06

ID_No	Name	Existing_Width (M)	RS_Width (M)	CS_Width (M)	Proposed Width(M)	Length (M)
PC03	Tribeni Khal (Kadam Rasul)	20	21	31	31	1505
PC04	Kadam Rasul	9	10	9	10	842
PC01	Dhaleswari Branch (Kadam Rasul)	44	45	28	45	2376
PC02	Kadam Rasul	48	57	0	57	1688
PC13	Polykhali Khal (DND)	17	13	17	17	5
Total						6416

Source: Proposed by the DDC Consultant

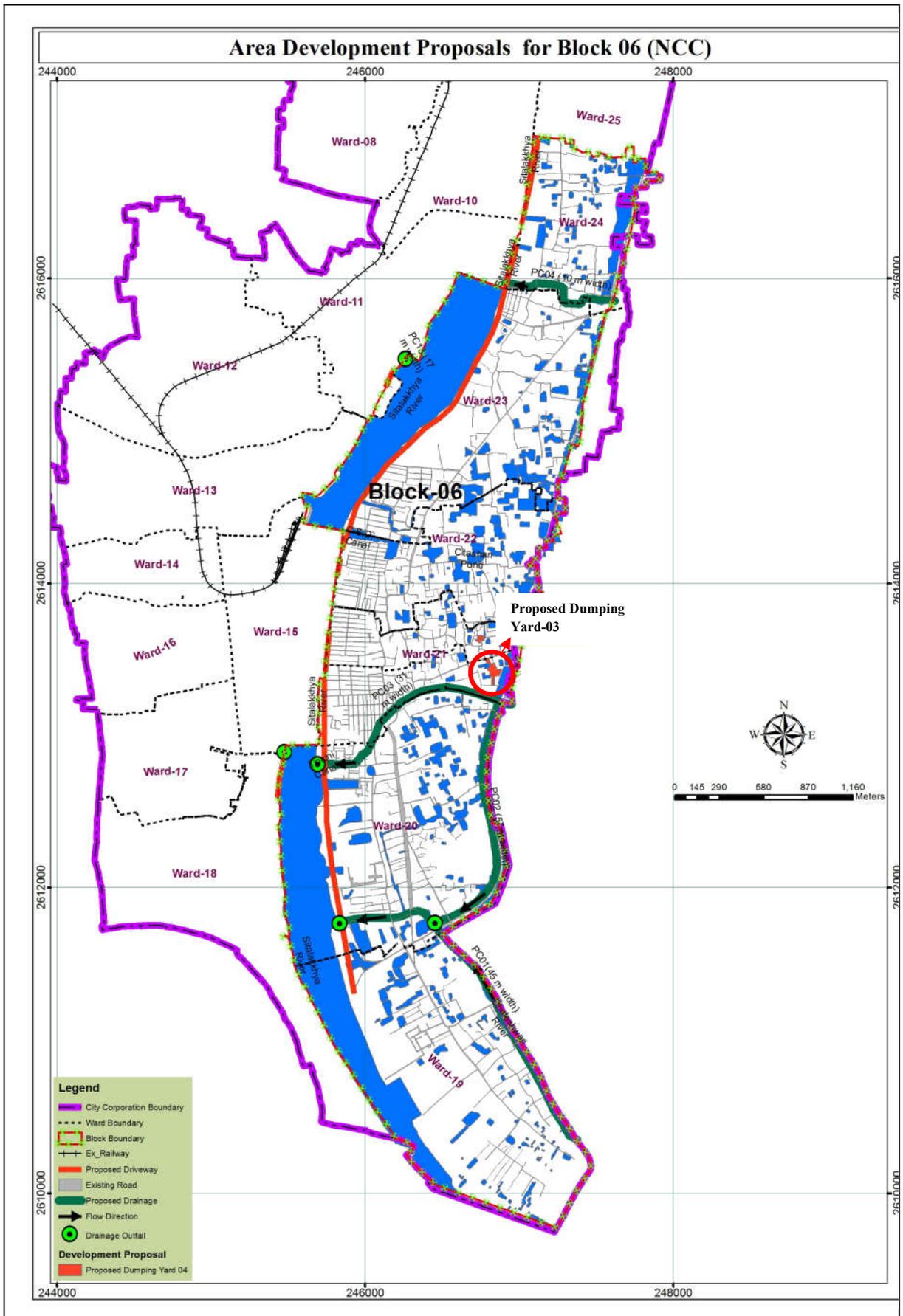
Development Proposals:

A waste dumping yard has been proposed in Ward-21. The site is located outside of the NCC Boundary. NCC will acquire the land and developed as a dumping yard. The total area of this yard is about 2.1 acres. The dumping yard must be environmental friendly with proper treatment system.

Table 8.24: Development Proposals of Block 6

Type	Ward No.	Mauza name	Plot No.	Area (acre)
Proposed Dumping Yard 03	Ward No. 21	Sonapur	41,42,53,191,194,195,205,208,2 10	2.1
Proposed Sayedpur Bridge	Ward No. 19	Madaniganj		

Source: Proposed by the DDC Consultant



Map-8.7: Proposed Projects of Block-06

8.5 Implementation Guidelines

Implementation, monitoring and evaluation of any proposed plan/project is major issue of development. Smooth implementation of any projects largely depends on the administrative setup of implementing authority and procedure follows by the authority to implement projects. Narayanganj City Corporation is the concern authority to implement the proposed projects of Action Area Plan. Existing organizational setup of NCC is not sufficient enough to implement projects effectively. There is no planning department in city corporation organogram. It is strongly recommended to establish a separate planning department in NCC organogram which could be responsible to implement, monitor and evaluate the plan/projects proposed in Action Area Plan.

Now a day's implementation procedure follows 'Inclusive Approach' to avoid overlay of works of different govt. service giving agencies. Implementation of the AAP should follow the development control procedures for determining planning applications by using simple and standard planning application procedures. A simple application will be assessed quickly against a given set of criteria, essentially consisting of the following:

- The proposed development confirms all respects mentioned in the policies of the SP and UAP
- The usage identified in the application is being considered appropriate for inclusion in an area demarcated in the AAP
- Provided that the planning application meets above criteria and the application will be approved and planning permission is given

Planning applications that do not meet the above criteria or are considered marginal cases (to be known as an invalid simple application) will be subjected to a more detailed examination in considering standard procedure.

Following developments are indicative of those appropriate in the AAP:

- Solid Waste Management
- Recreational facility improvement
- Local health facilities (clinics rather than hospital).
- Workshops (small-scale workshops with operations only) in daylight hours and low traffic generators
- Open spaces (playgrounds, parks, etc.)
- Access roads
- Utilities; and
- Drainage channels

When considering a standard planning application within areas zoned for AAP, the NCC need to undertake a two-stage process (suggested by DDC Consultant).

First, before considering site specific issues, on receipt of the planning application, to consider the wider context and determine issues relating to the overall area into which the application falls. NCC will need to:

1. Determine the boundaries of the wider area. These will usually be formed by some distinctive natural or man-made feature, for example a khal, river or road which provides access into the area. Such areas will vary in shape and size.
2. Identify and assess the existing access and circulation arrangements of the area. Preferably, the area should be served by 10 meter access roads which run through the entire area providing access to all Wards. These access roads should be linked to local roads. If this is not the case and access roads of sufficient width, are not available, the City Corporation shall consider whether or not further development is appropriate. New development may result in increased vehicular congestion and increased demand for utility services, where this could be difficult to supply.
3. Identify the need for community facilities (schools, clinics, religious facilities, open spaces, etc.) or plots for utility services. Do sufficient already exist or should more land be sought for increased provision to the existing population? In this latter instance, the City Corporation will again need to consider acquisition of land including the land, either in part or in full, under consideration for development.
4. Consider areas of high landscape quality in the locality which should be preserved and the potential impact of the proposed development on those areas.

Secondly, NCC needs to undertake the issues relating to the individual site and application. These can only be determined once the overall context of the area has been established. The questions NCC needs to ask are:

- I. Can be proposed use of land be considered a “Good Neighbor”, defined in this situation as a use which can be carried out in any residential area without detriment to the amenities of the area by reason of noise, vibration, smell, fumes, smoke, soot, ash, dust or grit?
 - Is the use likely to generate excessive volumes of traffic which either cannot be accommodated on the existing road system or which are likely to disturb, its neighbors?
 - Will the working hours of the use (if non-residential) cause a disturbance to residential neighbors (with working late in to the evening or night or 24-hours operations likely to cause a nuisance and therefore not being permitted)?
 - If yes to any of the above, the application should be rejected and directed to a more suitable location
- II. Does the proposed boundary of the application impinge upon a road corridor, utility reserve, drainage channel reserve or any khas land (List of khas land are given in annexure J)? If it does, it should be relocated outside such a reserve, even if this constitutes a reduction in the overall size of the plot. If excessive land will be lost as a result, implying that the development can no longer proceed, the application will need to be rejected.

- III. Does the application provide for adequate site access from, preferably as minimum, a 6 meter access road? Does it have sufficient on-site or off-site parking facilities to cater for the potential demand? If it does not, the plans should be amended or the application refused.
- IV. Will the development destroy landscape unique to the location? If it does, its design will need to be altered to protect the landscape, or the application will need to be refused.
- V. Is the scale of development proposed in keeping with its neighbors? If too large, it should be reduced. Does it impinge up on the privacy of others? If it does, the design /layout/size should be changed. If it cannot be appropriately modified, it should be refused.

CHAPTER 9

PHASING AND PRIORITY

9.1 Phasing

The Action Area Plan (AAP) for Narayanganj City Corporation Area has been prepared to develop a healthy and sustainable city for the next 5 years. AAP has proposed many projects in different sector to fulfill the objective of the plan and to achieve vision of NCC. The implementation stage of the plan proposals have been divided in three phases. This process has been adapted in almost all the plans prepared for other cities of the country including Dhaka. Narayanganj city also been followed this three phase implementation processes. The first phase of implementation stage will be 1st year after plan preparation which is also 2nd year of the national Seventh Five Year Plan (SFYP 2015-2020) period covering the remaining part of the national Sixth Five Year Plan and the first three years of next Seventh Five Year Plan. The second phase will be 2 year duration covering the 2nd and 3rd year of the plan period and third phase will be 4th and 5th year of the plan period. The phase of the Plan Package stands as:

First Phase	: 2016-2017
Second Phase	: 2017-2019
Third Phase	: 2019-2021

9.2 Priority

Fixing priority of projects earmarked in the AAP is subject to competition among the various projects none of which is of less importance. These are integral to the implementation of projects related to the augmentation of facilities for the benefit of the citizens. In this situation priority have been fixed and listed according to sector. The serial of the list is the ranking of the priority. Even in the case of time overrun during implementation, the priority remains unchanged. Here it may be mentioned that AAP are prepared for immediate implementation say within 3-5 years. But the list of the projects is quite tall and implementation of all of them in a single phase pose problem for many reasons, funding being the major one. In the circumstances the implementation of the projects will be during the validity of the plan package.

9.3 Projects

These proposals are implemented in the form of projects under different sectors. In this chapter such projects are listed under broad sectoral heads indicating their priority and phasing.

9.3.1 Transport Projects

Proposals associated with the transport are grouped in this chapter. The priority and phasing of roads are given below.

Table 9.1: Phasing of Transport Proposals

Road Id	Road_Name	Proposed Type	Road width (ft)	Length (m)	Phasing
PW 01	Bhuigar- Mauchak Road	Widening	40	1608	Phase-1
PW 02	Jalkuri-Siddirganj Road	Widening	60	4112	Phase-3
PW 03	Stadium to Tatkhana Bus Station Mor	Widening	40	3785	Phase-1
PW 04	Fakir Road - Haji KalimullahSarak - Model School Road	Widening	45	3513	Phase-3
PW 05	Jalkuri to Dakeshwari Road	Widening	60	2696	Phase-2
PW 06	Kadamtali - College Road	Widening	40	934	Phase-2
PW 07	Chasara- Hajiganj Road	Widening	60	1824	Phase-3
PW 08	Shibu Market- Hajiganj Road	Widening	40	1276	Phase-2
PW 09	Metro to 1 No. Railgate	Widening	60	962	Phase-1
PW 10	Ali Ahmed Chunka Road	Widening	40	1188	Phase-1
PW 11	Baburail Road	Widening	40	1046	Phase-2
Sub Total				22944	
PD 01	Sitalakkhay River Drive Way	New Road	62	24835	Phase-1
PD 02	Sitalakkhay River Drive Way	New Road	40	13502	Phase-1
Sub Total				38337	
Gross Total				61281	

9.3.2 Drainage Projects

Proposals associated with the drainage are grouped in this chapter. The priority and phasing of roads are given below.

Table 9.2: Phasing of Drainage Proposals

ID No.	Name	Proposed Width (M)	Phasing
PC03	Tipkini Khal (Kadam Rasul)	31	Phase-1
PC04	Kadam Rasul	10	Phase-2
PC05	Kadam Rasul	20	Phase-2
PC06	Kadam Rasul	15	Phase-2
PC01	Dhaleswari Branch (Kadam Rasul)	45	Phase-3
PC07	Sitalakhya Branch (Kadam Rasul)	21	Phase-2
PC02	Kadam Rasul	57	Phase-1
PC08	Kashipur River (Narayanganj)	200	Phase-1
PC13	Polykhali Khal (DND)	17	Phase-3
PC14	DND Khal	15	Phase-1
PC12	Baburail Khal (Narayanganj)	22	Phase-1
PC29	Jelepara Khal (Narayanganj)	22	Phase-3
PC22	Par Khal (DND)	9	Phase-3

ID No.	Name	Proposed Width (M)	Phasing
PC21	DND Khal	13	Phase-1
PC17	WAPDA Khal (DND)	25	Phase-1
PC24	WAPDA Khal (DND)	23	Phase-1
PC26	DND Khal	42	Phase-1
PC23	DND Khal	68	Phase-1
PC19	DND Khal	17	Phase-1
PC16	Jimkhana Khal (DND)	22	Phase-3
PC20	DND Khal	10	Phase-1
PC18	DND Khal	26	Phase-1
PC23	Konsol Khal (DND)	12	Phase-3
PC25	Pagla Khal (DND)	40	Phase-3
PC30	DND Khal	45	Phase-2
PC27	DND Khal	32	Phase-2
PC15	DND Khal	10	Phase-2
PC31	DND Khal	16	Phase-2
PC11	Narayanganj	30	Phase-1
PC09	Narayanganj	25	Phase-3
PC10	Narayanganj	16	Phase-3
PC28	Narayanganj	10	Phase-3

9.3.3 Development Projects

Proposals associated with the development proposals are grouped in this chapter. The priority and phasing of roads are given below.

Table 9.3: Phasing of Development Proposals

Type	Area (acre)	Phasing
Jimkhana Cultural park	38.5	Phase-1
Station Area Redevelopment	13.8	Phase-1
2 no rail gate Intersection development	2.35	Phase-2
Proposed Waste Dumping Yard 01	15.4	Phase-1
Proposed park 01	1.7	Phase-2
Proposed Low Cost Housing	3.3	Phase-1
Haziganj fort redevelopment	24.7	Phase-1
Chasara Intersection Development	4.6	Phase-2
Proposed Dumping Yard 02	24.47	Phase-3
Proposed College	0.56	Phase-2
Proposed Community Center	0.06	Phase-2
Proposed Park 02	10.1	Phase-3
Proposed Dumping Yard 04	2.1	Phase-2
Ward Councilor's Complex	Each per ward	Phase-1,2,3

CHAPTER 10

DETAILED DESIGN OF THE PROJECTS

10.1 Introduction

An Action Area Plan is a tool to solve immediate problem of the city identifying the necessary steps towards a development project. The consultant's team proposed some projects which need immediate implementation to make a livable, healthy and congestion free NCC area. Among the list of projects five projects are selected to detail design and cost estimation. The Projects are:

- Driveway along the Sitalakhya River
- Solid Waste Management System for NCC Area.
- Development of the Station area with Multi-modal Transport System
- Haziganj Fort Redevelopment Project
- Ward Councilors Complex
- Low cost Housing at Rishipara

During each stage, a number of activities and analysis must be carried out and the findings used to meet the requirements of the subsequent phase, until the project is finally completed.

10.2 Description of the Projects

Detail design and estimated cost is an important element to take any project to implementation. Detail design, objectives, detail program, estimated cost, source of fund and implementation authority have given here to take immediate action of implementation. Description of the projects is given below.

10.2.1 Driveway along the Sitalakhya River

Name of the project: Development of 62' wide Driveway with walkway along the Sitalakhya and Buriganga river.

Description of the Project

Shitalakkha River flows center of the Narayanganj City. Main Business center of Narayanganj City situated on the bank of Shitalakkha. Though city is situated on the bank of the river, protection of city is essential for the city. On the other hand, there is huge traffic congestion held within the city. Alternative arterial is also necessary to reduce congestion of the city. River bank encroachment and lack of recreational places is also a vital issue of the NCC area. Development of driveway with recreational facilities have been give solution of transport congestion, protect river bank from encroachment as well as recreational places. It should be mention here, existing drainage channel (natural or manmade) has been considered at the time of drive way construction and design. Pollution of Shitalakkha River should be controlled according to mentioned DMDP (1995-2015) Policy no RS/4,

Environmental protection measures will be taken to prevent pollution of the Lakhya River and its tributary, the Balu River, in order to ensure that it remains a viable, long-term source of

potable water. All industrial and commercial development, existing and future, within one kilometer of the rivers to be subject to minimum standards of effluent control, and surface water run-off into the rivers constantly monitored and pollution from any source to be identified and stopped forthwith.

Objective of the Project:

- i. To mitigate the Transportation problem within the NCC area
- ii. Easy Accessibility
- iii. To protect the Sitalakhya river (River erosion and illegal occupation)
- iv. River Side Beautification
- v. Traffic Diversification
- vi. Recreational purposes

Programs include:

- i. Double carriage drive way (each 20 feet), median (1 feet),
- ii. Both side walkway along the Drive way (9 feet and 12 feet)
- iii. River side park and floating deck
- iv. River side sitting
- v. River side slope
- vi. Both side plantation along the driveway

Dimension of drive way: Total driveway width- 62 feet

Project Implementation Authority: Narayanganj City Corporation (NCC)

Funding Source: NCC, GoB and Donar Agencies

Estimated Cost: 5,659,257,150.00 Taka (Detail cost see Annexure C)

Table 10.1: Effected Structure of Drive Way

Ward No.	Structure Use	Full Structure					Partial Structure				Total
		Katcha	Pucca	Semi-Pucca	Under Construction	Total	Katcha	Pucca	Semi-Pucca	Total	
Ward-13	Commercial							1	4	5	5
	Industrial								7	7	7
	Residential							2		2	2
	Sub-total							3	11	14	14
Ward-15	Administrative			2		2					2
	Commercial	1	1	2		4	1	3	10	14	18
	Community Facilities		1			1		1		1	2
	Industrial	2	1	3		6		2	11	13	19
	Miscellaneous							1		1	1
	Mixed Use		2			2		5	1	6	8
	Residential	1	6	4		11		5		5	16
Restricted		1			1					1	
	Sub-total	4	12	11	0	27	1	17	22	40	67
Ward-18	Commercial	3		5		8	6	1	8	15	23
	Community Facilities			1		1					1
	Education and Research	1				1					1
	Industrial	3	2			5	1	5	24	30	35

Ward No.	Structure Use	Full Structure					Partial Structure				Total
		Katcha	Pucca	Semi-Pucca	Under Construction	Total	Katcha	Pucca	Semi-Pucca	Total	
	Miscellaneous	1				1					1
	Mixed Use		1			1		6		6	7
	Residential	24	6	13	2	45	4	8	5	17	62
	Transportation & Communication						1			1	1
	Sub-total	32	9	19	2	62	12	20	37	69	131
Ward-20	Commercial						1		1	2	2
	Industrial							3	5	8	8
	Mixed Use							2		2	2
	Residential							2		2	2
	Transportation & Communication						1			1	1
	Sub-total						2	7	6	15	15
	Grand Total	36	21	30	2	89	15	47	76	138	227

Table 10.2: Effected Mauza of Drive Way.

Mauza Name	JL No	Plot No.	Area in acre
Paik Para (Municipality)	009	783	0.02
Sayedpur (Municipality)	017	112, 110, 107, 106, 103, 102, 95, 94, 93, 92, 88, 79, 78, 77, 74, 69, 65, 66, 61, 62, 58, 56, 57, 52, 51, 48, 49, 41, 46, 40, 37, 38, 34, 33	6.15
Bhagbanganj (Municipality)	010	181, 155, 154, 153, 61, 137, 138, 60, 59, 58, 57, 55, 54, 53, 52, 51, 50, 49, 48, 47, 45, 46, 44, 43, 41, 42, 38, 40, 35, 34, 33, 32, 31, 30, 28, 29, 25, 27, 24, 26, 21, 23, 19, 22, 18, 20, 17, 14	1.24
Chashara (Municipality)	005	847, 388, 387	1.07
Sayedpur	016	1671	0.06
Shitalakshya	011	3931, 3930, 3929, 3928, 3927, 3926, 3925, 3924, 3923, 3831, 3832, 3909, 3827, 3826, 3825, 3824, 3822, 3821, 3820, 3819, 3818, 3817, 3830, 3816, 3298, 3300, 3292, 3291, 3290, 3289, 3256, 3254, 3253, 3246, 3245, 3252, 3244, 3243, 3242, 3299, 3241	4.21
Narayanganj	006	2249, 2247, 2246, 2248, 2245, 2152, 2150, 2151, 2149, 2148, 2147, 2146, 2260, 2145, 2144, 1950, 1949, 1948, 1947, 1946, 1944, 2259, 1932, 1931, 1167, 1166, 1161, 1168, 1160, 1082, 1081, 1080, 1079, 1042, 1050, 1040, 1039, 1051, 1052, 1038, 1053, 1055, 1037, 1056, 1057, 1036, 1035, 1059, 1034, 1041, 1033, 1031, 1032, 1011, 1010, 1007, 1008, 1009, 1006, 1004, 1003, 1002, 1001, 998, 996, 373, 374, 375, 376, 309, 377, 368, 378, 379, 380	5.21
Khanpur	004	4812, 4811, 1087, 4810, 1086, 4809, 4808, 1084, 1085, 1083, 4802, 4097	1.73
Ekrapur	049	181	0.55
Total			20.25

Design of the Projects

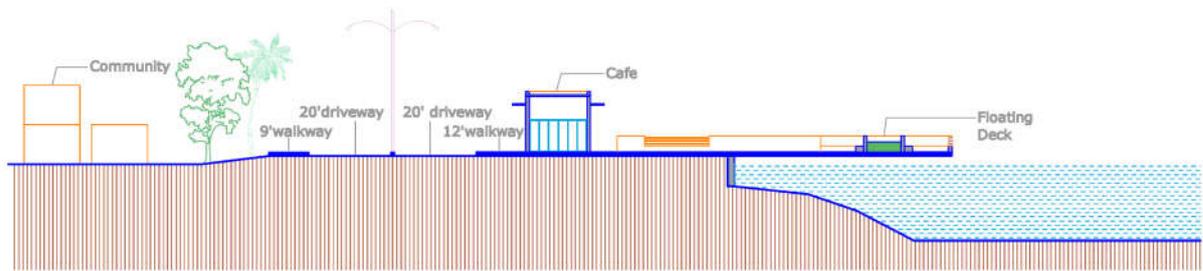
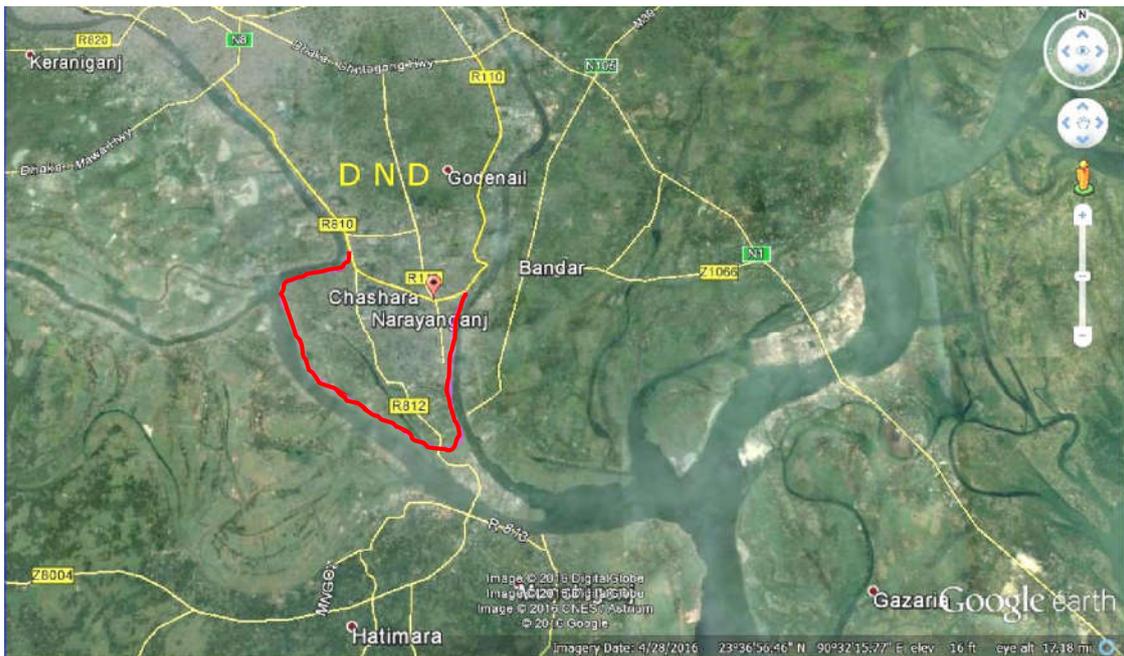


Figure 10.1: Cross section of Driveway



Photograph 10.1: Location of the Proposed Driveway

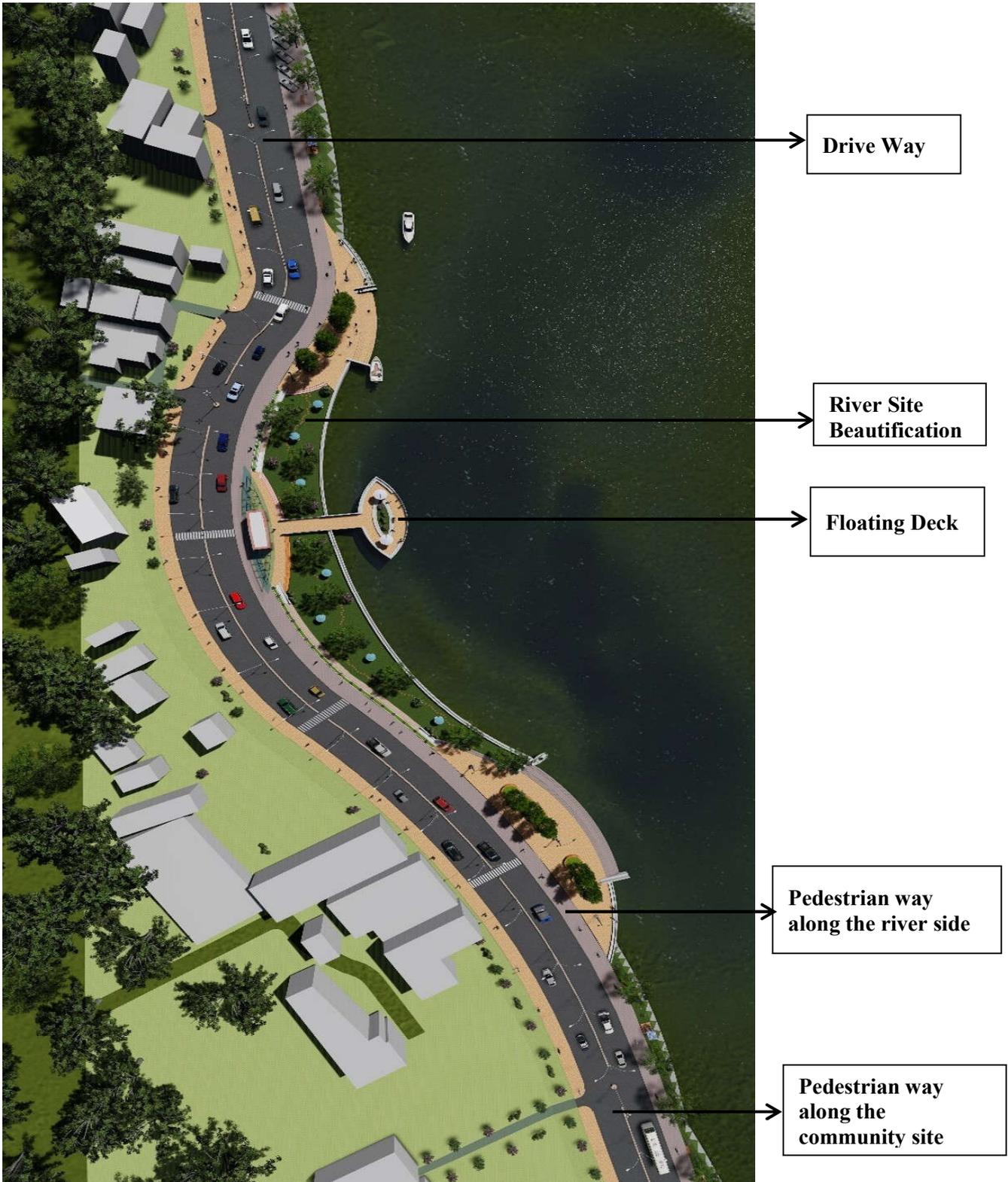
Source: Google map, 2016



Photograph 10.2: River Side view of the driveway
Source: Prepared by DDC Consultants, 2016



Photograph 10.3: Floating Deck and River side view
Source: Prepared by DDC Consultants, 2016



Photograph 10.4: Driveway along the Sitalakhya River

Source: Prepared by DDC Consultants, 2016



Photograph 10.5: Seating Arrangement
Source: Prepared by DDC Consultants, 2016



Photograph 10.6: Walkway along the river side
Source: Prepared by DDC Consultants, 2016

10.2.2 Solid Waste Management System for NCC Area

Project background:

Solid waste management is considered as one of the most immediate and serious environmental problems confronting municipal authority in NCC area. Narayanganj city is predominantly an industrial area. A huge quantity of industrial waste such as, polyethylene, cloth and papers is generated here daily. The major components of municipal solid wastes include food, vegetables, fruits, polyethylene, paper and cloths. Among these, medical waste, food and vegetables wastes comprise the major component of the city. In NCC area solid waste are classified by the following way-household waste, municipal waste, commercial and non-hazardous industrial wastes, hazardous (toxic) industrial wastes, medical waste, human and animal wastes, construction and demolition waste, and ,incinerator wastes et cetera.

Solid waste management is an essential part for the community facility provider. In NCC area, the entire Solid waste management system is conducted in two ways:

Solid waste generation within NCC area has been calculated and it is about 0.42 kg/day (2016). The Narayanganj city generates total about 350 tons of solid waste every day containing industrial waste, residential waste like food, vegetables, fruits, polyethylene, paper and cloths et cetera. The city corporation authority has the capacity to collect total about 290 tons of solid waste every day. The waste collection rate is estimated about 83% in a day and the rest of the garbage is disposed on the landfills and left are unattended or locally dumped on the riverside or canals which results serious environmental degradation and public-health risk to the local inhabitants

NCC disposes solid wastes adopting crude dumping methods, and thereby, creates environmental hazards and health risks. Community based household wastes and commercial and medical wastes are disposed of daily on road sides, ponds, canals etc. This haphazard situation of solid collection & disposal management creates the city vulnerable in terms of all pollution that enhances the severe health hazard conditions of the city. Therefore, the city should be clean & free from all pollution taking this project for Narayanganj City Corporation.

National 3R Strategy for Waste Management:

The principle of reducing waste, reusing and recycling resources and products is often called the "3Rs."

- **Reducing** means choosing to use items with care to reduce the amount of waste generated
- **Reusing** involves the repeated use of items or parts of items which still have usable aspects
- **Recycling** means the use of waste itself as resources

Objective of the Project:

- i. To initialize an environmental friendly Solid Waste Management system for NCC area
- ii. To reduce crude dumping practice within the NCC area and initialize an vibrant waste collection, transports, dumping and waste management system
- iii. To provide jobs opportunity for the poor people
- iv. To reduce the quantity of toxic, hazardous waste and cost of solid waste management

Description of the Project:

Solid Waste Management Plant for NCC area is proposed at Jhalkuriarea along the Shiddirganj-Jhalkuri Road (south-east direction) considering its transport, locational suitability. Dhaka-Narayanganj Highway is situated at west-south direction of the project area.

Location: Jhalkuri(Shiddirganj-Jhalkuri Road, Narayanganj)

Total Area: 23 acres (70 Bigha approx.)

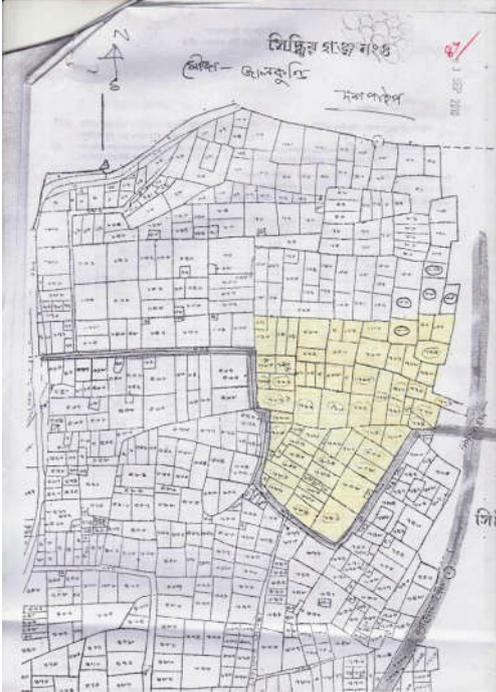


Figure-10.2: Location of SWM Project (Mauza Map)

Photograph-10.7: Location of SWM Project (Google Map)

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স্বাস্থ্য মন্ত্রণালয়, শহীদ সোহরাওয়ার্দী উদ্যানে ৯, পলক বাজার

বিষয়: নারায়ণগঞ্জ সিটি কর্পোরেশনের পলক বাজারের জন্য স্বাস্থ্য মন্ত্রণালয় থেকে প্রাপ্ত ২৩.৩৯ একরকম জমির স্থান নির্ধারণের প্রস্তাবনা।

উপস্থিত বিবরণে ও সংশ্লিষ্ট নথিতে স্থান নির্ধারণের প্রস্তাবনা এবং ২৩.৩৯ একরকম জমির স্থান নির্ধারণের প্রস্তাবনা।

ক্র.সং.	খাস্তার নং	খাস্তার এলাকা (বর্গ ফুট)	খাস্তার মালিকের নাম	খাস্তার এলাকা (বর্গ ফুট)	খাস্তার মালিকের নাম
১	১০১	০.১০	১০১	১০১	১০১
২	১০২	০.১০	১০২	১০২	১০২
৩	১০৩	০.১০	১০৩	১০৩	১০৩
৪	১০৪	০.১০	১০৪	১০৪	১০৪
৫	১০৫	০.১০	১০৫	১০৫	১০৫
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মোট ২৩.৩৯ একর

স্বাস্থ্য মন্ত্রণালয়, শহীদ সোহরাওয়ার্দী উদ্যানে ৯, পলক বাজার

Figure-10.3: Designated location for SWM in NCC area by NCC Authority
Source: NCC. 2016

Proposed Solid Waste Management System for NCC Area:

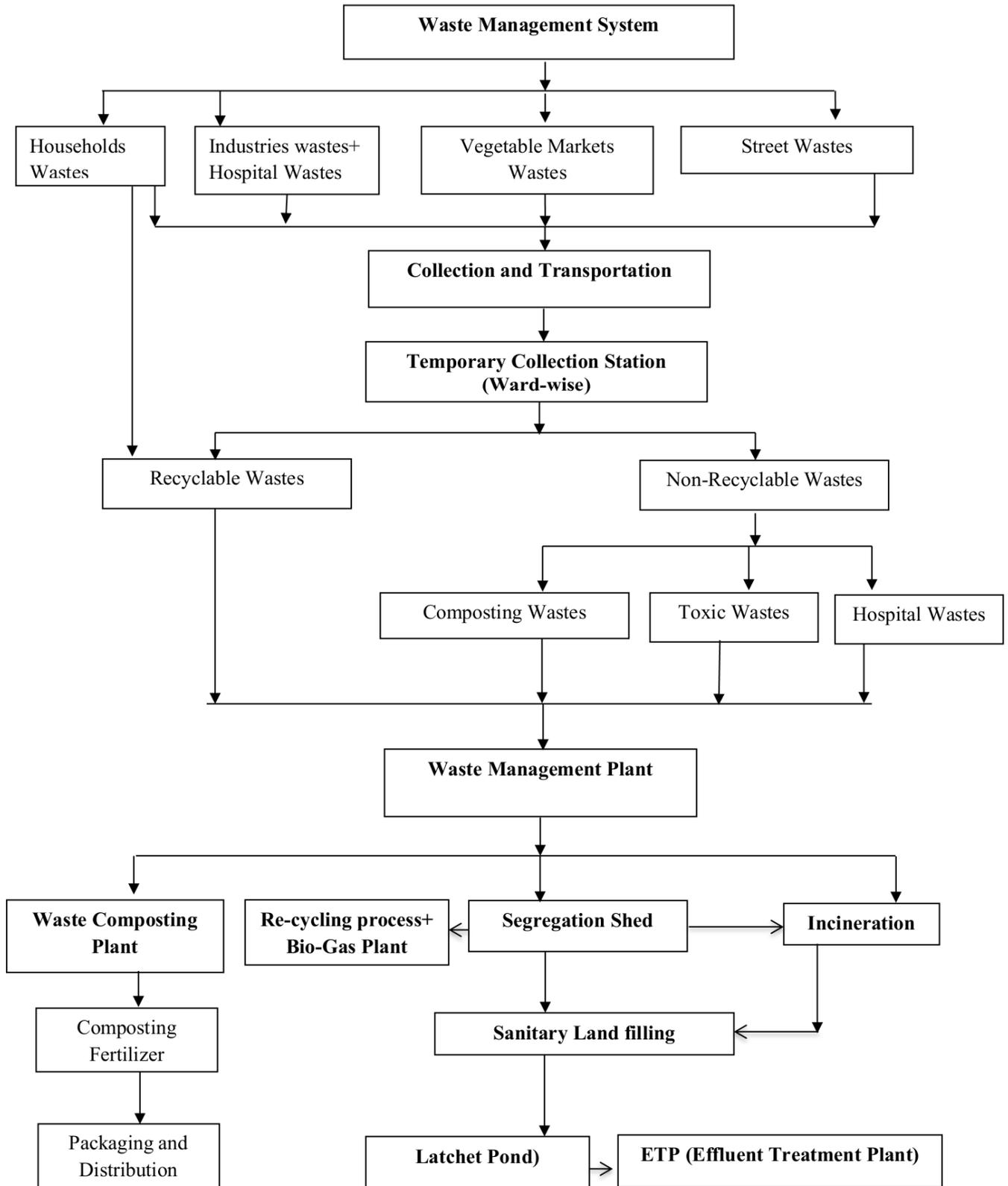


Figure-10.4: Proposed Solid Waste Management System for NCC Area
 Source: Prepared by DDC Consultants, 2016

Waste Management Plant Description:

1. Functional components (6 acres): 6 acres=2, 61,360.0 square feet

- i. Compost Plant(200*100 sq.ft)
- ii. Incinerator+ Hospital Waste Management center (100*80 sq ft)
- iii. ETP (300*200 sq feet)
- iv. Segregation Shed (200*100 sq.ft)
- v. Sub-station (40*40 sq.ft)
- vi. Recycling center+Bio-Gas Plant (100*50 sq ft)
- vii. Canteen (30*20 sq.ft)
- viii. Administrative Building (100*50 sq.ft)
- ix. Garage/Parking Area (70*30 sq.ft)
- x. Leachate Pond (128*128 sq.ft)
- xi. Water tank
- xii. Septic tank
- xiii. Guard room (15*10 sq.ft)

2. Land filling site (17 acre): 17 acres= 7, 40,520.0 square feet (10 feet under the ground and 30 feet on the ground=total 40 feet land filling)

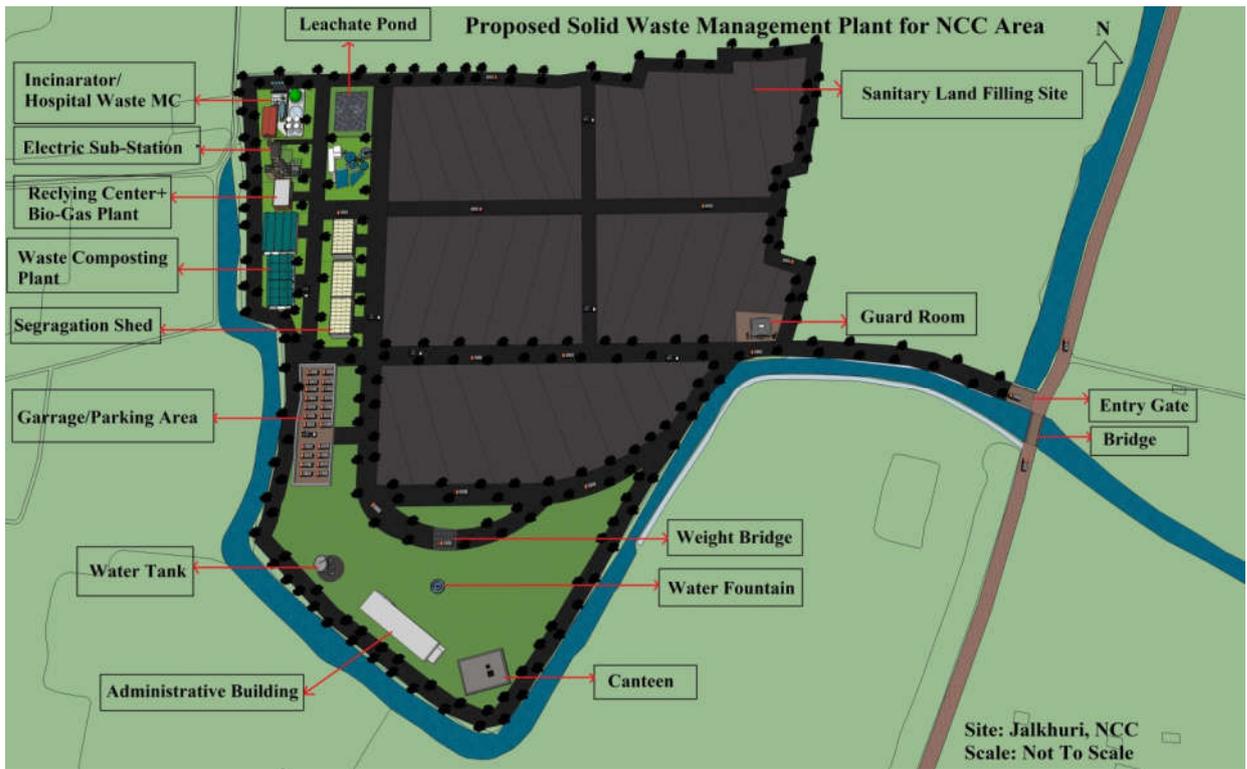
3. Road

- Main road =40 feet
- Internal=30 feet

4. Weight bridge

Estimated Cost : 191,18,00,000 (Detail in Annexure D)

Proposed Solid Waste Management (SWM) Plant Design:



Photograph 10.8: Plan View of Solid Waste Management Plant (SWMP)

Source: Prepared by DDC Consultants, 2016



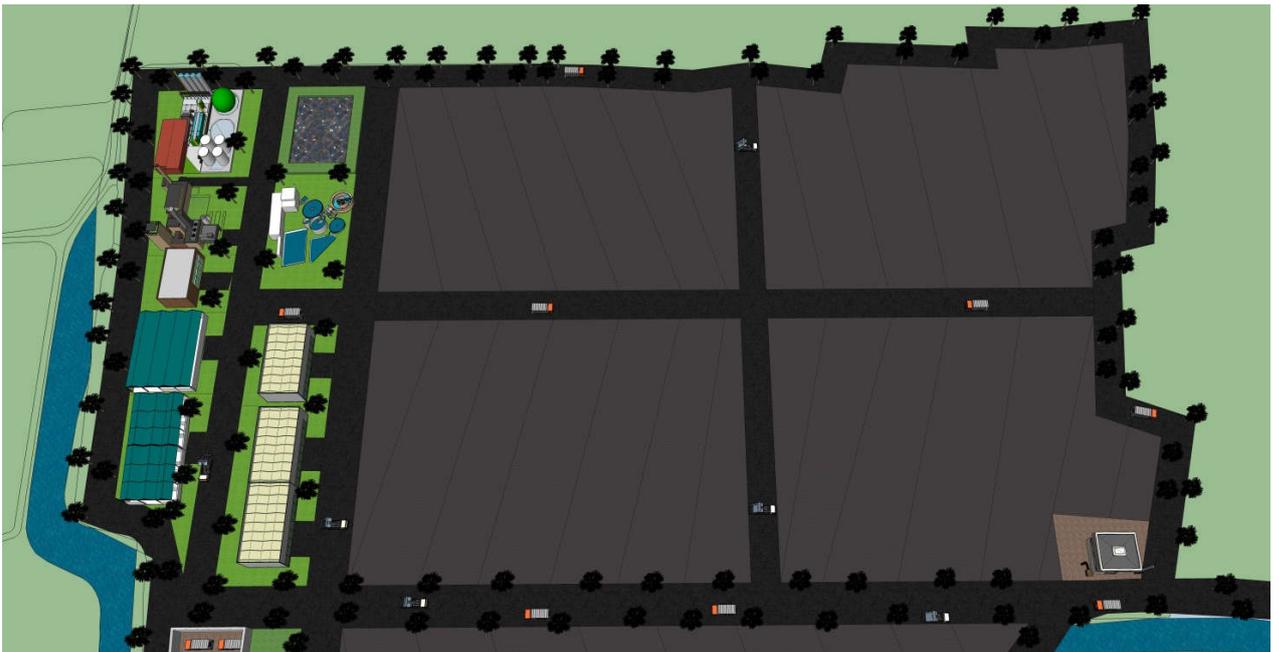
Photograph 10.9: Main Entry Point of SWMP

Source: Prepared by DDC Consultants, 2016



Photograph 10.10: Guard Room (SWMP)

Source: Prepared by DDC Consultants, 2016



Photograph 10.11: Sanitary Land Filling Site and other facilities

Source: Prepared by DDC Consultants, 2016



Photograph 10.12: Functional Area(ETP, Leachate Pond, Segregation Shed, Composting Plant, Electric Sub-Station and Incinerator)

Source: Prepared by DDC Consultants, 2016



Photograph 10.13:Administration center, Canteen and Water Tank

Source: Prepared by DDC Consultants, 2016



Photograph 10.14: Solid Waste Management Plant View-01
Source: Prepared by DDC Consultants, 2016



Photograph 10.15: Solid Waste Management Plant View-02
Source: Prepared by DDC Consultants, 2016

10.2.3 Development of the Station area with Multi-modal Transport System

Objective of the Project:

- i. To develop the station area as Multi-Modal Transport hub
- ii. To save the valuable land from land grabbers
- iii. To improve the functional character of the area.

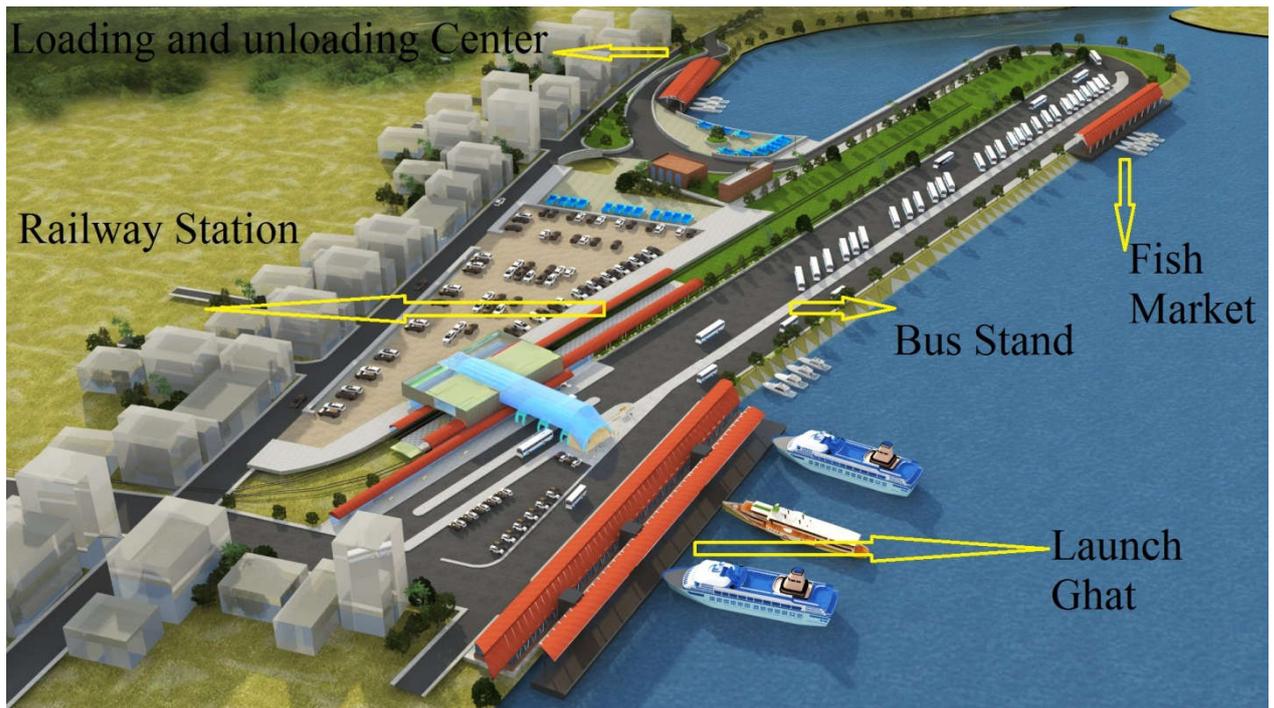
Programs Include:

- i. Facilities provision for railway, launch and bus passengers
- ii. Recreational facilities provision (mosque, restaurant, walkway etc.)
- iii. Parking facility (Bus, Truck, car) and vehicular Circulation Network development
- iv. Incorporation with Fish market, Loading and unloading center, Launch Ghat

Implementation Authority: Narayanganj City Corporation in association with Bangladesh Railway

Funding Source: NCC, GoB and Donar Agencies

Estimated Cost: 734,150,040.00 Taka (Detail cost see Annexure E)



Photograph 10.16: Develop the Station area with Muulti-modal Transport System

Source: Prepared by DDC Consultants, 2016



Photograph 10.17: Railway Station
Source: Prepared by DDC Consultants, 2016



Photograph 10.18: Truck parking center, loading and unloading center
Source: Prepared by DDC Consultants, 2016



Photograph 10.19: Over-bridge with Bus bay
Source: Prepared by DDC Consultants, 2016



Photograph 10.20: Bus stand, Launch Ghat, Walkway
Source: Prepared by DDC Consultants, 2016

10.2.4 Haziganj Fort Redevelopment Project

Objective of the Project:

- Conservation and Development of the Hajigonj Fort to a Tourist Spot and a Historic park

Programs include:

- i. Conservation of Fort Structures
- ii. Boating (with traditional boat)
- iii. River Cruising
- iv. Sound and Lighting Show
- v. Horse Carriage
- vi. Open and Breathing Space for Common People
- vii. Puthipath (Manuscript Reading)
- viii. Parking
- ix. Display and Sales Center of Traditional Craft
- x. Archive and Museum
- xi. Restaurant and Floating Cafe

Implementation Authority: Narayanganj City Corporation

Funding Source: NCC, GoB and Donar Agencies

Estimated Cost:790,701,180.00Taka (Detail cost see Annexure F)



Photograph 10.21: Haziganj Fort Development Project

Source: Prepared by DDC Consultants, 2016



Photograph 10.22: Main gate of Haziganj Fort
Source: Prepared by DDC Consultants, 2016



Photograph 10.23: Seating arrangement
Source: Prepared by DDC Consultants, 2016



Photograph 10.24: Landscaping
Source: Prepared by DDC Consultants, 2016



Photograph 10.25: Internal Road Network
Source: Prepared by DDC Consultants, 2016

10.2.5 Ward Councilor's Complex

Objective of the Project:

- i. To provide ward level municipal facilities under one umbrella.
- ii. Help to improve services to the inhabitants of ward.

Programs include:

- i. Councilor's office (Staff office, Design and Permission Department etc)
- ii. Super Shop
- iii. Community Center
- iv. Children's Play area
- v. IT Center
- vi. Conference Room
- vii. Community Clinic
- viii. Public Library
- ix. Area for future Activities
- x. Parking area
- xi. Commercial space

Implementation Authority: Narayanganj City Corporation

Funding Source: NCC, GoB and Donar Agencies

Estimated Cost: 396,344,340.00 Taka (Detail cost see Annexure G)

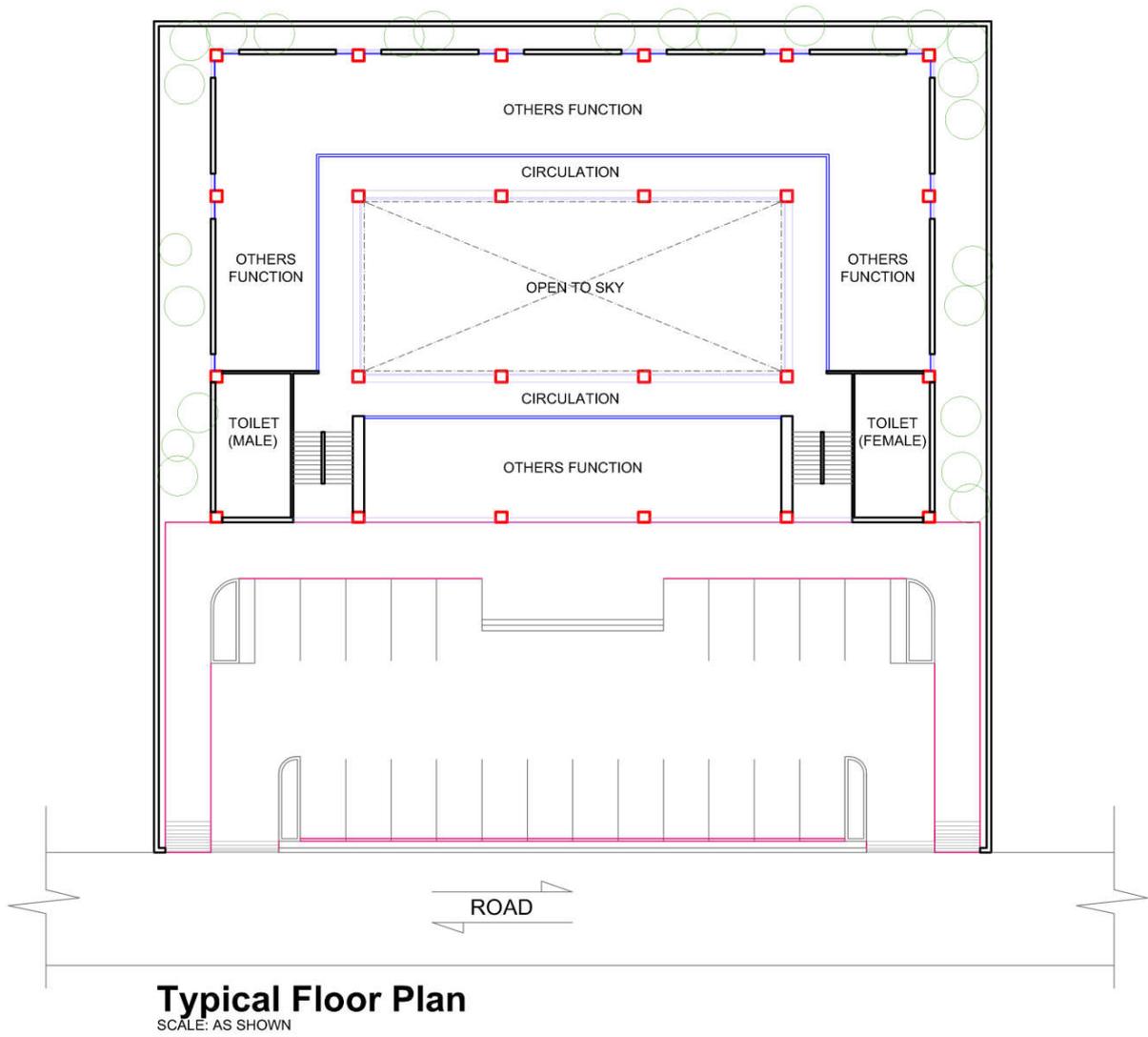


Figure 10.5: Typical Floor Plan of Ward Councilor's Complex
Source: Prepared by DDC Consultants, 2016



Figure 10.6: Ground Floor Plan of Ward Councilor's Complex
Source: Prepared by DDC Consultants, 2016



Photograph 10.26: Front View of Ward Councilor's Complex
Source: Prepared by DDC Consultants, 2016



Photograph 10.27: Parking Area
Source: Prepared by DDC Consultants, 2016



Photograph 10.28: Main Entry point
Source: Prepared by DDC Consultants, 2016

10.2.6 Low Income Housing

Name of the project: Low income settlement up-gradation project in Paikpara area

Background of the Project:

Being an oldest historical port city and business hub, Narayanganj faces new challenges of providing settlement for all. Many big industries and garments factories are located here. Moreover, number of industries is increasing rapidly due to its swift connectivity with the capital city. Workers of these industries and garments factories are living here in a disastrous condition. Middle income people have places to live but the condition for low income families is beggar's description.

There are about 400 families of scavengers have been living in Paikpara area. These huge numbers of people are living in an area of only 3.3 acres. There are no educational facilities or a healthy place for the children. Absent of proper drainage and sewerage system, sanitary latrines etc. are adding to the problem. This project intends to mitigate the sufferings of those people living Paikpara area. List of Slum in NCC Area is shown in Annexure-G part.

Objective of the Project:

- i. To improve the living conditions of scavengers of NCC area
- ii. To increase the income level of scavengers
- iii. To provide shelter and ensure sanitation and potable water supply system
- iv. To ensure the minimum basic human needs
- v. To increase literacy rate and cultural affinity among the low income people

Programs include:

- Ten storied residential building
- Providing all the modern amenities
- Community hall, garden, playground, common gathering places etc.
- Corner shops, mosques, katcha bazar, school
- Hospital/ Clinic, Park, open space, Green belt

Dimension of the building:

- Flat size: 472 sq.ft.
- Total number of flats: 540
- Building stories: 10
- Number of Building: 3
- Total population of the project area: 3240

Project Implementation Authority: Narayanganj City Corporation (NCC)

Estimated Cost: 449.46 Lakh (Taka) detailed costing of the individual building is attached in Annexure-I

Funding Source: World bank (WB), GoB and NCC



Figure 10.7: Location of Low Cost Housing at Paikpara Area.

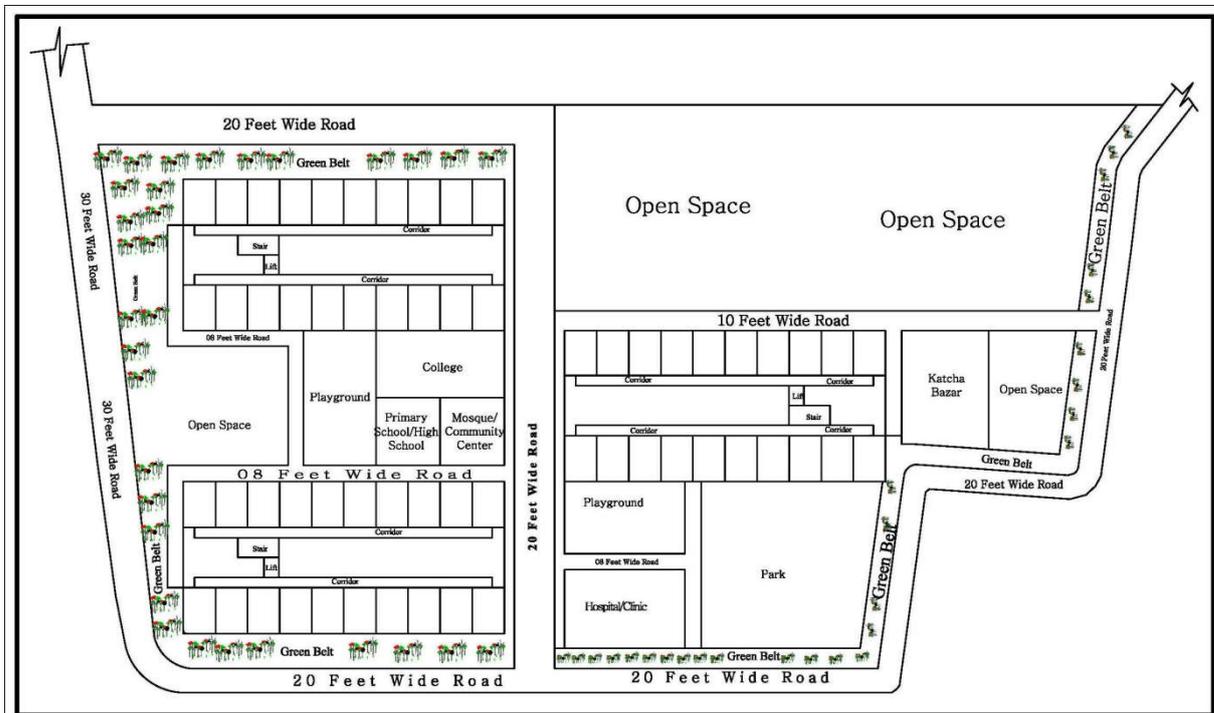


Figure 10.8: Layout of Low Cost Housing Project
Source: Prepared by the DDC Consultants, 2016

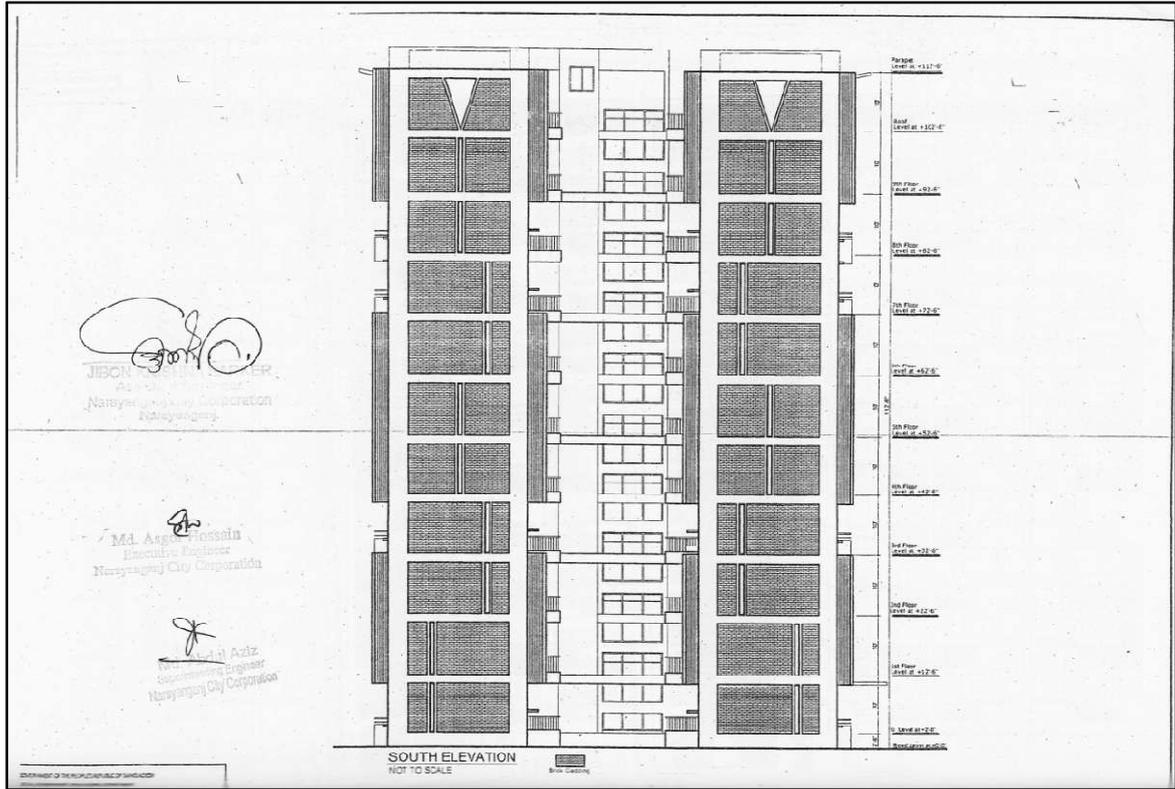


Figure 10.9: Section: South Elevation
Source: NCC, 2016

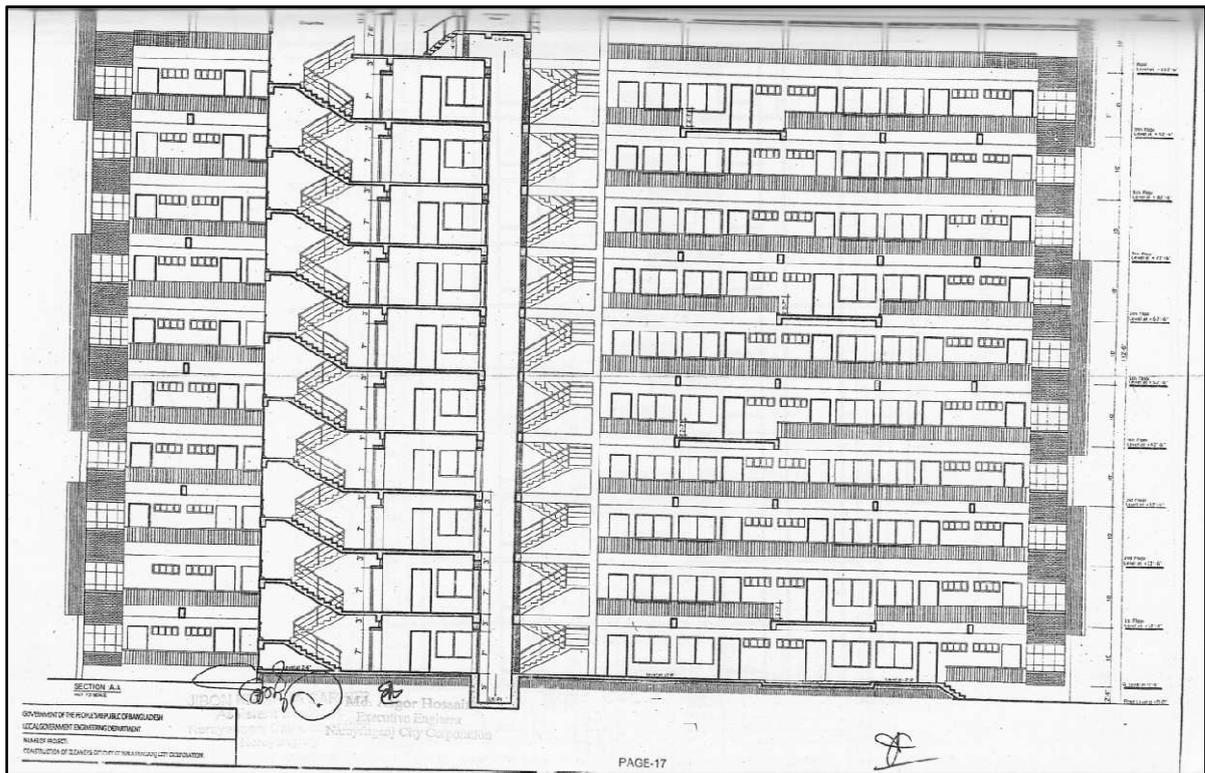


Figure 10.10: Section: A-A
Source: NCC, 2016

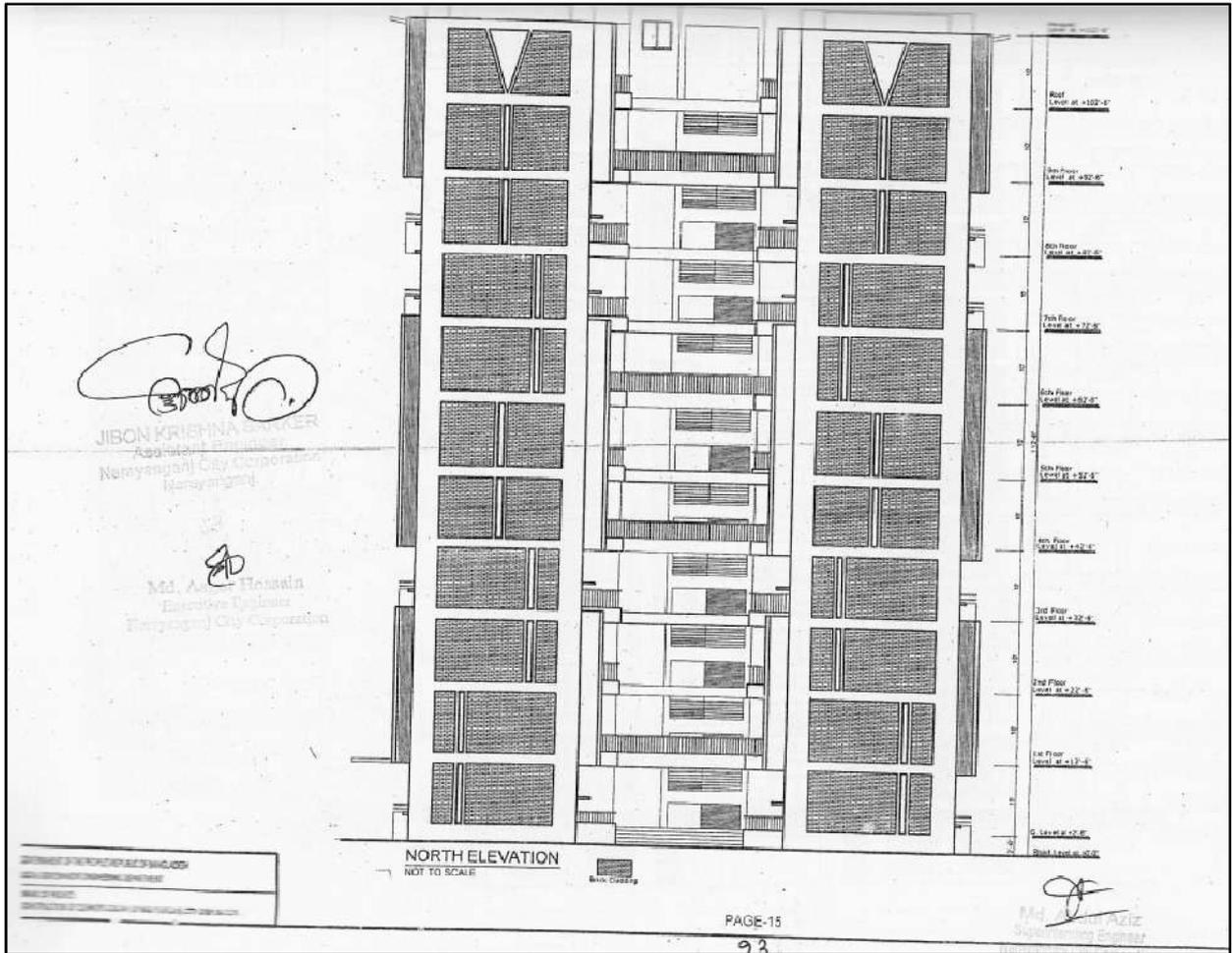


Figure 10.11: North Elevation
Source; NCC, 20116

CHAPTER 11

CONCLUSION

11.1 Conclusion

With the guidelines of project documents, the AAP projects of NCC areas have been prepared by the DDC Consultant Team and such projects are incorporated in the Final Report. During the preparation stage of AAP projects, the Consultants Team had made consultation with Honorable City Mayor, Ward Councilors, and NCC personals. Besides, the consultation was taken place with the local officials of different department of NCC areas. Local people and leaders have been associated with the team from project inception. In this connection, a several meeting, discussions, were hold at ward level, zonal offices and NCC head office. The project experiences were shared with professional, academic. Through this process, local requirements of city dwellers/habitants have been assessed and reflected in the report.

It is notice that NCC has established on 2011 with the Paurashava: Narayanganj, Siddirganj and Kadam Rasul. At present, NCC holds the corporation status and development requirements are enhanced. AAPs are to improve the conditions of NCC areas through implementing development projects.

The development approach of infrastructure leads to achieve the vision of the city. The vision of city is to be ‘to build an environment friendly, clean, healthy, safe and poverty-free planned city to provide necessary service to all city dwellers’. In this regard, the Consultants recommend taking Inclusive Approach. It includes relevant department with NCC areas.

Through this participatory process, area improvement, transportation, drainage, solid waste management, sanitation, municipal facilities projects may implementable.

NCC would prepare a comprehensive list of the existing and future projects (based on DDC recommendation) through discussion of different departments and NCC. The priority projects should have undertaken by the NCC and other department.

The on- going and future projects of the different department agencies have been collected and make prioritize for implementation with the coordination manner. In addition, the projects of local and international funding (ADP, JICA, LGRD and NGOs) are to be considered with this process. In the framework of National Seven Five Year, Inclusive Approach has already been included. This plan mainly focuses on integrated and coordinated approach for project implementation attitude is prevailed for area improvement.

Annexure A: Comments of NCC personnel on Proposed Development Projects of NCC Area

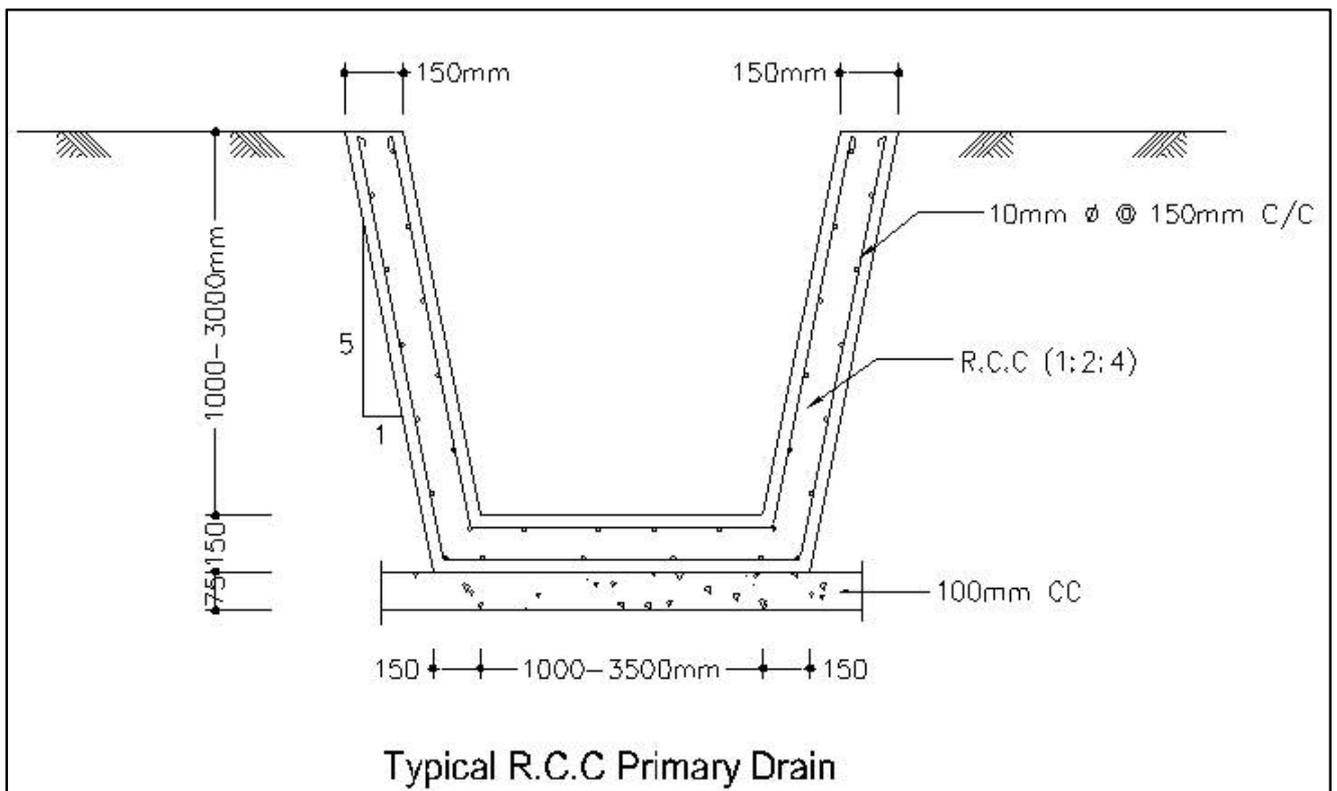
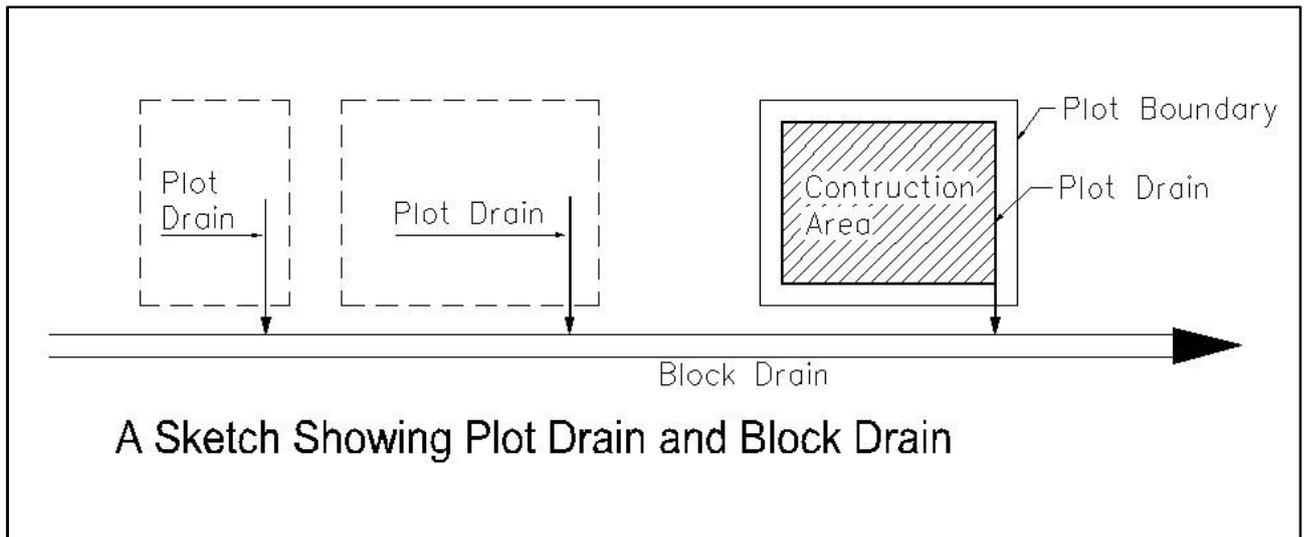
Sl. No.	Projects	Comments from consultation meeting held on 03 & 05 Oct, 2016	Answer to the Questions developed by DDC consultant team
1	Proposed Driveway along the Sitalakhya River	Identification of water discharge points at river side and its management system.	Water discharge points will be shown in planned maps and report appropriately at the river side
		How land acquisition process will be carried out and what strategies need to be undertaken for resettlement program?	The acquisition programme would be minimal on the one hand, utilization on underused/unused land of government /agencies are being recommended for services through Inclusiveness Techniques.
		Is it shown in the project costing?	Tentative land and structure cost is included in the project cost and shown in the report.
		How co-ordination/inclusiveness among the different agencies will be taken place at the time of project implementation?	Inclusiveness Techniques has a recognized a method to implement the projects which are applied (e.g. help each other in terms of land, resources, technical knowhow, management technique and so no) for greater interest of city. In this process Honorable Mayor of NCC should take a vital role-for city development.

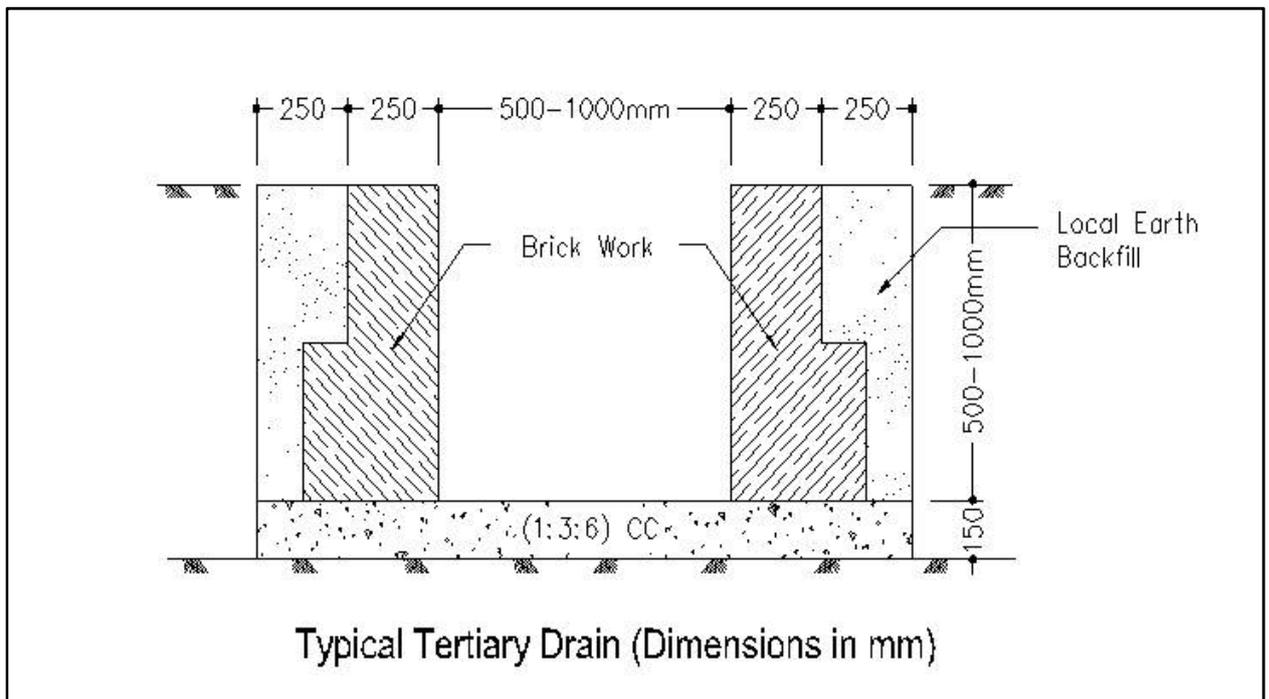
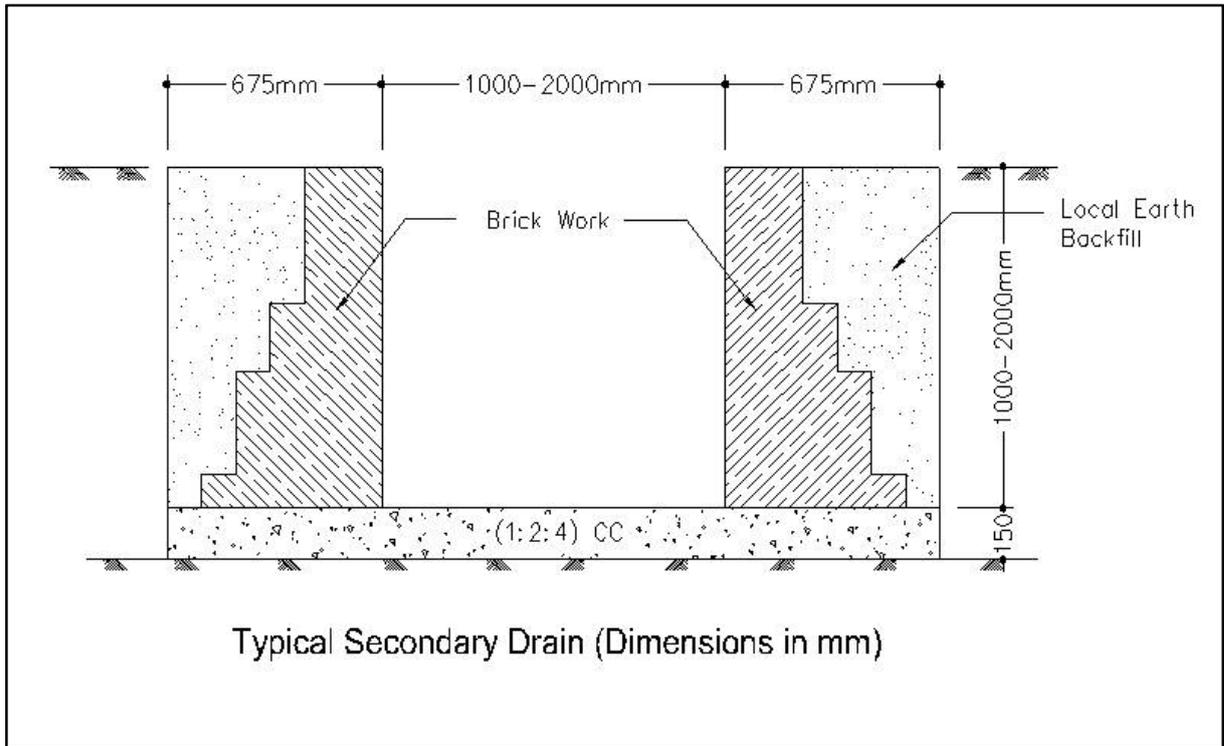
Sl. No.	Projects	Comments from consultation meeting held on 03 & 05 Oct, 2016	Answer to the Questions developed by DDC consultant team
2	Solid Waste Management System for NCC Area	How temporary or secondary waste collection sites are to be identified? And what is the related information in this regard? (size, design, project cost)?	Through the detailed level survey, the dumping sites have been identified (from small to large). At the same time waste generation and disposal percentage information are recorded in NCC office. Moreover, discussion was made between the respective ward Councilors and Consultants (AAP) regarding waste management (collection, transportation, dumping and management). However all sorts of aspects has been considered and design has been finalized.
		Will Compost plant run functionally in NCC area as there create huge solid waste every day?	Composting Plant will reduce the volume of solid waste, then the composed waste convert into fertilizer or dumped on the land filling site.
		How the sludge water/ leachate created from land filling site will be treated?	Leachate brings out from the solid waste and need to be treated though ETP (Effluent Treatment Plant).
3	Development of the Station area with Multi-modal Transport Terminal	What are the resettlements polices for affected people by proposed <i>Charargop</i> area and <i>Bandar</i> Bridge?	According the government resettlement policy may apply in the project. In facts, the proposed project land is belongs to the department of Rail ways, Roads & Highway and BIWTA where illegal shops and shanty are taken place.
		How co-ordination will take place among the development actors?	Inclusiveness Techniques may apply for project implementation

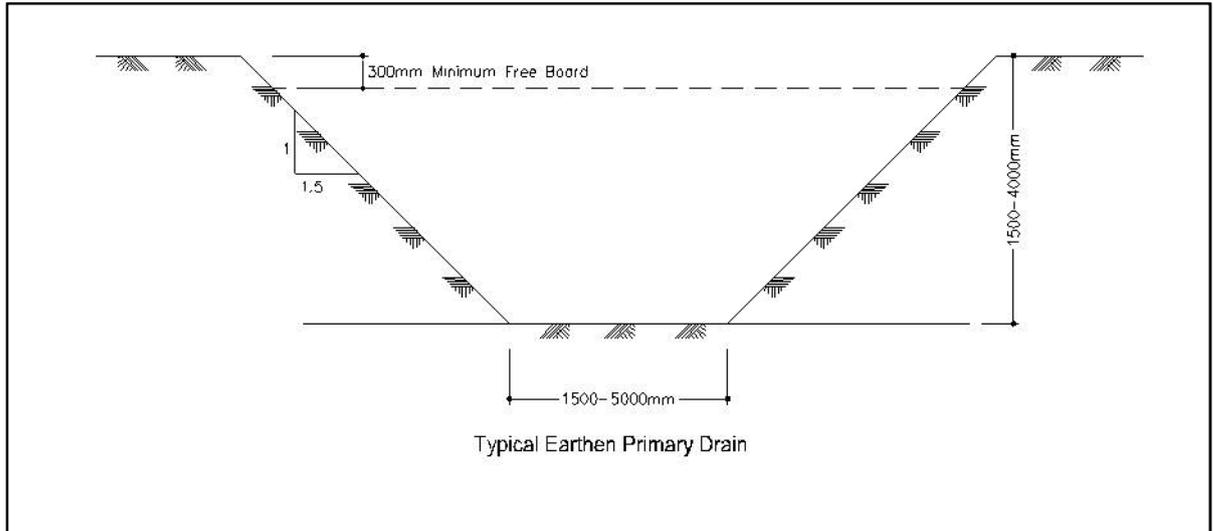
Sl. No.	Projects	Comments from consultation meeting held on 03 & 05 Oct, 2016	Answer to the Questions developed by DDC consultant team
4	Haziganj Fort Redevelopment	How Co-ordination will be taken place between NCC and Archaeological Department?	Haziganj Fort Redevelopment project needs to revitalize for recreational purpose keeping its heritage status. In this case,
			Archaeological Department and NCC need to make understanding to implement the project.
5	Ward-Councilor Complex	Detail Floor-wise use of the complex should be shown in the drawing.	Location of Ward-Councilor Complex has been identified based on the following criteria like
			(a) accessible location,(b) availability of land,
			and (c) opinion of respective ward Councilors and local people and so on
6	Low cost housing in Rishipara	<i>Rishipara</i> Low cost housing project has already been identified by NCC and implemented by World Bank financed.	AAP (NCC) Consultants has prepared the lay-out plan showing set of designed buildings and proposed required common facilities.
7	Proposal on Drainage Network of NCC area	How existing drainage problem will be solved?	AAP Consultant has built up drainage net -work within NCC area. In this case, the proposals have been made to drain widening, new connection, and minimize missing.
		DND drainage is connected with NCC drainage and how it will be solved.	Identification of Water logging areas and condition of natural drainage
		Baburailkhal and Jimkhana lake development should be incorporated in the report	Demarcation of water channel of DND area.

Sl. No.	Projects	Comments from consultation meeting held on 03 & 05 Oct, 2016	Answer to the Questions developed by DDC consultant team
			All the aspects have been reviewed and linkage in between NCC drainage net-work and DND has recommended depending on hydrography, contour and solve of water flow.
			The new drainage project of DND area has come up and hopefully the proposal will be integrated.
8	Utility facilities	How common utility duct will be used in providing utility facilities?	Depending of demand the common utility will provide.
		Standard needed to be followed during Infrastructure development for utility facilities	In this regard, the standards of infrastructure are available in BNBC 1993 (2006), these standards ought to be followed.
9	Transportation System	As detail traffic survey had been conducted, it would be feasible to provide some policies to reduce traffic congestion in intersection	Appropriate design of intersection is essential.
		What strategies has to be undertaken for congested intersection of NCC area	In addition traffic management is more important to minimize traffic congestion.
			In the proposal road widening, connection of missing like and proposal of new roads are also recommended.
			It is essential to make design of each intersection depending on survey and recommended strategy of higher level plan of NCC area.

Annexure B: Cross Section of Man-made Drain







Annexure C: Driveway along the Sitalakhya River

S.L	Description	Unit	Quantity	Rate	Sub Total (Tk.)	Total (Tk.)
1.1	Double carriage drive way Bituminous Carpeting Road Carpeting, Sand filling etc	Sqm	234,000.0 0	3,600.00	842,400,000.00	
Sub-Total =					842,400,000.00	842,400,000.00
1.2	Both side walkway along the Drive way	Sqm	128,700. 00	2,500.00	321,750,000.00	
Sub-Total =					321,750,000.00	321,750,000.00
1.3	Steel Floating deck (6mm MS Sheet)	Sqm	293.00	12,000.00	3,516,000.00	
Sub-Total =					3,516,000.00	3,516,000.00
1.4	River side park sitting arrangement	Sqm	4,875.00	2,500.00	12,187,500.00	
Sub-Total =					12,187,500.00	12,187,500.00
1.5	River side slope Cc Block, Geo-tex	Sqm	78,000.0 0	2,420.00	188,760,000.00	
Sub-Total =					188,760,000.00	188,760,000.00
1.6	Car Parking area	Sqm	1,040.00	2,850.00	2,964,000.00	
Sub-Total =					2,964,000.00	2,964,000.00
1.7	Café	Sqm	260.00	26,000.00	6,760,000.00	
Sub-Total =					6,760,000.00	6,760,000.00
1.8	Plantation along the drive way green Box	Sqm	260.00	18,000.00	4,680,000.00	
Sub-Total =					4,680,000.00	4,680,000.00
1.9	River Bank (Ghat)	Sqm	1,560.00	35,000.00	54,600,000.00	
Sub-Total =					54,600,000.00	54,600,000.00
1.10	Beautification	Sqm	87,750.0 0	450.00	39,487,500.00	
Sub-Total =					39,487,500.00	39,487,500.00
Total -A (5.0)					Driveway G.Total =	1,477,105,000.00
1.11	Electrical Works (12%)					565,925,715.00
1.12	Sanitary Works (8%)					377,283,810.00
Grand Total -A (1.0 to 5.0)						5,659,257,150.00

**Annexure D: Solid Waste Management System for Narayanganj City Corporation (NCC) Area
(In lakh Taka)**

Code Description	Unit	Quantity	GoB (FE)	NCC (CF)	Total Cost Σ(6 to10)	% of the total cost
Stationery, Seals and Stamps	LS	LS	2.80	1.20	4.00	0.02
Advertising and Publicity	LS	LS	2.80	1.20	4.00	0.02
Training Expenses	LS	LS	70.00	30.00	100.00	0.52
Consultancy	MM	36.00	49.84	21.36	71.20	0.37
Sub Total (Revenue Component)			125.44	53.76	179.20	
b) Capital Component						
Motor Vehicle	nos.	6	217.00	93.00	310.00	1.62
Machinery and Other Equipment	nos.	200	17.50	7.50	25.00	0.13
Engineering Equipment	nos.	3	399.00	171.00	570.00	2.98
Furniture and Fixtures	LS	LS	7.00	3.00	10.00	0.05
Acquisition/Purchase of Land	Acre	23.28	10500.02	4500.01	15000.03	78.46
Land Development	cum	50214.96	159.24	68.24	227.48	1.19
Office Buildings	sqm	3717.50	280.00	120.00	400.00	2.09
Others Buildings & Structures	sqm	3717.5	350.00	150.00	500.00	2.62
Roads and Highways	sqm	13300.00	351.55	150.66	502.21	2.63
Drainage Structures	m	2005.00	188.95	80.98	269.93	1.41
Sanitation and Water Supply	LS	LS	171.50	73.50	245.00	1.28
Electrical Installation	LS	LS	70.00	30.00	100.00	0.52
Sub Total (Capital Component)			12711.76	5447.89	18159.65	
c) Price Contingency (3.25%)			417.21	178.80	596.01	3.12
Sub Total (Physical Contingency)			417.21	178.80	596.01	
d) Physical Contingency (1%)			128.37	55.02	183.39	0.96
Sub Total (Price Contingency)			128.37	55.02	183.39	
Grand Total (a+b+c+d)			13382.78	5735.47	19118.25	100.00

Annexure E: Development of the Station area with Multi-modal Transport System

S.L	Description	Unit	Quantity	Rate	Sub Total (Tk.)	Total (Tk.)	
1.1	(i) Fish Poltun Shed	Sqm	1,950.00	22,000.00	42,900,000.00		
	(ii) Fish Poltun	Sqm	1,560.00	12,000.00	18,720,000.00		
	(iii) Gangway	Sqm	780.00	50,000.00	39,000,000.00		
Sub-Total =					100,620,000.00	100,620,000.00	
1.2	(i) Launch Poltun	Sqm	6,565.00	22,000.00	144,430,000.00		
	(ii) Construction of steel jetty, approach road and fabrication of steel SPUD (30" dia) including installation with allied works at different rural launch ghat.	Nos	52.00	1,000,000.00	52,000,000.00		
Sub-Total =					196,430,000.00	196,430,000.00	
1.3	2-Storeyed Rail-Station	Sqm	4,615.00	5,200.00	23,998,000.00		
Sub-Total =					23,998,000.00	23,998,000.00	
1.4	Bus-Terminal	Sqm	4,940.00	25,000.00	123,500,000.00		
Sub-Total =					123,500,000.00	123,500,000.00	
1.5	Mosque	Sqm	585.00	32,000.00	18,720,000.00		
Sub-Total =					18,720,000.00	18,720,000.00	
1.6	Loading Unload Poltun	Sqm	585.00	22,000.00	12,870,000.00		
Sub-Total =					12,870,000.00	12,870,000.00	
1.7	Truck Stand, RCC (25mpa) Pavement i/c Re-bar	Sqm	1,625.00	3,000.00	4,875,000.00		
Sub-Total =					4,875,000.00	4,875,000.00	
1.8	Riverbank Protection (CC.Block)	Sqm	13,650.00	2,200.00	30,030,000.00		
Sub-Total =					30,030,000.00	30,030,000.00	
1.9	Bituminous Carpeting, Sand filling etc	Sqm	21,762.00	3,600.00	78,343,200.00		
Sub-Total =					78,343,200.00	78,343,200.00	
1.10	Beautification	Sqm	49,790.00	450.00	22,405,500.00		
Sub-Total =					22,405,500.00	22,405,500.00	
1.11	Electrical Cost (12%)					73,415,004.00	
1.12	Sanitary Cost (8%)					48,943,336.00	
Total -A (4.0)		Station G.Total =				734,150,040.00	

Annexure F: Haziganj Fort Redevelopment Project

S.L	Description	Unit	Quantity	Rate	Sub Total (Tk.)	Total (Tk.)
	Civil Works:					
1.1	Internal Road & Footpath:					
	(i) Ceramic brick and CC pavement	Sqm	9,256.00	2,500.00	23,140,000.00	
Sub-Total =					23,140,000.00	23,140,000.00
1.2	Ponding:					
	Earthwork	Cum	147,550.00	200	29,510,000.00	
Sub-Total =					29,510,000.00	29,510,000.00
1.3	Main Gate:					
	(i) Rcc work, Marble Work, Ceramic bricks, Terracotaetc	Sqm	272	35,000.00	9,520,000.00	
	(ii) CC work, Ceramic bricks Pave	Sqm	310	1,590.00	492,900.00	
Sub-Total =					10,012,900.00	10,012,900.00
1.4	Boundary Wall:					
	Rcc Footing, GB, Vertical Pipe etc	Rm	1,885.00	22,000.00	41,470,000.00	
Sub-Total =					41,470,000.00	41,470,000.00
1.5	Sitting arrangement					
	RccFooting, Col, Roof etc Sitting arrangement	sqm	936	48,000.00	44,928,000.00	
Sub-Total =					44,928,000.00	44,928,000.00
1.6	Food Corner					
	(i) Indoor Sitting Arrangement,	sqm	4,030.00	45,000.00	181,350,000.00	
	(ii) Outdoor Sitting Arrangement 2-Storeid	sqm	2,145.00	42,000.00	90,090,000.00	
Sub-Total =					271,440,000.00	271,440,000.00
1.7	Beautification					
	(i) Open Area	sqm	113,815.00	450	51,216,750.00	
	(ii) Cultural Heritage (maintanance) work	sqm	7,488.00	25,000.00	187,200,000.00	
Sub-Total =					238,416,750.00	238,416,750.00
1.8	Electrical Cost					79,070,118.00
1.9	Sanitary Cost					52,713,412.00
Total -A (1.0)		Fort G. Total =				790,701,180.00

Annexure G: Ward Councilor's Complex (5 Storied)

S.L	Description	Unit	Quantity	Rate	Sub Total (Tk.)	Total (Tk.)
1.1	5-Storied Building Area	Sqm	6,703.00	48,000.00	321,744,000.00	
Sub-Total =					321,744,000.00	321,744,000.00
1.2	Hall Boundary Wall	Sqm	234	22,000.00	5,148,000.00	
Sub-Total =					5,148,000.00	5,148,000.00
1.3	Parking Area, Rcc Work, Sand filling etc	Sqm	1,027.00	2,850.00	2,926,950.00	
Sub-Total =					2,926,950.00	2,926,950.00
1.4	Beautification					
	(i) Open Area	sqm	1,040.00	450	468,000.00	
Sub-Total =					468,000.00	468,000.00
1.8	Electrical Cost (12%)					39,634,434.00
1.9	Sanitary Cost (8%)					26,422,956.00
Total -A (2.0)		Ward Councilor's Complex G.Total =				396,344,340.00

Annexure H: Cost of Low cost Housing**Summary of Consultancy Services**

Cost Component	Currency	
	USD	BDT in Lac
Remuneration	-	180.00
Reimbursable Expenses	-	18.84
Design Consult	-	162.33
Contingencies including VAT & Taxes	-	88.29
Total	0.00	449.46

Supervision Consultant: Breakdown of Remuneration (Time-Based):

Description/Position	Number	Staff-month Rate	Input (Staff-months)	Currency		
				USD	BDT in Lac	
Professionals						
1	Professionals for Building Works	4	(Home) 1.20	1.50x4		7.20
			(Field) 0.00		0	0.00
Sub-Total (Cost for Professionals)				6.0		7.20
Support Staff						
1	Junior Consultant (B.Sc in Civil Engineer)	4	(Home)	0	-	0.00
			(Field) 0.30		16x36	-
Sub-Total (Cost for Support Staff)				576		172.80
Grand Total Cost				582.00 mm		180.00

Supervision Consultants: Breakdown of Reimbursable Expenses (Time-Based):

No.	Description	Unit	Unit Cost	Quantity	Currency	
					USD	BDT in Lac
1.	Local Communication					
	1.1 Internet Facility/Telephone sites	Month	0.10	12x4	00.00	4.80
2.	Office Operations					
	2.1 Office Supplies	Month	0.10	12x4	00.00	4.80
	2.2 Printing and Reproduction of Reports	Month	0.0675	12x4	00.00	3.24
	2.3 Office Equipments	LS	0.50	1x4	00.00	2.00
	2.4 Computer Softwares	LS	0.1250	1x4	00.00	0.50
	2.5 Office Furnitures	LS	0.875	1x4	00.00	3.50
Grand Total (Cost for Reimbursable Expenses)					00.00	18.84

Design Consultant: Breakdown Cost

Description/Position	Unit	Unit Cost	Quantity	Currency
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				USD	BDT in Lac
Building Design					
1	Structural & Foundation Cost	sqft	15.63	472280	73.82
2	Plumbing Cost	Sqft	4.52	472280	21.35
3	Electrical Cost	Sqft	3.47	472280	16.39
4	Mechanical Cost	Sqft	3.47	472280	16.39
5	Fire Fighting Cost	Sqft	2.08	472280	9.82
6	Estimate Cost	sqft	5.20	472280	24.56
Total					162.33 Lac

Annexure I: List of Slum in NCC Area

Sl. No	Name of the Slum	Location of slum	Name of the Mohalla	Ward No.	Number of Household	Population
01	Wapda Khal's West Side Slum	West side of Narayanganj-Chittaganag road	East Panaidi	01	18	93
02	Chittaganag road	Chittaganag road market	Ati Part	01	18	88
03	Slum of Kader Miya	East side of Sign Board-Chaorangi Filling station	Mijmiri of West para	02	85	467
04	Mauchak Bus stand East side	South side of NimaiKashariBaitunMamur Mosque	Nimai Kashari	03	22	116
05	Kac Bridge Under	Under of KacpurDridge	Simarail	04	09	48
06	Shanti Nagor Slum	North side of M/S Fajlur Rahman & Brothers	Simarail	04	65	348
07	HorijonSuiparkoloni slum	South side of Chittagonj road and North side of Wapda road	Simarail	04	45	252
08	C & B Slum	South side of Kac Bridge and North side of Wapdakhal	Simarail	04	18	94
09	WapdaKoloni slum	East side of Wapda Khal	Ati	04	128	653
10	Ajibpur North Rail gate Line slum	East side of Siddhirganj pull and North side of Sailor north gate	Ajibpur South	04	144	752
11	Ajibpur South Rail gate Line slum	Siddhirganj pull to Sailor gate	Ajibpur South	05	97	504
12	Omorpur Slum	East side of Siddhirganj pull Omor slum	Ajibpur South	05	250	1318
13	Kolabag West Slum	North side of Power Station and South side of Sailor road	SiddhirganjKolabag west	05	50	254
14	Kolabag east Slum	South side of Sailor road	SiddhirganjKolabag east	05	160	784
15	Bihari Kamp Slum	Adomji Bihari Kololi	Somil para	06	1420	7810
16	Bihari Camp	South side of Adamje 3 no	Char	06	240	1152

Sl. No	Name of the Slum	Location of slum	Name of the Mohalla	Ward No.	Number of Household	Population
	Slum	Bihari Colony pond	Sumilpara			
17	Mohobbat Ali Slum	North side of Adamje graveyard	North Kadomtoli	07	09	47
18	B J C Labor Colony Slum	Adjacent to Jute Office	Arambagh	10	396	2019
19	Ibrahim Colony Slum	North side of Temple	2 no Dhakeswari	10	204	1018
20	Chittironjon Cotton Mill Slum	North side of rodeside pond	Chittoronjaon mill	10	213	1022
21	Co-operative Labor Colony Slum	In the area of Bangladesh Industry of Co-operative	Water works road	10	47	220
22	Rasulbagh Rail line Slum	North side of old Rail line	Rasulbagh	10	172	791
23	M Circus Slum	M Circus (Kulibagan)	M.Circus	11	1375	6462
24	Slum of Jabbar Mia	West side of Water works road	Water works road	11	263	1210
25	Talla Rail line Slum	West side of Talla Rail line and adjacent to the pond.	Talla	11	396	2019
26	Isdair Rail line Slum	East side and West side of Isdair Rail line	Isdair	12	1219	6130
27	Chasara Rail station Slum	West side and North side of Chashara Rail Station	North Chasara	12	936	4677
28	Kumudini Welfare Trust Slum	East side of Khanpur Hospital	Kumudini Welfare Trust	13	768	3835
29	Sweeper colony Slum	South side of Metro Cinema hall	K B Shaha road	13	983	5013
30	New Pal para Rail line Slum	West side of 2 no Rail gate, Ukilpara	New Palpara	14	40	206
31	New Jimkhana Slum	Back yard of FireService	New Jimkhana	15	1350	6885
32	Rishipatti Slum	Back yard of FireService	New Jimkhana	15	200	1017
33	Narayanganj Rail Station Slum	West side of Narayanganj Rail Station	Rail Colony	15	130	598
34	North Ralibagan Slum	Back yard of Karim Market	Noyamati	15	250	1175
35	Tanbazar Horizon City Colony Slum	Methorpotti S A Saleh road	Tanbazar	15	560	1688
36	South Rali Bagan Slum	Kuti Para Mosue Backyard	Tana Bazar	15	400	1920
37	Bail Khana Horizon City Koloni	Beside Sutar Para Primary School	Sutar para	15	21	92
38	Hazibari Slum	West side of Deovug Water tank	Deovug Water Tank	16	26	1016

Sl. No	Name of the Slum	Location of slum	Name of the Mohalla	Ward No.	Number of Household	Population
			Slum			
39	Slum of Railway Colony, Old Jimkhana	Adjacent to D.I.T. Mosque	Old Jimkhana, Railway Colony, D.I.T.	16	300	1290
40	Slum of Old Jimkhana	Backside of D.I.T. Market	Jimkhana	16	500	2556
41	Slum of D.I.T.	Backside of D.I.T. Market	Jimkhana	16	100	536
42	Slum of Hrishi Para	Backside of A.S.P. Banglo	Hrishi Para	17	768	3905
43	Slum of Shukam Patti	North side of PubaliSolt Industries	Gopchar	18	50	265
44	Slum of Alaminnagar	South side of Kadamtoli Bridge	Gopchar	18	125	654
45	Slum of Hira Doctor's House	South Side of Shahid Nagar Bridge	Shahid Nagar Diara	18	25	132
46	Slum of Kumudini Bagan	Inside of Kumudini Bagan	Sultan Giashuddin Road	18	40	216
47	Slum of Babumia's House	West side of 41 no. Bismillah Battery House	Nolua Road	18	50	265
48	Slum of NitaiganjHrishi para Field	West side of Prottasha Club	Zamindar Bari	18	275	1540
49	Slum of Hakim Munshi's House	Beside 195/1, Hakim Mia's House	Elua Road	18	70	371
50	Slum of SayelBarighat	North-West side of Bridge	Lokkhar Char	19	45	238
51	Slum of Mr. Jaman's House	East side of Bashundhara Cement Factory	M.M Ghoshar Road	19	19	102
52	Slum of IslampurNoya Para (1)	North side of ProgotiJuboShongho	Islampur Road	19	125	675
53	Slum of IslampurNoya Para (2)	East side of Mr. MofizProdhan	Islampur Road	19	40	214
54	Slum of Modonganj Bus Stand	South side of Modonganj Bus Stand	P.M Road	19	9	47
55	Slum of Khaja Company	North side towards KoilaGhat Road	K.N. Shen Road, Mahmud Nagar	20	35	184
56	Slum of Forajikanda Bus Stand's North side	North side of Modonpur Road	Forazi Kanda	20	11	58
57	Slum of Star Meril	West side of Modonganj Road	Chawdhury Para	21	50	271

Sl. No	Name of the Slum	Location of slum	Name of the Mohalla	Ward No.	Number of Household	Population
	Technology					
58	Slum of Hazi Mostaque's House	East side of Saleh Baba Majar	Saleh Nagar Road	21	14	76
59	Slum of Hrisi Para	East Side of Tirpan Pool	Enaet Nagar	21	150	813
60	Slum of Datta Para Bou Bazar	East Side of Sikander Malek High School	Datta Para	21	45	231
61	Slum of Bangladesh Para	East side of Baitul Habib Jame Mosque	Saleh Nagar Road	21	25	137
62	Slum of Thakur Bari	West side of Thakur bari is Shahi Mosque, at south is Graveyard	Bandar Thakur Bari	22	140	754
63	Slum of Bandar Colony Krishnopur	North side of Thakurbari Slum	Bandar Kolony	22	200	1046
64	Slum of Najimoddi	East side of Hazi Nurulislam's House	Cote Para	22	45	243
65	Slum of Mymanshingah	Adjacent to 1 no kheyaghat	Willson Road	22	300	1608
66	Babu Para (Slum of Atghati)	South side of Moriom's House and West side of Hamidur's House	S.S. Shah Road	22	85	456
67	Slum of Sotito Narayan	Beside of Haque Jeweller's	S.S. Shah Road	22	18	98
68	Slum of Religation	West side of WASHA Pamp adjacent to Food Godown	Willson Road	22	20	160
69	Slum of West Old Rail Station	West side of Old Railway Station	Shampa	22	10	53
70	Slum of East Zail Para	West side of Zail Para Ispahani Mosque	Ekrumpur Road	23	140	753
71	Slum of West Zail Para	North side of Zail Para Ispahani Mosque	Ekrumpur Road	23	160	866
72	Slum of Under Water Tank	Under Water Tank and South of Godown	Ekrumpur Road	23	12	62
73	Swiper Colony	Adjacent to Kadam Rosul University	Ekrumpur Road	23	150	796
74	Slum of Four Storied	Old Ispahani Building, Adjacent to Palki Community Center	Ekrumpur Road	23	80	397
75	Slum of Tazul Islam	West side of Ispahani Mosque	Ekrumpur Road	23	22	114
76	Slum of Falan	West side of Hazi Shiraz High School	North willson Road	23	10	57
77	Slum of Moslem Member	East side of Upazilla Chairman's House	North willson Road	23	25	132
78	Amirabad	North side of Kaitakhali Mouza	Amirabad	24	24	130

Sl. No	Name of the Slum	Location of slum	Name of the Mohalla	Ward No.	Number of Household	Population
79	Kaitakhali	North side of Bandar Bus Stand	Kaitakhali	24	42	231
80	Chaura Para	West side of Rail Line Road	LokkhonKhola	25	350	2126
81	South LokkhonKhola	West side of Rail Line Road	LokkhonKhola	25	480	3428
82	Slum of Dhakashory Oil Ghat	Beside Dhakashory Mills School	LokkhonKhola	26	15	82
83	Slum of Dockyard Super Colony	South side of Dockyard Main Gate	Sonachara	26	6	32
84	Chapatoli	West side of Rail Line Road	Chapatoli	27	160	812
85	Slum of Kuripara Colony	Beside Kuripara High School	Kuripara	27	320	1785

Annexure J: List of Khas Land in NCC Area

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Saiyadpur (Ma)	100	Plot	0.24	0.24
Saiyadpur (Ma)	99	Plot	0.27	0.27
Saiyadpur (Ma)	93	Plot	3.71	3.71
Saiyadpur (Ma)	85	Plot	0.54	0.54
Shitalakshya	3931	Plot	0.15	0.15
Shitalakshya	3930	Plot	0.40	0.40
Shitalakshya	3929	Plot	0.57	0.57
Shitalakshya	3928	Plot	0.66	0.66
Shitalakshya	3927	Plot	0.53	0.53
Shitalakshya	3919	Plot	0.31	0.31
Shitalakshya	3926	Plot	0.91	0.91
Shitalakshya	3925	Plot	0.84	0.84
Shitalakshya	3918	Plot	2.38	2.38
Shitalakshya	3922	Khal	0.78	0.78
Shitalakshya	3913	Plot	0.37	0.37
Shitalakshya	3921	Road	0.29	0.29
Shitalakshya	3920	Khal	1.15	1.15
Shitalakshya	3914	Plot	0.43	0.43
Shitalakshya	3924	Plot	0.62	0.62
Shitalakshya	3912	Plot	0.62	0.62
Shitalakshya	3915	Plot	0.27	0.27
Shitalakshya	3916	Plot	0.30	0.30
Shitalakshya	3923	Plot	1.67	1.67
Shitalakshya	3911	Plot	0.65	0.65
Shitalakshya	3917	Plot	1.22	1.22
Shitalakshya	3910	Plot	0.24	0.24
Shitalakshya	1886	Plot	4.87	4.87
Shitalakshya	1854	Plot	1.32	1.32
Shitalakshya	1866	Plot	0.05	0.05
Shitalakshya	1867	Plot	0.04	0.04
Shitalakshya	718	Plot	0.01	0.01
Shitalakshya	716	Plot	0.01	0.01
Shitalakshya	1853	Plot	0.05	0.05
Shitalakshya	722	Plot	0.09	0.09
Shitalakshya	1885	Plot	0.29	0.29
Shitalakshya	1863	Plot	0.07	0.07
Shitalakshya	1868	Plot	0.27	0.27
Shitalakshya	1855	Plot	0.03	0.03
Shitalakshya	1862	Plot	0.09	0.09
Shitalakshya	719	Plot	0.03	0.03
Shitalakshya	1872	Plot	0.10	0.10
Shitalakshya	1856	Plot	0.11	0.11
Shitalakshya	1879	Plot	0.08	0.08
Shitalakshya	717	Plot	0.09	0.09
Shitalakshya	715	Plot	0.05	0.05
Shitalakshya	1875	Plot	0.12	0.12
Shitalakshya	1845	Plot	0.29	0.29
Shitalakshya	1882	Plot	0.08	0.08
Shitalakshya	1838	Plot	0.16	0.16

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Shitalakshya	1878	Plot	0.04	0.04
Shitalakshya	720	Plot	0.02	0.02
Shitalakshya	1852	Plot	0.06	0.06
Shitalakshya	721	Plot	0.11	0.11
Shitalakshya	1839	Plot	0.14	0.14
Shitalakshya	703	Plot	0.08	0.08
Shitalakshya	702	Plot	0.12	0.12
Shitalakshya	1837	Plot	0.20	0.20
Shitalakshya	1874	Plot	0.06	0.06
Shitalakshya	1861	Plot	0.04	0.04
Shitalakshya	701	Plot	0.08	0.08
Shitalakshya	1883	Plot	0.14	0.14
Shitalakshya	704	Plot	0.04	0.04
Shitalakshya	705	Plot	0.01	0.01
Shitalakshya	700	Plot	0.12	0.12
Shitalakshya	1884	Plot	0.09	0.09
Shitalakshya	699	Plot	0.09	0.09
Shitalakshya	1865	Plot	0.21	0.21
Shitalakshya	698	Plot	0.10	0.10
Shitalakshya	1851	Plot	0.03	0.03
Shitalakshya	637	Plot	0.02	0.02
Shitalakshya	634	Plot	0.06	0.06
Shitalakshya	697	Plot	0.17	0.17
Shitalakshya	1880	Plot	0.05	0.05
Shitalakshya	1877	Plot	0.03	0.03
Shitalakshya	693	Plot	0.10	0.10
Shitalakshya	1881	Plot	0.02	0.02
Shitalakshya	645	Plot	0.03	0.03
Shitalakshya	1836	Plot	0.06	0.06
Shitalakshya	633	Plot	0.03	0.03
Shitalakshya	696	Plot	0.19	0.19
Shitalakshya	1869	Plot	0.09	0.09
Shitalakshya	1876	Plot	0.06	0.06
Shitalakshya	1871	Plot	0.04	0.04
Shitalakshya	1873	Plot	0.06	0.06
Shitalakshya	1849	Plot	0.03	0.03
Shitalakshya	1840	Plot	0.09	0.09
Shitalakshya	1860	Plot	0.08	0.08
Shitalakshya	1846	Plot	0.03	0.03
Shitalakshya	1859	Plot	0.13	0.13
Shitalakshya	649	Plot	0.03	0.03
Shitalakshya	636	Plot	0.23	0.23
Shitalakshya	1858	Plot	0.06	0.06
Shitalakshya	653	Plot	0.03	0.03
Shitalakshya	1857	Plot	0.10	0.10
Shitalakshya	2363	Plot	0.05	0.05
Shitalakshya	646	Plot	0.06	0.06
Shitalakshya	650	Plot	0.03	0.03
Shitalakshya	1844	Plot	0.05	0.05
Shitalakshya	654	Plot	0.01	0.01
Shitalakshya	695	Plot	0.45	0.45

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Shitalakshya	662	Plot	0.03	0.03
Shitalakshya	657	Plot	0.03	0.03
Shitalakshya	658	Plot	0.01	0.01
Shitalakshya	692	Plot	0.15	0.15
Shitalakshya	644	Plot	0.03	0.03
Shitalakshya	1870	Plot	0.06	0.06
Shitalakshya	1850	Plot	0.08	0.08
Shitalakshya	663	Plot	0.01	0.01
Shitalakshya	2362	Plot	0.03	0.03
Shitalakshya	632	Plot	0.07	0.07
Shitalakshya	666	Plot	0.02	0.02
Shitalakshya	635	Plot	0.09	0.09
Shitalakshya	638	Plot	0.06	0.06
Shitalakshya	1842	Plot	0.16	0.16
Shitalakshya	691	Plot	1.24	1.24
Shitalakshya	2361	Plot	0.05	0.05
Shitalakshya	2357	Plot	0.01	0.01
Shitalakshya	2350	Plot	0.01	0.01
Shitalakshya	694	Plot	0.07	0.07
Shitalakshya	1835	Plot	0.19	0.19
Shitalakshya	1848	Plot	0.03	0.03
Shitalakshya	2349	Plot	0.01	0.01
Shitalakshya	2360	Plot	0.04	0.04
Shitalakshya	1847	Plot	0.02	0.02
Shitalakshya	2348	Plot	0.01	0.01
Shitalakshya	1843	Plot	0.04	0.04
Shitalakshya	2356	Plot	0.01	0.01
Shitalakshya	2351	Plot	0.02	0.02
Shitalakshya	2340	Plot	0.01	0.01
Shitalakshya	641	Plot	0.05	0.05
Shitalakshya	1841	Plot	0.07	0.07
Shitalakshya	690	Plot	0.05	0.05
Shitalakshya	2339	Plot	0.02	0.02
Shitalakshya	689	Plot	0.05	0.05
Shitalakshya	2359	Plot	0.11	0.11
Shitalakshya	2347	Plot	0.02	0.02
Shitalakshya	647	Plot	0.10	0.10
Shitalakshya	652	Plot	0.07	0.07
Shitalakshya	651	Plot	0.05	0.05
Shitalakshya	648	Plot	0.04	0.04
Shitalakshya	643	Plot	0.03	0.03
Shitalakshya	671	Plot	0.03	0.03
Shitalakshya	640	Plot	0.01	0.01
Shitalakshya	659	Plot	0.02	0.02
Shitalakshya	656	Plot	0.06	0.06
Shitalakshya	661	Plot	0.13	0.13
Shitalakshya	667	Plot	0.11	0.11
Shitalakshya	639	Plot	0.00	0.00
Shitalakshya	668	Plot	0.11	0.11
Shitalakshya	664	Plot	0.05	0.05
Shitalakshya	2341	Plot	0.04	0.04

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Shitalakshya	2358	Plot	0.11	0.11
Shitalakshya	2335	Plot	0.03	0.03
Shitalakshya	3831	Plot	1.05	1.05
Shitalakshya	669	Plot	0.08	0.08
Shitalakshya	665	Plot	0.09	0.09
Shitalakshya	3832	Plot	0.54	0.54
Shitalakshya	670	Plot	0.05	0.05
Shitalakshya	1832	Plot	0.01	0.01
Shitalakshya	2355	Plot	0.05	0.05
Shitalakshya	673	Plot	0.04	0.04
Shitalakshya	674	Plot	0.04	0.04
Shitalakshya	1826	Plot	0.02	0.02
Shitalakshya	1829	Plot	0.02	0.02
Shitalakshya	1825	Plot	0.01	0.01
Shitalakshya	675	Plot	0.08	0.08
Shitalakshya	1822	Plot	0.01	0.01
Shitalakshya	2346	Plot	0.09	0.09
Shitalakshya	679	Plot	0.09	0.09
Shitalakshya	2334	Plot	0.06	0.06
Shitalakshya	676	Plot	0.07	0.07
Shitalakshya	678	Plot	0.15	0.15
Shitalakshya	2352	Plot	0.09	0.09
Shitalakshya	1821	Plot	0.03	0.03
Shitalakshya	672	Plot	0.03	0.03
Shitalakshya	1807	Plot	0.21	0.21
Shitalakshya	582	Plot	0.04	0.04
Shitalakshya	504	Plot	0.13	0.13
Shitalakshya	2337	Plot	0.19	0.19
Shitalakshya	2343	Plot	0.09	0.09
Shitalakshya	687	Plot	0.07	0.07
Shitalakshya	680	Plot	0.05	0.05
Shitalakshya	688	Plot	0.11	0.11
Shitalakshya	577	Plot	0.08	0.08
Shitalakshya	591	Plot	0.04	0.04
Shitalakshya	580	Plot	0.05	0.05
Shitalakshya	681	Plot	0.04	0.04
Shitalakshya	2342	Plot	0.06	0.06
Shitalakshya	2354	Plot	0.02	0.02
Shitalakshya	682	Plot	0.06	0.06
Shitalakshya	576	Plot	0.36	0.36
Shitalakshya	595	Plot	0.04	0.04
Shitalakshya	1828	Plot	0.11	0.11
Shitalakshya	2336	Plot	0.13	0.13
Shitalakshya	1831	Plot	0.08	0.08
Shitalakshya	683	Plot	0.06	0.06
Shitalakshya	596	Plot	0.03	0.03
Shitalakshya	592	Plot	0.01	0.01
Shitalakshya	684	Plot	0.03	0.03
Shitalakshya	686	Plot	0.05	0.05
Shitalakshya	685	Plot	0.05	0.05
Shitalakshya	587	Plot	0.04	0.04

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Shitalakshya	586	Plot	0.02	0.02
Shitalakshya	601	Plot	0.03	0.03
Shitalakshya	1830	Plot	0.06	0.06
Shitalakshya	2333	Plot	0.04	0.04
Shitalakshya	1827	Plot	0.09	0.09
Shitalakshya	590	Plot	0.01	0.01
Shitalakshya	2353	Plot	0.02	0.02
Shitalakshya	583	Plot	0.09	0.09
Shitalakshya	2332	Plot	0.05	0.05
Shitalakshya	1824	Plot	0.09	0.09
Shitalakshya	606	Plot	0.02	0.02
Shitalakshya	1823	Plot	0.11	0.11
Shitalakshya	611	Plot	0.01	0.01
Shitalakshya	607	Plot	0.02	0.02
Shitalakshya	1820	Plot	0.17	0.17
Shitalakshya	602	Plot	0.03	0.03
Shitalakshya	612	Plot	0.02	0.02
Shitalakshya	2345	Plot	0.01	0.01
Shitalakshya	605	Plot	0.04	0.04
Shitalakshya	615	Plot	0.01	0.01
Shitalakshya	616	Plot	0.01	0.01
Shitalakshya	2331	Plot	0.11	0.11
Shitalakshya	618	Plot	0.01	0.01
Shitalakshya	621	Plot	0.01	0.01
Shitalakshya	2344	Plot	0.03	0.03
Shitalakshya	503	Plot	0.33	0.33
Shitalakshya	578	Plot	0.11	0.11
Shitalakshya	610	Plot	0.07	0.07
Shitalakshya	624	Plot	0.01	0.01
Shitalakshya	579	Plot	0.08	0.08
Shitalakshya	625	Plot	0.01	0.01
Shitalakshya	1806	Plot	0.26	0.26
Shitalakshya	508	Plot	0.05	0.05
Shitalakshya	594	Plot	0.24	0.24
Shitalakshya	593	Plot	0.11	0.11
Shitalakshya	2330	Plot	0.06	0.06
Shitalakshya	628	Plot	0.02	0.02
Shitalakshya	630	Plot	0.03	0.03
Shitalakshya	589	Plot	0.04	0.04
Shitalakshya	588	Plot	0.09	0.09
Shitalakshya	585	Plot	0.03	0.03
Shitalakshya	584	Plot	0.16	0.16
Shitalakshya	600	Plot	0.17	0.17
Shitalakshya	505	Plot	0.15	0.15
Shitalakshya	608	Plot	0.15	0.15
Shitalakshya	575	Plot	0.46	0.46
Shitalakshya	2329	Plot	0.06	0.06
Shitalakshya	622	Plot	0.08	0.08
Shitalakshya	2328	Plot	0.06	0.06
Shitalakshya	598	Plot	0.13	0.13
Shitalakshya	620	Plot	0.09	0.09

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Shitalakshya	1819	Plot	0.20	0.20
Shitalakshya	619	Plot	0.07	0.07
Shitalakshya	1812	Plot	0.04	0.04
Shitalakshya	613	Plot	0.11	0.11
Shitalakshya	614	Plot	0.06	0.06
Shitalakshya	604	Plot	0.16	0.16
Shitalakshya	617	Plot	0.07	0.07
Shitalakshya	502	Plot	0.04	0.04
Shitalakshya	603	Plot	0.10	0.10
Shitalakshya	507	Plot	0.08	0.08
Shitalakshya	623	Plot	0.04	0.04
Shitalakshya	2325	Plot	0.07	0.07
Shitalakshya	2324	Plot	0.12	0.12
Shitalakshya	509	Plot	0.12	0.12
Shitalakshya	629	Plot	0.05	0.05
Shitalakshya	1810	Plot	0.03	0.03
Shitalakshya	1818	Plot	0.04	0.04
Shitalakshya	627	Plot	0.05	0.05
Shitalakshya	1817	Plot	0.06	0.06
Shitalakshya	1816	Plot	0.04	0.04
Shitalakshya	1814	Plot	0.16	0.16
Shitalakshya	609	Plot	0.10	0.10
Shitalakshya	1815	Plot	0.04	0.04
Shitalakshya	2327	Plot	0.03	0.03
Shitalakshya	566	Plot	0.05	0.05
Shitalakshya	1804	Plot	0.03	0.03
Shitalakshya	599	Plot	0.25	0.25
Shitalakshya	1811	Plot	0.06	0.06
Shitalakshya	1805	Plot	0.11	0.11
Shitalakshya	567	Plot	0.05	0.05
Shitalakshya	2326	Plot	0.03	0.03
Shitalakshya	571	Plot	0.03	0.03
Shitalakshya	1813	Plot	0.04	0.04
Shitalakshya	570	Plot	0.03	0.03
Shitalakshya	551	Plot	0.01	0.01
Shitalakshya	554	Plot	0.04	0.04
Shitalakshya	555	Plot	0.03	0.03
Shitalakshya	558	Plot	0.03	0.03
Shitalakshya	550	Plot	0.01	0.01
Shitalakshya	559	Plot	0.04	0.04
Shitalakshya	516	Plot	0.03	0.03
Shitalakshya	562	Plot	0.06	0.06
Shitalakshya	547	Plot	0.02	0.02
Shitalakshya	1809	Plot	0.10	0.10
Shitalakshya	510	Plot	0.04	0.04
Shitalakshya	546	Plot	0.04	0.04
Shitalakshya	515	Plot	0.05	0.05
Shitalakshya	2323	Plot	0.07	0.07
Shitalakshya	3827	Plot	0.19	0.19
Shitalakshya	542	Plot	0.02	0.02
Shitalakshya	1803	Plot	0.16	0.16

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Shitalakshya	541	Plot	0.05	0.05
Shitalakshya	565	Plot	0.12	0.12
Shitalakshya	1801	Plot	0.09	0.09
Shitalakshya	538	Plot	0.05	0.05
Shitalakshya	573	Plot	0.07	0.07
Shitalakshya	574	Plot	0.13	0.13
Shitalakshya	528	Plot	0.07	0.07
Shitalakshya	537	Plot	0.07	0.07
Shitalakshya	2321	Plot	0.13	0.13
Shitalakshya	532	Plot	0.08	0.08
Shitalakshya	517	Plot	0.03	0.03
Shitalakshya	1802	Plot	0.04	0.04
Shitalakshya	2318	Plot	0.16	0.16
Shitalakshya	572	Plot	0.05	0.05
Shitalakshya	511	Plot	0.02	0.02
Shitalakshya	568	Plot	0.14	0.14
Shitalakshya	569	Plot	0.06	0.06
Shitalakshya	2320	Plot	0.10	0.10
Shitalakshya	520	Plot	0.23	0.23
Shitalakshya	521	Plot	0.05	0.05
Shitalakshya	522	Plot	0.11	0.11
Shitalakshya	553	Plot	0.13	0.13
Shitalakshya	552	Plot	0.05	0.05
Shitalakshya	523	Plot	0.11	0.11
Shitalakshya	561	Plot	0.10	0.10
Shitalakshya	543	Plot	0.02	0.02
Shitalakshya	549	Plot	0.05	0.05
Shitalakshya	560	Plot	0.09	0.09
Shitalakshya	524	Plot	0.11	0.11
Shitalakshya	556	Plot	0.07	0.07
Shitalakshya	557	Plot	0.06	0.06
Shitalakshya	535	Plot	0.11	0.11
Shitalakshya	534	Plot	0.11	0.11
Shitalakshya	548	Plot	0.05	0.05
Shitalakshya	533	Plot	0.09	0.09
Shitalakshya	525	Plot	0.13	0.13
Shitalakshya	526	Plot	0.15	0.15
Shitalakshya	527	Plot	0.12	0.12
Shitalakshya	518	Plot	0.03	0.03
Shitalakshya	512	Plot	0.02	0.02
Shitalakshya	2315	Plot	0.01	0.01
Shitalakshya	545	Plot	0.08	0.08
Shitalakshya	564	Plot	0.07	0.07
Shitalakshya	540	Plot	0.08	0.08
Shitalakshya	2310	Plot	0.02	0.02
Shitalakshya	514	Plot	0.07	0.07
Shitalakshya	539	Plot	0.08	0.08
Shitalakshya	536	Plot	0.10	0.10
Shitalakshya	2308	Plot	0.07	0.07
Shitalakshya	2312	Plot	0.04	0.04
Shitalakshya	544	Plot	0.02	0.02

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Shitalakshya	530	Plot	0.03	0.03
Shitalakshya	2316	Plot	0.28	0.28
Shitalakshya	529	Plot	0.04	0.04
Shitalakshya	2319	Plot	0.13	0.13
Shitalakshya	513	Plot	0.03	0.03
Shitalakshya	519	Plot	0.03	0.03
Shitalakshya	531	Plot	0.05	0.05
Shitalakshya	2307	Plot	0.02	0.02
Shitalakshya	151	Plot	0.04	0.04
Shitalakshya	150	Plot	0.03	0.03
Shitalakshya	2305	Plot	0.04	0.04
Shitalakshya	2311	Plot	0.05	0.05
Shitalakshya	2304	Plot	0.02	0.02
Shitalakshya	145	Plot	0.03	0.03
Shitalakshya	141	Plot	0.04	0.04
Shitalakshya	144	Plot	0.05	0.05
Shitalakshya	2303	Plot	0.09	0.09
Shitalakshya	2306	Plot	0.03	0.03
Shitalakshya	95	Plot	0.03	0.03
Shitalakshya	146	Plot	0.05	0.05
Shitalakshya	2301	Plot	0.18	0.18
Shitalakshya	149	Plot	0.07	0.07
Shitalakshya	94	Plot	0.06	0.06
Shitalakshya	99	Plot	0.03	0.03
Shitalakshya	148	Plot	0.15	0.15
Shitalakshya	104	Plot	0.04	0.04
Shitalakshya	105	Plot	0.03	0.03
Shitalakshya	134	Plot	0.09	0.09
Shitalakshya	133	Plot	0.09	0.09
Shitalakshya	130	Plot	0.11	0.11
Shitalakshya	129	Plot	0.11	0.11
Shitalakshya	138	Plot	0.12	0.12
Shitalakshya	126	Plot	0.11	0.11
Shitalakshya	3830	Plot	1.76	1.76
Shitalakshya	108	Plot	0.09	0.09
Shitalakshya	2302	Plot	0.04	0.04
Shitalakshya	118	Plot	0.07	0.07
Shitalakshya	120	Plot	0.03	0.03
Shitalakshya	137	Plot	0.16	0.16
Shitalakshya	117	Plot	0.07	0.07
Shitalakshya	136	Plot	0.12	0.12
Shitalakshya	97	Plot	0.19	0.19
Shitalakshya	125	Plot	0.05	0.05
Shitalakshya	96	Plot	0.04	0.04
Shitalakshya	113	Plot	0.09	0.09
Shitalakshya	122	Plot	0.05	0.05
Shitalakshya	143	Plot	0.11	0.11
Shitalakshya	140	Plot	0.11	0.11
Shitalakshya	112	Plot	0.13	0.13
Shitalakshya	109	Plot	0.12	0.12
Shitalakshya	98	Plot	0.07	0.07

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Shitalakshya	139	Plot	0.07	0.07
Shitalakshya	147	Plot	0.04	0.04
Shitalakshya	103	Plot	0.03	0.03
Shitalakshya	101	Plot	0.11	0.11
Shitalakshya	121	Plot	0.17	0.17
Shitalakshya	100	Plot	0.05	0.05
Shitalakshya	135	Plot	0.03	0.03
Shitalakshya	132	Plot	0.03	0.03
Shitalakshya	106	Plot	0.07	0.07
Shitalakshya	131	Plot	0.05	0.05
Shitalakshya	128	Plot	0.06	0.06
Shitalakshya	119	Plot	0.05	0.05
Shitalakshya	116	Plot	0.05	0.05
Shitalakshya	107	Plot	0.08	0.08
Shitalakshya	114	Plot	0.05	0.05
Shitalakshya	127	Plot	0.08	0.08
Shitalakshya	102	Plot	0.06	0.06
Shitalakshya	124	Plot	0.03	0.03
Shitalakshya	111	Plot	0.06	0.06
Shitalakshya	110	Plot	0.05	0.05
Shitalakshya	123	Plot	0.03	0.03
Shitalakshya	92	Plot	0.46	0.46
Shitalakshya	155	Plot	0.27	0.27
Shitalakshya	91	Plot	0.87	0.87
Shitalakshya	86	Plot	0.28	0.28
Enatnagar	45	Plot	0.09	0.09
Sonakanda (Ma)	1	Plot	1.00	1.00
Enatnagar	49	Plot	1.10	1.10
Enatnagar (Ma)	117	Plot	0.03	0.03
Enatnagar	15	Plot	0.22	0.22
Narayanganj	2076	Plot	0.05	0.05
Enatnagar	14	Plot	0.24	0.24
Enatnagar	6	Plot	0.13	0.13
Enatnagar	5	Plot	0.11	0.11
Enatnagar	4	Plot	0.20	0.20
Enatnagar	2	Plot	0.19	0.19
Enatnagar	1	Khal	0.11	0.11
Narayanganj	1168	Plot	0.08	0.08
Gangakul Bandar (Ma)	1427	Plot	0.11	0.11
Gangakul Bandar (Ma)	865	Road	0.50	0.50
Gangakul Bandar (Ma)	1421	Plot	0.07	0.07
Gangakul Bandar (Ma)	1422	Plot	0.07	0.07
Gangakul Bandar (Ma)	1426	Plot	0.18	0.18
Gangakul Bandar (Ma)	1420	Plot	0.01	0.01
Narayanganj	1071	Plot	0.01	0.01
Narayanganj	1036	Plot	0.13	0.13
Sonapur (Ma)	14	Plot	0.13	0.13
Bandar	1	Khal	0.52	0.52
Narayanganj	791	Plot	0.06	0.06
Bara Deobhog	1754	Plot	0.22	0.22
Sonapur (Ma)	2	Plot	0.59	0.59

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Dakshin Bandar Krishnapura (Ma)	110	Plot	0.31	0.31
Bandar Krishnapura	130	Plot	1.18	1.18
Narayanganj	1243	Plot	1.12	1.12
Bandar Krishnapura	116	Plot	0.21	0.21
Narayanganj	988	Plot	0.04	0.04
Narayanganj	659	Plot	0.01	0.01
Narayanganj	638	Plot	0.05	0.05
Narayanganj	650	Plot	0.09	0.09
Narayanganj	646	Plot	0.04	0.04
Narayanganj	343	Plot	0.13	0.13
Narayanganj	340	Plot	0.02	0.02
Narayanganj	334	Plot	0.04	0.04
Narayanganj	165	Plot	0.05	0.05
Gangakul Bandar (Ma)	1	Plot	1.50	1.50
Chasara (Ma)	171	Plot	0.08	0.08
Chasara (Ma)	759	Plot	0.04	0.04
Chasara (Ma)	758	Plot	0.06	0.06
Chasara (Ma)	760	Plot	0.01	0.01
Chasara (Ma)	738	Plot	0.04	0.04
Chasara (Ma)	740	Plot	0.01	0.01
Chasara (Ma)	741	Plot	0.01	0.01
Chasara (Ma)	725	Plot	0.04	0.04
Ekrampur (Ma)	142	Plot	0.40	0.40
Ekrampur (Ma)	129	Plot	0.06	0.06
Khanpur	825	Plot	0.94	0.94
Khanpur	826	Plot	0.57	0.57
Khanpur	822	Plot	0.38	0.38
Uttar Bandar Krishnapura (Ma)	13	Plot	0.20	0.20
Uttar Bandar Krishnapura (Ma)	12	Plot	0.11	0.11
Khanpur	845	Plot	0.24	0.24
Khanpur	844	Plot	0.27	0.27
Nabiganj (Ma)	1539	Plot	0.16	0.16
Khanpur	843	Plot	0.59	0.59
Khanpur	814	Plot	0.31	0.31
Nabiganj (Ma)	1442	Plot	0.18	0.18
Khanpur	813	Plot	0.06	0.06
Khanpur	1076	Plot	0.04	0.04
Khanpur	803	Plot	0.02	0.02
Khanpur	1001	Plot	0.09	0.09
Khanpur	1024	Plot	0.18	0.18
Khanpur	1051	Plot	0.08	0.08
Khanpur	1059	Plot	0.05	0.05
Khanpur	1033	Plot	0.09	0.09
Khanpur	64	Plot	0.60	0.60
Khanpur	80	Plot	0.80	0.80
Khanpur	1727	Plot	0.13	0.13
Khanpur	1772	Plot	0.02	0.02
Khanpur	1765	Plot	0.01	0.01
Khanpur	73	Plot	0.28	0.28
Khanpur	46	Plot	0.11	0.11
Khanpur	1757	Plot	0.02	0.02

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Khanpur	4037	Plot	0.07	0.07
Khanpur	40	Plot	0.15	0.15
Khanpur	4039	Plot	0.60	0.60
Khanpur	4028	Plot	0.07	0.07
Khanpur	4022	Plot	0.05	0.05
Khanpur	4091	Plot	0.50	0.50
Khanpur	13	Plot	1.03	1.03
Khanpur	4001	Khal	0.24	0.24
Khanpur	1506	Plot	0.84	0.84
Nabiganj (Ma)	901	Plot	0.61	0.61
Nabiganj (Ma)	682	Plot	0.20	0.20
Nabiganj (Ma)	666	Plot	0.14	0.14
Masdair	117	Plot	0.37	0.37
Khanpur	441	Plot	0.51	0.51
Nabiganj (Ma)	1042	Plot	0.11	0.11
Haziganj	411	Plot	1.89	1.89
Haziganj	409	Plot	1.25	1.25
Haziganj	408	Road	0.50	0.50
Haziganj	410	Plot	0.91	0.91
Ayama Kadamrasul (Ma)	10	Plot	0.81	0.81
Ayama Kadamrasul (Ma)	19	Plot	0.71	0.71
Talla	157	Plot	0.12	0.12
Mukraba	42	Plot	0.16	0.16
Nabiganj (Ma)	397	Plot	0.15	0.15
Haziganj	407	Plot	0.35	0.35
Nabiganj (Ma)	319	Plot	0.17	0.17
Haziganj (Ma)	260	Plot	0.34	0.34
Nabiganj (Ma)	288	Plot	0.08	0.08
Nabiganj (Ma)	488	Khal	0.40	0.40
Haziganj (Ma)	250	Plot	0.08	0.08
Nabiganj (Ma)	235	Plot	0.02	0.02
Haziganj (Ma)	238	Plot	3.47	3.47
Haziganj	244	Plot	0.15	0.15
Haziganj (Ma)	237	Plot	0.84	0.84
Haziganj	9	Plot	0.04	0.04
Haziganj	8	Plot	0.13	0.13
Godnail (Ma)	46	Plot	1.13	1.13
Uttor Nanda	139	Road	0.47	0.47
Kusiara	4	Plot	0.05	0.05
Nondirgaon	26	Road	0.11	0.11
Nondirgaon	27	Plot	0.47	0.47
Nondirgaon	28	Plot	0.15	0.15
Godnail	3689	Plot	0.40	0.40
Uttor Nanda	16	Road	0.54	0.54
Godnail (Ma)	35	Plot	0.81	0.81
Godnail (Ma)	12	Plot	1.75	1.75
Uttor Nanda	2	Plot	0.16	0.16
Uttor Nanda	140	Road	0.11	0.11
Godnail	3769	Plot	0.50	0.50
Godnail	3438	Plot	0.53	0.53
Godnail	3654	Plot	3.20	3.20

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Godnail	3227	Plot	0.10	0.10
Godnail	3182	Plot	0.50	0.50
Godnail	3215	Plot	0.26	0.26
Godnail	3606	Plot	0.22	0.22
Godnail	3618	Plot	0.07	0.07
Godnail	3575	Plot	0.73	0.73
Godnail	3577	Plot	0.40	0.40
Godnail	3388	Plot	0.48	0.48
Godnail	3540	Plot	0.26	0.26
Godnail	2870	Plot	0.30	0.30
Godnail	2866	Plot	0.08	0.08
Godnail	2804	Plot	0.49	0.49
Godnail	3351	Plot	0.86	0.86
Godnail	3503	Plot	0.21	0.21
Godnail	3502	Plot	0.24	0.24
Godnail	3514	Plot	0.31	0.31
Godnail	2800	Plot	0.14	0.14
Godnail	1371	Plot	0.46	0.46
Godnail	1592	Plot	0.77	0.77
Jalkundi	4981	Plot	0.62	0.62
Jalkundi	3526	Plot	0.28	0.28
Jalkundi	3525	Plot	0.45	0.45
Jalkundi	3524	Plot	1.10	1.10
Godnail	1491	Plot	0.12	0.12
Godnail	1554	Plot	0.17	0.17
Godnail	1437	Plot	0.77	0.77
Godnail	1649	Plot	0.17	0.17
Godnail	1435	Plot	0.58	0.58
Godnail	1521	Plot	0.03	0.03
Godnail	1479	Plot	0.09	0.09
Godnail	1473	Plot	0.01	0.01
Godnail	1541	Plot	0.51	0.51
Godnail	1595	Plot	39.13	39.13
Jalkundi	3944	Plot	0.17	0.17
Jalkundi	3981	Plot	0.33	0.33
Godnail	1610	Plot	0.18	0.18
Jalkundi	3983	Plot	0.89	0.89
Godnail	1675	Plot	0.25	0.25
Jalkundi	3989	Plot	0.23	0.23
Godnail	1414	Plot	0.55	0.55
Godnail	1410	Plot	0.06	0.06
Godnail	1630	Plot	0.19	0.19
Godnail	1600	Plot	0.12	0.12
Godnail	1599	Plot	0.11	0.11
Godnail	1216	Plot	0.17	0.17
Dhamgar	1942	Plot	0.16	0.16
Dhamgar	1940	Plot	0.15	0.15
Dhamgar	1833	Plot	0.22	0.22
Godnail	1180	Plot	0.06	0.06
Godnail	1236	Plot	3.46	3.46
Dhamgar	1829	Plot	0.45	0.45

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Godnail	1076	Plot	0.06	0.06
Godnail	1668	Plot	0.46	0.46
Jalkundi	4523	Plot	0.37	0.37
Godnail	1063	Plot	0.60	0.60
Jalkundi	4522	Plot	0.45	0.45
Godnail	1075	Plot	0.22	0.22
Jalkundi	4524	Plot	0.29	0.29
Godnail	1062	Plot	0.48	0.48
Godnail	1074	Plot	0.06	0.06
Godnail	1673	Plot	0.05	0.05
Jalkundi	4347	Plot	0.70	0.70
Jalkundi	4227	Plot	0.02	0.02
Jalkundi	4228	Plot	0.26	0.26
Jalkundi	4602	Plot	0.30	0.30
Jalkundi	4586	Plot	0.34	0.34
Siddhirganj	10874	Plot	0.16	0.16
Siddhirganj	6881	Halot	0.20	0.20
Siddhirganj	10866	Plot	0.08	0.08
Siddhirganj	10867	Plot	0.07	0.07
Siddhirganj	10875	Plot	0.07	0.07
Jalkundi	404	Plot	0.50	0.50
Siddhirganj	7584	Plot	0.20	0.20
Siddhirganj	7583	Plot	0.12	0.12
Siddhirganj	7917	Plot	0.08	0.08
Siddhirganj	7911	Plot	0.06	0.06
Siddhirganj	7577	Plot	0.07	0.07
Siddhirganj	10793	Plot	0.35	0.35
Siddhirganj	7951	Plot	0.17	0.17
Siddhirganj	10878	Plot	0.47	0.47
Jalkundi	1991	Plot	0.17	0.17
Siddhirganj	6777	Plot	0.25	0.25
Siddhirganj	10630	Plot	0.05	0.05
Siddhirganj	7844	Plot	0.07	0.07
Siddhirganj	10629	Plot	0.10	0.10
Siddhirganj	10628	Plot	0.07	0.07
Siddhirganj	10625	Plot	0.08	0.08
Siddhirganj	10627	Plot	0.07	0.07
Siddhirganj	7840	Plot	0.27	0.27
Siddhirganj	7841	Plot	0.22	0.22
Siddhirganj	10624	Plot	0.19	0.19
Siddhirganj	10623	Plot	0.06	0.06
Siddhirganj	10591	Plot	0.12	0.12
Siddhirganj	10592	Plot	0.06	0.06
Siddhirganj	10593	Plot	0.04	0.04
Siddhirganj	10621	Plot	0.08	0.08
Siddhirganj	10588	Plot	0.04	0.04
Siddhirganj	10623	Plot	0.12	0.12
Siddhirganj	10620	Plot	0.05	0.05
Siddhirganj	10590	Plot	0.03	0.03
Siddhirganj	10587	Plot	0.11	0.11
Siddhirganj	10588	Plot	0.03	0.03

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Siddhirganj	10619	Plot	0.09	0.09
Siddhirganj	10622	Plot	0.07	0.07
Siddhirganj	10584	Plot	0.08	0.08
Siddhirganj	10586	Plot	0.08	0.08
Siddhirganj	10618	Plot	0.11	0.11
Siddhirganj	10583	Plot	0.04	0.04
Siddhirganj	10616	Plot	0.24	0.24
Siddhirganj	10598	Plot	0.39	0.39
Siddhirganj	10580	Plot	0.05	0.05
Siddhirganj	10585	Plot	0.07	0.07
Siddhirganj	10579	Plot	0.04	0.04
Siddhirganj	10582	Plot	0.04	0.04
Siddhirganj	10617	Plot	0.08	0.08
Siddhirganj	10576	Plot	0.16	0.16
Siddhirganj	10581	Plot	0.05	0.05
Siddhirganj	10610	Plot	0.09	0.09
Siddhirganj	10615	Plot	0.05	0.05
Siddhirganj	10578	Plot	0.03	0.03
Siddhirganj	10575	Plot	0.07	0.07
Siddhirganj	10609	Plot	0.07	0.07
Siddhirganj	10612	Plot	0.04	0.04
Siddhirganj	10577	Plot	0.12	0.12
Siddhirganj	10608	Plot	0.06	0.06
Siddhirganj	10611	Plot	0.06	0.06
Siddhirganj	10572	Plot	0.04	0.04
Siddhirganj	7807	Plot	0.32	0.32
Siddhirganj	10605	Plot	0.05	0.05
Siddhirganj	10571	Plot	0.03	0.03
Siddhirganj	10596	Plot	0.49	0.49
Siddhirganj	10574	Plot	0.17	0.17
Siddhirganj	10568	Plot	0.03	0.03
Siddhirganj	10567	Plot	0.05	0.05
Siddhirganj	10604	Plot	0.25	0.25
Siddhirganj	10573	Plot	0.08	0.08
Siddhirganj	10564	Plot	0.04	0.04
Siddhirganj	10606	Plot	0.03	0.03
Siddhirganj	10570	Plot	0.04	0.04
Siddhirganj	10595	Plot	0.31	0.31
Siddhirganj	10563	Plot	0.04	0.04
Siddhirganj	10569	Plot	0.06	0.06
Siddhirganj	10603	Plot	0.07	0.07
Siddhirganj	10560	Plot	0.04	0.04
Siddhirganj	10566	Plot	0.06	0.06
Siddhirganj	10602	Plot	0.05	0.05
Siddhirganj	10559	Plot	0.04	0.04
Siddhirganj	10565	Plot	0.05	0.05
Siddhirganj	10557	Plot	0.05	0.05
Siddhirganj	10601	Plot	0.11	0.11
Siddhirganj	10562	Plot	0.04	0.04
Siddhirganj	10556	Plot	0.05	0.05
Siddhirganj	10561	Plot	0.05	0.05

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Siddhirganj	6766	Plot	2.78	2.78
Siddhirganj	10519	Plot	0.33	0.33
Siddhirganj	10553	Plot	0.10	0.10
Siddhirganj	10558	Plot	0.10	0.10
Siddhirganj	10552	Plot	0.11	0.11
Siddhirganj	10555	Plot	0.06	0.06
Siddhirganj	10518	Plot	0.17	0.17
Siddhirganj	10520	Plot	0.29	0.29
Siddhirganj	10513	Plot	0.24	0.24
Siddhirganj	8356	Plot	0.82	0.82
Siddhirganj	10517	Plot	0.28	0.28
Siddhirganj	10521	Plot	0.21	0.21
Siddhirganj	10424	Plot	0.18	0.18
Siddhirganj	10514	Plot	0.43	0.43
Siddhirganj	10512	Plot	0.43	0.43
Siddhirganj	10516	Plot	0.18	0.18
Siddhirganj	10511	Plot	1.01	1.01
Siddhirganj	10515	Plot	0.23	0.23
Siddhirganj	10510	Plot	0.10	0.10
Siddhirganj	10506	Plot	0.55	0.55
Siddhirganj	10508	Plot	0.25	0.25
Siddhirganj	10507	Plot	0.17	0.17
Siddhirganj	8290	Plot	0.28	0.28
Siddhirganj	8328	Plot	0.31	0.31
Siddhirganj	8327	Plot	0.26	0.26
Siddhirganj	8367	Plot	0.05	0.05
Siddhirganj	6627	Plot	0.40	0.40
Siddhirganj	8370	Plot	0.02	0.02
Siddhirganj	6713	Plot	12.37	12.37
Siddhirganj	8251	Plot	0.08	0.08
Kuripara	557	Plot	0.14	0.14
Kuripara	552	Plot	0.03	0.03
Siddhirganj	6683	Plot	1.22	1.22
Kuripara	551	Plot	0.04	0.04
Jalkundi	1747	Plot	0.35	0.35
Kuripara	550	Plot	0.07	0.07
Siddhirganj	8560	Plot	0.14	0.14
Kuripara	544	Plot	0.12	0.12
Siddhirganj	8555	Plot	0.15	0.15
Kuripara	543	Plot	0.22	0.22
Kuripara	532	Plot	0.09	0.09
Kuripara	531	Plot	0.13	0.13
Siddhirganj	8549	Plot	0.09	0.09
Siddhirganj	5217	Plot	0.04	0.04
Siddhirganj	5220	Plot	0.04	0.04
Siddhirganj	5222	Plot	0.13	0.13
Siddhirganj	1747	Plot	0.25	0.25
Siddhirganj	5321	Plot	0.10	0.10
Siddhirganj	2661	Plot	0.30	0.30
Haripur	84	Plot	0.09	0.09
Haripur	85	Plot	0.09	0.09

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Siddhirganj	2618	Plot	0.12	0.12
Haripur	57	Plot	0.32	0.32
Siddhirganj	1991	Plot	0.05	0.05
Siddhirganj	10018	Plot	0.47	0.47
Siddhirganj	8812	Plot	0.34	0.34
Siddhirganj	8811	Plot	0.37	0.37
Siddhirganj	4555	Plot	0.31	0.31
Siddhirganj	9360	Halot	0.04	0.04
Siddhirganj	4658	Plot	0.93	0.93
Siddhirganj	9053	Plot	0.77	0.77
Siddhirganj	9562	Plot	0.33	0.33
Haripur	10	Plot	0.23	0.23
Haripur	7	Plot	0.20	0.20
Haripur	16	Plot	0.10	0.10
Haripur	15	Plot	0.23	0.23
Siddhirganj	9561	Plot	0.31	0.31
Haripur	14	Plot	0.17	0.17
Siddhirganj	9620	Plot	0.06	0.06
Haripur	2	Plot	0.24	0.24
Siddhirganj	9523	Road	0.19	0.19
Siddhirganj	994	Plot	0.04	0.04
Siddhirganj	993	Plot	0.11	0.11
Siddhirganj	9024	Plot	1.04	1.04
Siddhirganj	982	Plot	0.41	0.41
Siddhirganj	9511	Plot	0.50	0.50
Siddhirganj	9504	Plot	0.00	0.00
Siddhirganj	9506	Plot	0.00	0.00
Siddhirganj	9507	Plot	0.17	0.17
Siddhirganj	9510	Plot	0.03	0.03
Azibpur	414	Plot	0.85	0.85
Azibpur	415	Plot	0.59	0.59
Azibpur	409	Plot	0.45	0.45
Siddhirganj	812	Plot	0.27	0.27
Azibpur	401	Plot	0.92	0.92
Azibpur	396	Plot	0.97	0.97
Siddhirganj	911	Plot	0.29	0.29
Ati	395	Plot	2.42	2.42
Azibpur	303	Plot	0.97	0.97
Ati	379	Plot	0.28	0.28
Ati	615	Plot	0.26	0.26
Ati	614	Plot	0.72	0.72
Ati	178	Plot	0.07	0.07
Ati	606	Plot	0.31	0.31
Ati	602	Plot	0.19	0.19
Ati	601	Plot	0.16	0.16
Siddhirganj	398	Plot	0.27	0.27
Khorda Ghoshpara	867	Plot	0.48	0.48
Ati	600	Plot	0.15	0.15
Siddhirganj	400	Plot	0.14	0.14
Ati	599	Plot	0.14	0.14
Ati	592	Plot	0.29	0.29

Mauza Name	Plot No	Plot Type	Plot Area (Acre)	Khas Area (Acre)
Ati	591	Plot	0.29	0.29
Khorda Ghoshpara	546	Plot	0.18	0.18
Ati	185	Plot	3.73	3.73
Ati	99999	Plot	0.37	0.37
Ati	581	Plot	0.47	0.47
Ati	579	Plot	0.21	0.21
Ati	580	Plot	0.26	0.26
Ati	163	Plot	3.59	3.59
Ati	571	Plot	0.21	0.21
Ati	569	Plot	0.22	0.22
Ati	200	Plot	0.08	0.08
Ati	94	Plot	4.79	4.79
Ati	93	Plot	2.75	2.75
Siddhirganj	319	Plot	0.20	0.20
Ati	568	Plot	2.05	2.05
Ati	97	Plot	0.35	0.35
Ati	82	Plot	2.30	2.30
Ati	77	Plot	6.28	6.28
Siddhirganj	181	Plot	0.66	0.66
Khorda Ghoshpara	111	Plot	4.04	4.04
Siddhirganj	112	Plot	0.47	0.47
Ati	543	Plot	0.20	0.20
Siddhirganj	155	Plot	0.20	0.20
Ati	542	Plot	0.18	0.18
Shimrail	135	Plot	0.20	0.20
Shimrail	123	Plot	0.61	0.61
Shimrail	673	Plot	0.02	0.02
Shimrail	97	Plot	0.50	0.50
Siddhirganj	2	Plot	0.26	0.26
Shimrail	494	Plot	0.25	0.25
Shimrail	493	Plot	0.26	0.26
Shimrail	492	Plot	0.22	0.22
Shimrail	325	Plot	0.13	0.13
Shimrail	326	Plot	0.12	0.12
Shimrail	467	Plot	0.29	0.29
Shimrail	479	Plot	0.17	0.17
Shimrail	478	Plot	0.20	0.20
Shimrail	466	Plot	0.75	0.75
Shimrail	472	Plot	0.24	0.24
Shimrail	465	Plot	0.22	0.22
Shimrail	464	Plot	0.18	0.18
Total Land			266.30	266.30

Annexure K: List of Water bodies under ownership of Narayanganj City Corporation

Narayanganj Zone:

List of Ponds:

Serial no.	Ward no.	Location of Pond	Mouza and Dag no.	Amount (Percentages)
1	8	North side of Hajiganj graveyard	Godnail R.S. Dag-no.-3286	170.00
2	10	South side of the Chittoronjon Play field of the house belonging to Khnapur Hossain Sardar	Godnail R.S. Dag-no.-3533, 3536	27+12= 40.00
3	11	West side of the house of Khnapur Hossain Sardar	Khanpur R.S. Dag no.- 2066	14.32
4	11	West side of Godnail Water Works Board	Mouza: Godnail R.S. khotian-06 R.S. Dag no.- 3706, 3782	165.00
5	12	North side of EsdairOsmani Stadium	Esdair R.S. Dag no.-203, 204, 205, 199, 217	232.00
6	12	East side of Esdair Stadium	Esdair R.S. Dag no.-211	30.00
7	12	North side of Sweeper colony near of Esdair Stadium	Masdair R.S. Dag no.-109	39.00
8	Null	West side of Pouro Sweeper colony road near of Esdair Stadium	Masdair R.S. Dag no.-107	Null
9	12	East and North side of Masdair graveyard	Masdair R.S. Dag no.-84, 93, 95, 171, 175, 176	35+48+42= 125.00
10	12	Masdairshoshan	Masdair R.S. Dag no.-173	40.00
11	12	KhanpurBoubazar	R.S. Dag no.-2037	43.82
12	12	New Khanpur Deep Tube well	Mouza: Khanpur “Mo” khondo R.S. Dag no.-2802	21.64
13	13	North side of the house of Advocate ToimorAlamKhandkar	Masdair R.S. Dag no.-885	18.00
14	13	East side Ditch of Western Road at South side of Masdair Bazar	Masdair R.S. Dag no.-1027	18.00
15	16	South side of Ali AhammadChunka Road	BoroDaobhog, R.S. Dag no.-	52.00

Serial no.	Ward no.	Location of Pond	Mouza and Dag no.	Amount (Percentages)
			1572	
16	16	West side Ditch of Beparipara Primary School	BoroDaobhog, R.S. Dag no.-1838, 1839, 1840, 1841	5+17+8+11= 41.00
17	17	West side of Pikepara Play ground	Pikepara R.S. Dag no.-288	51.00
18	17	South side of Pikepara Play ground	Pikepara R.S. Dag no.-333	60.00
19	17	South & East side of PikeparaBangobandhu Govt. Primary School	Pikepara R.S. Dag no.-142, 126	50.20
20	17	South side of Pikepara large graveyard	Goalbond, R.S. Dag no.-58, 59, 60, 61	30+39+45+26= 140.00
21	17	West side of BaburailBoubazar	Goalbond, R.S. Dag no.-7	60.00
22	17	South side of Pikepara small graveyard	C.S., R.S. dag no.-70,72,73	4+27+3= 34.00
23	Ponchoboti	North side of truck stand	Horihorpara R.S.-562	70.20

Siddhirganj Zone:

List of Canals

Sl. No	Ward No.	Location of Canal	Length (meter)	Width (meter)	MouzaName	R.S.Line
1	2,3	Toward West from Shimrail Bot-tolato Shahebpara Canal	2040	15	Shimrail SiddhirganjKhordoghoshpara	131,132,133 210,211,212,213 Line is not identical
2	2 and3	Toward West from Abdul Alir PooltoDogair via DhonuHaziMorCanal	1860	33	Khordoghoshpara	176,1126,502,521
3	1,2	Toward West from Siddhirganj Poolto Abdul Alir PoolCanal	1240	13(avg)	MouzaShiddirganj	995,989,732,731,791,646,1221, 1248,631

Narayanganj City Corporation Action Area Plan

Sl. No	Ward No.	Location of Canal	Length (meter)	Width (meter)	Mouza Name	R.S.Line
4	1,2,4	Toward East from Dhonu Hazi Morto Shitalakhya river via Hazi G. L.	1347	28(avg)	Ati: Siddhirganj Ati	339 230,705,50
5	Null	Toward East from Resettlement Project of Ati Mouza Land Ministry to Shitalakhya River	726	8	Ati	106,141,502,552
6	3	Toward North from Shimrail Bottolato Mosque Canal	710	25	Shimrail	647
7	6	Toward East from Sona Bibi Market Bridge to Orion Power Station and Shitalakhya River via Satghora Cement Factory Canal	1265	12.25	Siddhirganj	Line is not identical
8	2 and 9	Toward South from Abdul Alir Pool to the boundary of Kutubpur/City Corporation via Jalkuri Bus Stand	5030	15	Siddhirganj(2) Jalkuri(1)	2700,2694,2652,2188,2187, 2,185,284,339
9	1,2 and 9	Toward West from Mijimiji Eastern Wapda Cannel Bank to Delparavia Jalkuri Bus Stand	3691	18.60	Siddhirganj Jalkuri 6/2 Jalkuri 6/1 Jalkuri 6/3	4581,2593,2527,2814 1503 1013,1006,925, 4195
10		Toward East from Narayanganj-Dhaka Link Road to Madina Baag via Shima Dying	1800	25	Jalkuri	3518 Rest of the lines are blurred
11	10	Toward North from Madina Baag to Dr. A. Maleks' Resident	1200	13	Godanail Siddhirganj 4/4 Siddhirganj 4/3	418,719,370,129 4574 5234
12	7 and 9	Toward west from western part of Siddhirganj Navana Housing	2810	18	Jalkuri	1887,1572,731,678,570
13	Null	Toward South from Vangar Bridgeto Lafi Bazar/ Fakir Garment	2470	15	Godanail Dhonkunda	Null

Kadamrasul Zone:**List of Ponds**

Serial no.	Ward no.	Location of Pond	Mouza name and J.L. no.	Khotian no.	Dag no.	Amount (approx.) acre
1	19	Madanganj Doctor Chamber	Madanganj-251 'Mo'	R.S. Khotian-4	R.S. Dag no.-1684	0.4282
2	19	West of GouchDarbar	Madanganj-251 'Mo'	R.S. Khotian-11	R.S. Dag no.-830	0.5629
3	20	From East to West of Sonakanda play field	Madanganj- 'Mo' khondo and Madanganj	R.S. Khotian-11	R.S. Dag no.-1, 8, 9, 85	37+38+8+76= 1.5900
4	21	South side of Sonakanda graveyard	Anayatnagar-257	R.S. Khotian-3	R.S. Dag no-48	1.0200
5	23	Port graveyard	Gongakul port-239	R.S. Khotian-2	R.S. Dag no-6	0.6100
6	23	MoylaKhola, Graveyard Road	Port Krishnopura-238	C.S. Khotian-10, 40	56/105, 56	0.11800
7	23	Wilson road, West of Kadam Rasul play field	Nabiganj-246 'Mo'	S.S. Khotian-365	C.S. Dag no.-417 S.A- 568	0.7200
8	23	South of Ashok Ali Mridha's House (South of Bagbari Road)	Nabiganj-246 'Mo'	R.S. Khotian-4	R.S. Dag no-1514	0.2725
9	23	Kadam Rasul College, Degree City Pond	North Port Krishnopura-236	Null	R.S. Dag no-8, 32, 34	2.42200
10	23	S.I. road, South of Govt. Primary School	Nabiganj-246 'Mo'	R.S. Khotian-4	R.S. Dag no-380	0.4600

Serial no.	Ward no.	Location of Pond	Mouza name and J.L. no.	Khotian no.	Dag no.	Amount (approx.) acre
11	24	Nabiganj Road, North City Pond (Near house of Hashi)	Nabiganj-246 'Mo'	R.S. Khotian-4	R.S. Dag no-259	0.1962
12	23	South of Puli's house (West of North Noadda Road)	North Noadda-223	R.S. Khotian-3	R.S. Dag no-51	0.1100
13	24	West and South of DeuliChourapara graveyard	Deuli-222	R.S. Khotian-5	R.S. Dag no-173, 174	0.23+0.22= 0.4500
14	25	West of HelalShaheb's Cotton Mill (North of Lakshmankhola Graveyard Road)	Lakshman khola-206	R.S. Khotian-8	R.S. Dag no-1010	0.1800
15	24	LakshmankholaGraverard Road, South of Shahid Battery Mill	Lakshman khola-206	R.S. Khotian-4	R.S. Dag no-1031	0.1500
16	25	East side Ditch (near dispensary) of Lakshmankhola play field	Lakshman khola-30	R.S. Khotian-8	R.S. Dag no-176, 177, 182	0.35+0.92+0.20= 1.4700
17	25	North-west side of Lakshmankhola play field	Lakshman khola-206	R.S. Khotian-8	R.S. Dag no-181, 182	0.4000
18	26	East of City Corporation Road (Near Darbar), Beside Dhakeshwari Mill	Dhamgor-207	R.S. Khotian-9	R.S. Dag no-1945	0.3100
19	26	North side pond, East of City Corporation Road (Near Darbar), Beside Dhakeshwari Mill	Dhamgor-207 Jomi: 0.31	R.S. Khotian-9	R.S. Dag no-1937	0.1800
20	26	West side pond, East of City Corporation Road near East of Dhakeshwari Mill	Dhamgor-207	R.S. Khotian-9	R.S. Dag no-1857	0.1900
21	26	North side pond, East of City Corporation Road near East of Dhakeshwari Mill	Dhamgor-2079	R.S. Khotian-9	R.S. Dag no-1	0.3000

[Note: Serial no. 10 and 11 are dry or abandon ponds]

List of Borrow pit

Serial no.	Ward no.	Location	Mouza name and J.L. no.	Khotian no.	Dag no.	Amount (approx.) acre
1	20	Mahmudnagar graveyard	Madanganj-251 'Mo'	R.S. Khotian-4	R.S. Dag no.-686	2.3100
2	23	East of Nabiganj graveyard	Nabiganj-245	R.S. Khotian-4	R.S. Dag no.-510, 509	10.8700

List of Dry Ditches

Serial no.	Ward no.	Location	Mouza name and J.L. no.	Khotian no.	Dag no.	Amount (approx.) acre
1	20	North Noadda Road, West of 'Dila Rice Mill'	North Noadda-223	R.S. Khotian-3	R.S Dag no.-18	0.1800
2	23	North of Lakshmankhola 'Chan Miah' Diller's house	Lakshman khola-30	R.S. Khotian-3	R.S Dag no.-617	0.1700