ENVIRONMENTAL ASSESSMENT REPORT

Improvement of Answer Road by RCC Road and Drain from Kalimuddin Chairmanbari Morh to Baherarchala (Labolang Khal)

Municipal Governance and Services Project (MGSP)

Bangladesh Municipal Development Fund (BMDF)

MAY 2018

SREEPUR MUNICIPALITY, SREEPUR, GAZIPUR

EXECUTIVE SUMMARY

Introduction: Sreepur Municipality is situated within the Gazipur district at a distance about 25 km from the district headquarter and on the south-east part of the district. It is the centre of Sreepur Upazilla and located beside the Dhaka-Mymensingh highway. The Municipality is established in 2000. It is classified as a "Category B" Municipality. It is a rapidly growing industrial area. The total area of the Municipality is 48.48 sq km and consists of 4 Mouzas and 9 Wards. The total population of the Municipality is 126249 amongst which 67160 are male and 59089 are female. The total household of the Municipality is 31470. The density of the population per square kilometer is 2604.

The sreepur Municipality has been implementing different development projects. Recently, the Municipality has prepared its Capital Investment Plan (CIP) for its infrastructural development following a participatory approach with the technical assistance from Bangladesh Municipal Development Fund (BMDF) and identified the Answer Road improvement by RCC road and drain from Kalimuddin Chairmanbari Morh to Bherarchala as the first priority work (CIP No. 01) for meeting the long pending demand of road and for ensuring local and commercial traffic movement of growing commerce, industries and population, and drainage facilities of the Municipality. The estimated cost of the subproject is BDT 180 million and the duration of construction is 18 months starting in July 2018 and to be ended in December 2019.

Justification of selecting the subproject: The proposed road is one of the key roads of the Municipality and more than half of the inhabitants of the Municipality covering the people from ward number 2, 4, 5, 6, 7 and 9 moves through this road to different areas of the Municipality and out of Municipality using different local vehicles. Various industries and commercial places are also situated on the both sides of the road those are also being facing tremendous economic losses due to lack of road communication. Further, there is no drainage facility of removing rain water as well as household waste water on the right-of-way of the proposed road. The condition of removing industrial waste water facility at the both sides of the road is very poor. The proposed subproject will add significant social and economic value of the area by easing transportation facilities, decreasing transportation cost for local movement, increasing value of local land, establishing the new industries and business institutes, increasing the income opportunity of the local unemployed people and increasing house rent to be used by outsiders. Subsequently, the Municipality will be able to earn more revenue from the establishments around the subproject area.

Location of the subproject: The proposed subproject goes over the areas of Ward Number 5, 6, and 9. It is divided into two portions by Dhaka-Mymensingh High Way. The eastern part is started from Kalimuddin Chairman Bari Morh and ended at Answer road bus stand (Beraiderchala) under Ward Number 5 and 6, and the western part is started from Beriaderchala and ended at Baherarchala (Labolanga khal) under Ward number 9.

Objective of the study: The general objective of the study is to determine the major environmental impacts that might be happened due to the implementation of the subproject and to recommend possible mitigation measures to avoid or reduce identified adverse environmental impacts and to enhance positive impacts. The specific objectives include:

- Identifying existing environment condition at the sub-project areas for environmental components viz. air, noise, water, land, soil, biological and socio-economic aspects;
- Prediction and evaluation of positive and negative impacts that may result from the proposed sub-project;
- Undertaking public consultation and disclosure of project-related information;
- Formulation of an environmental management plan (EMP) to eliminate or minimize the adverse impacts of the project on the surrounding environment and affected communities;
- Preparing occupational health and safety to minimize any accident or emergency situation;
- Proposing plans for the post project monitoring, ongoing consultation and disclosure, EMP implementation, and institutional arrangement/organizational arrangement; and
- Suggestion and recommendation for abatement/mitigation/management measures to ensure environmental, biological, health and social compatibilities and also to comply with the National Environmental legal requirements and national Environmental Quality standards.

Methodology of the study: This is a qualitative study. However, both quantitative and qualitative data are collected and analyzed to achieve the objective of the study and show the baseline information of the study areas. Quantitative data are collected from secondary sources and qualitative data are collected from primary sources using different qualitative approach and methods. The approach and methods those are applied during the assessment include: (i) Consultation with stakeholders and community people; (ii) Focus Group Discussion; and (iii) Field visit and observation.

Findings of environmental impact assessment: The key environmental and social impacts, and benefits those are found and anticipated during environmental screening, field observation and community consultation are given as below:

Land use: Existing land use adjacent to the roadways will not change as a result of the subproject but the land value will be increased. In addition, the subproject will involve partial right-of-way acquisitions from residential and commercial agricultural areas.

Site cleaning work: Widening of road requires cleaning of 300 trees and removing of extension of temporary and permanent structures of some areas at the both sides of the road.

Noise level: Moderate adverse impact of noise level is anticipated to adjacent residential and commercial properties during construction works. However, change in noise levels will not exceed State regulatory thresholds at any location.

Air quality: No remarkable impact on air quality is anticipated.

Water quality: The constructed drains will carry storm water, household waste water and industrial waste water to outfall areas which have moderate impact on aquatic environment. However, the existing water quality of the outfall is badly polluted by the industrial effluents. Therefore, the impact of newly added waste water could have minor impact on it. In addition, dumping of solid wastes, household wastewater into the drain and illegal toilet connections may create pollution in the aquatic environment.

Threatened and Endangered Species: There is no threatened and endangered species in the subproject area. So, no impact is anticipated to threatened or endangered species habitat.

Drainage Congestion: Drainage congestion is minor. However, erratic rainfall may create drainage congestion for short term.

Solid waste management: Improper collection and disposal of the generated wastes materials may degrade the quality of the surrounding environment and degrade the aesthetic value.

Tribal people: No minority or tribal populations exist on site or within the immediate area and, therefore, no impacts will fall on such populations. The subproject will not adversely impact the character of the community surrounding the roadway.

Despite the above mentioned negative impacts, the subproject will bring some positive impacts which are given as below:

Transportation and traffic Safety: Substandard and narrow roadway elements will be replaced by the newly constructed RCC and widened road which will ensure smooth movement of both light and heavy motorized vehicles and reduce traffic congestion and potential crashes. Additional roadway features such as lighting, and pavement drainage will contribute to the improvements in motorized vehicles and pedestrian safety. Separate walk way will reduce the probable accident by avoiding speedy vehicle path way.

Water logging: RCC drain will improve drainage facilities and prevent the accumulation of the stagnant water on the road surface. This will prevent formation of muddy and slippery surface on the road.

Employment and income generation: The road has a positive impact on the local and regional economy due to the generation of employment opportunity and will facilitate the trade and business of the commercial and industrial institutions and people living in the different parts of the Municipality.

Conclusion and recommendations: It is concluded that the subproject is environmentally sound and sustainable. Significant improvement in quality of life and public welfare will result once the subproject is in operation. The potential environmental impacts seem very minimum and manageable, and it would be minimized by taking proposed mitigation measures. The adverse environmental impacts from the subproject will mostly take place during the construction stage. No endangered or protected species of flora or fauna are reported at the subproject site. The community people, businessmen and other stakeholders are highly towards the proposed RCC road

and drain. However, some key recommendations are made for its smooth implementation and operation is given as below:

- The condition of the road is very bad and public demand for this road is very high. The construction of the road should be started as soon as possible and should be completed within least possible time;
- Proposed environmental management plan should be implemented strictly both during operation and construction phase of the project;
- The Municipality authority should consult with the respective authority of different industries to install their own waste water treatment plant and discharge waste water into constructed drain after proper treatment;
- Compensatory plantation should be done for trees to be cut down for off-site development minimum in ratio of 1:3;
- Suggestions and recommendation made by public for design and construction of road and drain, traffic management, solid waste management and waste water discharge should be taken into consideration;
- Proper training of maintaining environment, health and safety should be given to subproject management unit, contractor and workers in both construction and operation phase;
- Environmental monitoring should be conducted as proposed in environment management plan.

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ABBREVIATION

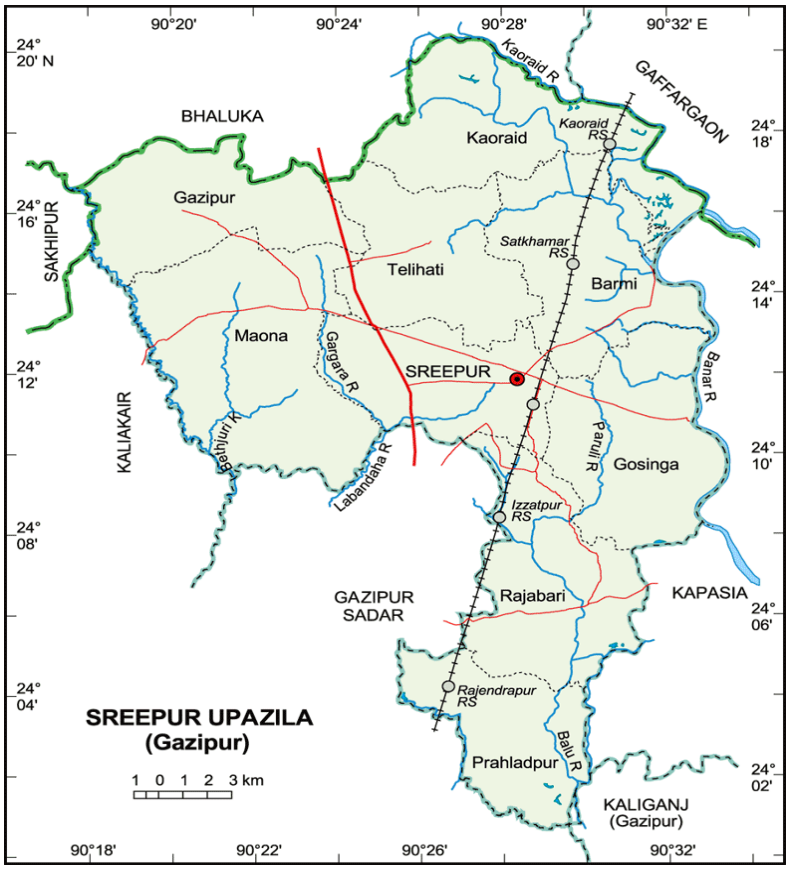
AP	Affected People
BBS	Bangladesh Bureau of Statistics
BDT	Bangladesh Taka
BMDF	Bangladesh Municipal Development Fund
BOQ	Bill of Quantity
CIP	Capital Investment Plan
DOE	Department of Environment
ECA	Environmental Conservation Act
ECoP	Environmental Code of Practice
ECR	Environmental Conservation Rules
EMF	Environmental Management Framework
EMP	Environmental Management Plan
ES	Environmental Screening
FGD	Focus Group Discussion
GOB	Government of Bangladesh
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GW	Ground Water
IUCN	International Union for Conservation of Nature
MD	Managing Director
MGSP	Municipal Governance and Services Project
NGO	Non-Governmental Organization
OP	Operational Policy
PIU	Project Implementation Unit
PMU	Project Management Unit
PPE	Personal Protective Equipment
RCC	Reinforced Concrete Cement
SPW	Supply Water
ULB	Urban Local Body
WB	World Bank

1. INTRODUCTION

1.1 Background of the Municipality and the Sub-project

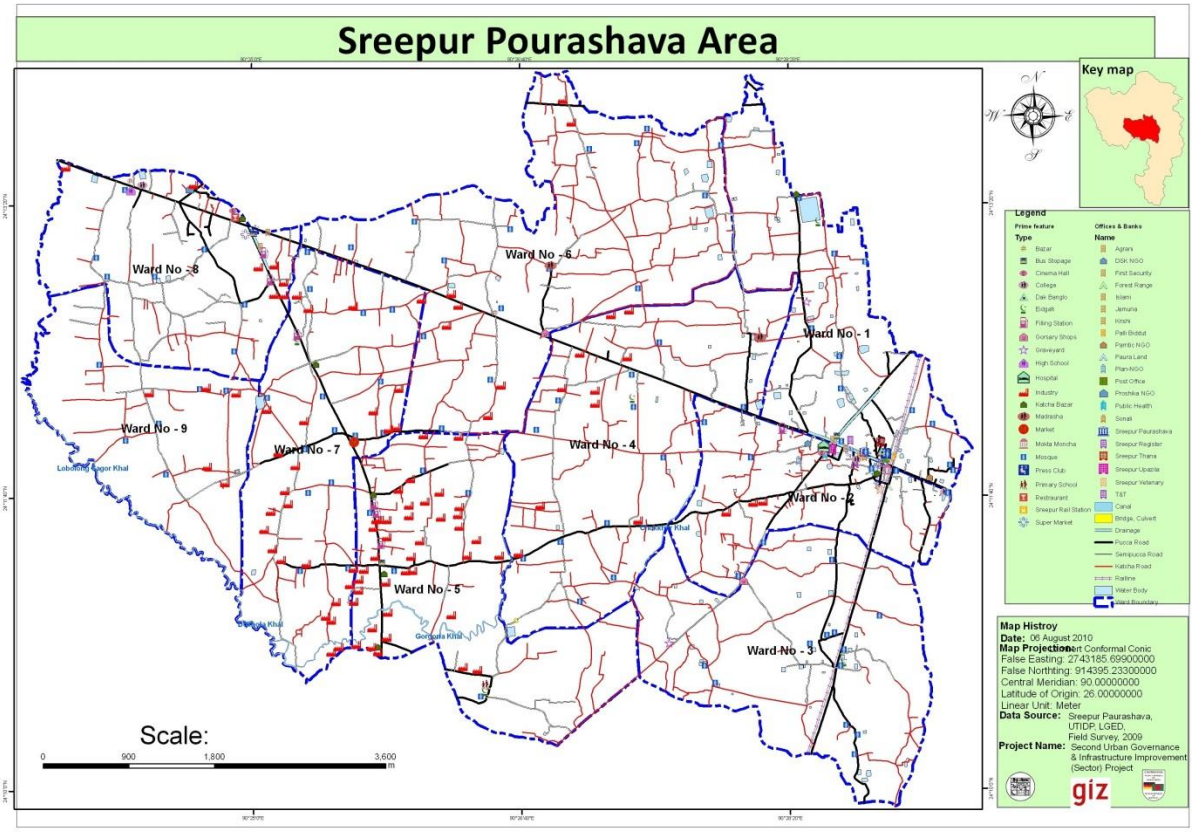
Sreepur Municipality is situated within the Gazipur district at a distance about 25 km from the district headquarter and on the south-east part of the district. It is the centre of Sreepur Upazilla and located beside the Dhaka-Mymensingh highway. The Sreepur Upazilla is located between $24^0 10'$ and $24^0 14'$ north latitude and between $90^0 23' 20''$ and $90^0 29' 35''$ east longitude. The Sreepur Municipality area is surrounded by Telihati and Barmi unions in the north, Gosigna union in the east, Maona union in the west and Gazipur Sadar Upazilla in the south. The Municipality is established in 2000. It is classified as a "Category B" Municipality. (Source: Sreepur Paurashava Master Plan: 2011 to 2031 and DPHE, 2014)

Sreepur Municipality is under development for industries and rising with high rate. There are about 88 industries, 63 livestock farms, 4 food processing industries, 4 rice mills, 7 markets, 7 banks, 3 technical colleges, 170 mosques, 3 churches, 2 government hospitals and 5 post-offices in the Municipality area. The relative importance of the town has ever been growing as a regional centre of trade and commerce. (Water Supply System Development: Volume 3 of 4, DPHE, February 2014)



Map 1: Location map of Sreepur Municipality

The total area of the Municipality is 48.48 sq km and consists of 4 Mouzas and 9 Wards. The total population of the Municipality is 126249 amongst which 67160 are male and 59089 are female. The total household of the Municipality is 31470. The density of the population per square kilometer is 2604. (Source: Population and Housing Census 2011)



Map 2: Boundary map of Sreepur Municipality

The Sreepur Municipality has implemented different development projects with the fund of Annual Development Programme allocated by the government and UGIIP-II. It has also implemented project by the fund of BMDF. Recently, the Municipality has prepared its Capital Investment Plan (CIP) for its infrastructural development following a participatory approach with the technical assistance from Bangladesh Municipal Development Fund (BMDF) and identified the "Reconstruction of RCC road and drain of Answer road from Kalimuddin Charimanbari morh to Baherarchala (Labolango Khal)" as the highest priority (CIP 01) for meeting the long pending demand of road for ensuring smooth movement of vehicles and growing population of the Municipality.

The Municipality has already submitted an application for sub-credit to BMDF seeking financial support in order to reconstruction of Answer Road and its drain at the both sides. The significant features of the subproject are given in **Table 1-1** as below:

Table 1-1: The significant features of the proposed sub-project	
Name of the Sub-Project	"Improvement of Answer road by RCC road and drain from Kalimuddin Chairman Bari Morh to Baherarchala (Labolanga Khal)".
Name of District	Gazipur
Name of ULB	Sreepur Municipality
Location of the Subproject	A part of the Answer road starting from Kalimuddin Chairman Bari Morh to Baherarchala comprising Ward number 5, 6, 7 and 9. It is located at both sides of Dhaka-Mymensigh high way.
Service Areas	All the areas under the Municipality. More specifically, the people living at Ward number 2, 4, 5, 6, 7 and 9 will frequently use the facilities.
Beneficiary Population	All the people of the Municipality will be benefitted. But the people living in Ward number 2, 4, 5, 6, 7 and 9 will be more benefitted which is more than half of the people of the Municipality.
Tribal People	No tribal people are living in the subproject influence areas.
Structural Design Option	RCC road and RCC drain at both sides of the road.
Total length and width of road and drain	The total length of the road and drain is 3.7 km. The width of the road is 8.25 meters of which 6097 mm is road and 1067 mm drain at the both sides of the road.
Land Acquisition	Mostly, Municipality owned land. However, some privately owned land will be acquired voluntarily for the expansion of the road at both sides.
Estimated Cost	BDT 94.28 millions
Subproject Duration	15 months
Tentative Starting Date	January 2019
Tentative Completion Date	March 2020

1.2 Justification of Selecting the Subproject

The proposed subproject has significant importance in internal and external communication of the citizen of the Municipality as well as drainage of household and industrial waste water. The proposed road is one of the key roads of the Municipality and more than half of the inhabitants of the Municipality covering the people from Ward number 2, 4, 5, 6, 7 and 9 moves through this

road to different areas of the Municipality and out of Municipality using different local vehicles. On the other hand, being a mixed commercial, industrial and residential areas, different people and large vehicles outside of the Municipality come to Municipality areas for carrying industrial products and goods for trade and business, and regular official and household activities using this road. Besides, the proposed road is connected with the Dhaka-Mymensingh High Way and one of the key entry and exit point of the citizens and vehicles to and from the different parts of the Upazilla, District as well as the country. But, the road is severely damaged and almost ineffectual for the movement of vehicles and people. All the people, business establishments and industries in and around the catchment areas are being affected due to the lack of functional movement of vehicles through this road.

In addition, there is no drainage facility of removing rain water as well as household waste water on the right-of-way of the proposed road. The condition of removing industrial waste water facility at the both sides of the road is very poor. Therefore, the construction of a drain at the both sides of the road is highly important for this area.

Further, the subproject has significant social and economic benefits to the community people. After completion, the road subproject will provide uniform width for the safe movement of inhabitants and vehicles which will reduce the risk of accidents. By constructing smooth road surface and footpath over the drain, it will provide better, easy and safe movement facilities for the travelers. On the contrary, new drains will minimize the drainage congestion and water logging problem. In addition, the proposed subproject will significantly enhance the business facilities and hence increase the income of the people, businessmen and industrialists. It will also add the commercial and aesthetic value of the area. Therefore, considering the benefits that will derive, the subproject is selected for implementation

1.3 Policy Legal and Administrative Framework

There are some environmental laws and regulations under the environmental legal framework of Bangladesh for environmental protection and natural resources conservation. In addition, there are also some safeguard policies of World Bank to prevent and mitigate undue harm to people and their environment in the development process. All the subprojects to be prepared and implemented under the BMDF should be in compliance with these environmental laws and policies of Bangladesh and World Bank. The proposed subproject will also be prepared and implemented in compliance with these laws and policies. The environmental laws and regulations of Bangladesh and the safeguard policies those are applicable to this subproject are given as below:

National Environmental Laws and Regulations:

- National Environmental Policy 1992
- Bangladesh Environmental Conservation Act (ECA) 1995 amended 2002
- Environmental Conservation Rules (ECR) 1997 amended 2003
- National Land-use Policy 2001

- Bangladesh Labor Action 2006
- Bangladesh National Building Code

World Bank Safeguard Policies:

- OP/BP 4.01 Environmental Assessment
- OP/BP 4.04 Natural Habitats
- OP/BP 4.11 Physical Cultural Resources

Now, as per the environmental management framework of BMDF, it is required to conduct an environmental assessment of the proposed reconstruction of road and drain subproject in accordance with the legal regulatory framework of the Government of Bangladesh and World Bank policies. Therefore, the Sreepur Municipality has deployed an individual consultant to carry out the environmental impact assessment of the proposed road and drain as a subproject.

2. OBJECTIVE AND METHODOLOGY

2.1. Objective of the Study

The general objective of the study is to determine the major environmental impacts that might be happened due to the implementation of the subproject and to recommend possible mitigation measures to avoid or reduce identified adverse environmental impacts and to enhance positive impacts. The specific objectives include:

- Existing environmental condition at the sub-project areas for environmental components viz. air, noise, water, land, soil, biological and socio-economic aspects;
- Prediction and evaluation of positive and negative impacts that may result from the proposed sub-project;
- Consideration of alternatives;
- Undertaking public consultation and disclosure of project-related information;
- Grievance redress mechanism;
- Formulation of an environmental management plan (EMP) to eliminate or minimize the adverse impacts of the project on the surrounding environment and affected communities;
- Preparing occupational health and safety to minimize any accident or emergency situation;
- Proposing plans for the post project monitoring, ongoing consultation and disclosure, EMP implementation, and institutional arrangement/organizational arrangement; and
- Suggestion and recommendation for abatement/mitigation/management measures to ensure environmental, biological, health and social compatibilities and also to comply with the National Environmental legal requirements and national Environmental Quality standards.

2.2. Scope and Methodology of the Study

2.2.1. Scope of the study

This study includes different dimensions of environmental issues those need to be considered at different stages of selecting, implementing, and operating the subproject following the environmental policies of Government of Bangladesh and World Bank. The study was conducted on the basis of proposed engineering works, field investigations, stakeholder consultation, primary and secondary data collection, screening of all baseline environmental parameters, environmental quality baseline monitoring, and review of other similar project reports in Bangladesh. The study was conducted in the month of May of the year 2018. The study covers the general environmental profile of the subproject area including physical, ecological, environmental, social, cultural and economic resources. Baseline environmental monitoring (primary data) was carried out on water (surface), and noise quality measurements. The EA includes an overview of the potential environmental impacts and their severity, and proposes necessary mitigation measures and environmental management plan for each of the identified and anticipated impacts. Three numbers of public consultations were conducted as part of the EA.

Addressing the environmental issues in this subproject includes a series of tasks carried out by the study. The scope and methods of this Environmental Assessment includes:

- Baseline Survey data acquisition of the baseline both environmental and social to carry out the Environmental Assessment;
- Understanding the technical aspects of the proposed sub-project through gathering and analyzing primary and secondary data;
- Explore the present environment condition of subproject influence areas through reconnaissance survey and in consultation with community people;
- Identification of potential environmental impacts and evaluating the consequences through using given environmental screening format;
- Categorize the pollutions that may come out during pre-construction, construction and operation phases at subproject site and surrounding areas through key informant interview and field observation;
- Discuss with the people living in the sub-project area about the mitigation measures suggested to avert the negative environmental impacts and to enhance the positive environmental impacts through stakeholders' consultations and general public consultation; and
- Assess the institutional aspects, and develop Environmental Management and Monitoring Plan for the subproject in consultation with Mayor and other PIU members, and based on the findings of the study.

2.2.2. Methods of the study

The study is qualitative in nature and different qualitative methods are used to gather information. Both primary and secondary information are collected, analyzed and used to fulfill the requirements of the study. The primary information is collected following qualitative technique as given below:

- Consultation with stakeholders and community people;
- Focus Group Discussion; and
- Field visit and observation.

Consultation with stakeholders and community people: Consultative meeting with different stakeholders such as Ward Councilors, market management committee, shop keepers, civil society members, representatives of business men, representative of association of bus, auto rickshaw and truck etc, community leaders and representative of community people is done to exercise the environmental screening using prescribed form of BMDF and filled in the screening form as per their information and opinion. Before starting the screening exercise, the participants are informed about the details of the project information and the way of implementing the subproject.

Focus group discussion: Two focus group discussion (FGD) sessions are organized separately with male community participants and female community participants, mainly the people who are residing and running business adjacent to the proposed subproject and using the road regularly to know their attitudes towards the proposed subproject, its potential impact and their feedback, and suggestions on mitigating the potential negative impacts and enhancing the positive impacts of the subproject.

Field visit and observation: Field visit and observation of different environmental features are done by the consultant to understand the overall environmental situation of the subproject areas and the potential impacts of the subproject on it during pre-construction, construction and operational stages.

In addition, some quantitative information is collected from secondary sources to complement the qualitative information. The secondary information is collected by reviewing national, district and Municipality level document and different websites.

3. SUBPROJECT DESCRIPTION

3.1. Name of the Subproject

The name of the subproject is "Improvement of Answer road by RCC road and drain from Kalimuddin Chairman Bari Morh to Baherarchala (Labolanga Khal)".

3.2. Brief Description of the Subproject

The proposed subproject will be consisted of RCC road and drain at a length of 3.7 km on the roadway of existing Answer Road from Kalimuddin Chairman Bari Morh to Baherarchala (Labolandgo Khal). The total width of the road will be 8.25 meters of which 6097 mm is road and 1067 mm drain at the both sides of the road. The drain will be constructed along all roadways on both sides of the road. The drain will be reinforced concrete slot drain with concrete cover plate. In addition, a 1220 m RCC culvert will be constructed on the Answer road.

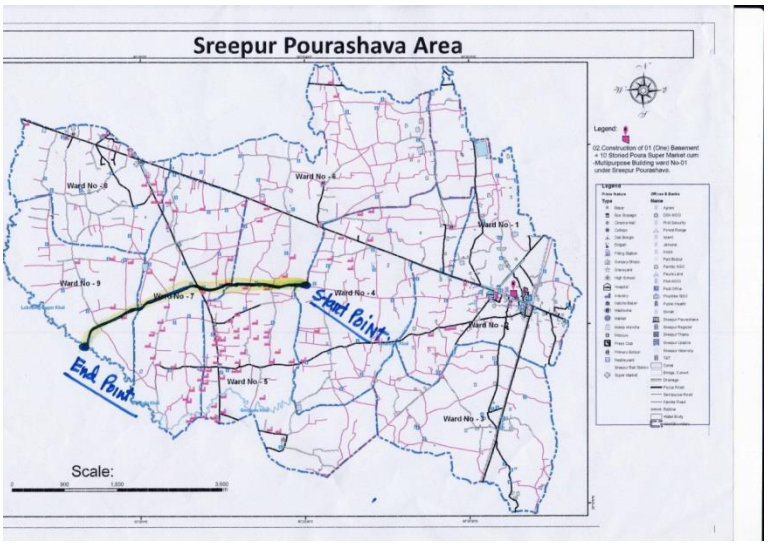
The proposed road is divided into two parts by Dhaka-Mymensingh High Way at Beraiderchala bazar of Answer road. The proposed Answer road from Kalimuddin Chairman Bari Morh to Beraiderchala (Answer road bus stand) is located at the eastern side of the Dhaka-Mymensingh High Way and from Beraiderchala to Baherar chala (Labolanga Khal) at the western side of the Dhaka-Mymensingh High Way. The portion of proposed road from Kalimuddin Chairman Bari Morh to Beraiderchala (Answer road bus stand) goes along the middle of Ward number 5 (south side of the ward) and Ward number 6 (north side of the ward) while the road from Beraiderchala to Baherar chala (Labolanga Khal) is under Ward number 9.

The subproject area consists of mixed land use pattern of commercial, industrial, administrative and residential area of the Municipality. Various commercial, industrial, social, administrative and residential areas are established at the both sides of the road. However, comparatively more industries are located at the road sides from Beraiderchala to Baherar chala (Labolanga Khal). Hence, both sides of the road remain busy round the clock due to commercial, industrial and administrative works.

The proposed subproject will be constructed on the roadway of the existing road which is owned by the Municipality. However, the proposed road will be wider than the existing right-of-way which requires acquisition of land at the both sides of the road. The acquisition of land at the both sides of the road demands voluntarily removal of different existing infrastructures.

3.3. Location of the Subproject

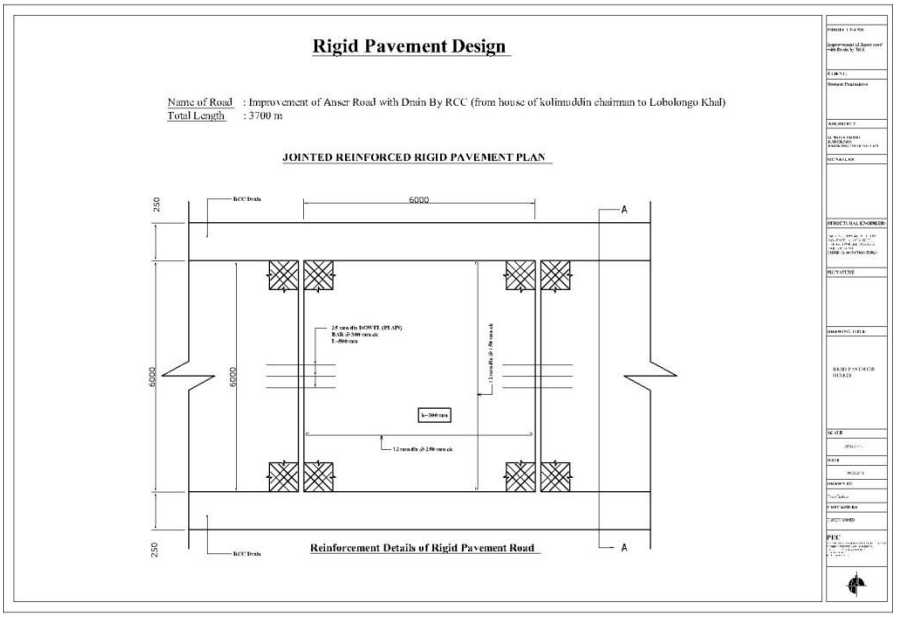
The proposed subproject goes over the areas of Ward Number 5, 6, and 9. It is divided into two portions by Dhaka-Mymensingh High Way. The eastern part is started from Kalimuddin Chairman Bari Morh and ended at Answer road bus stand (Beraiderchala) under Ward Number 5 and 6, and the western part is started from Beriaderchala and ended at Baherarchala (Labolanga khal) under Ward number 9.



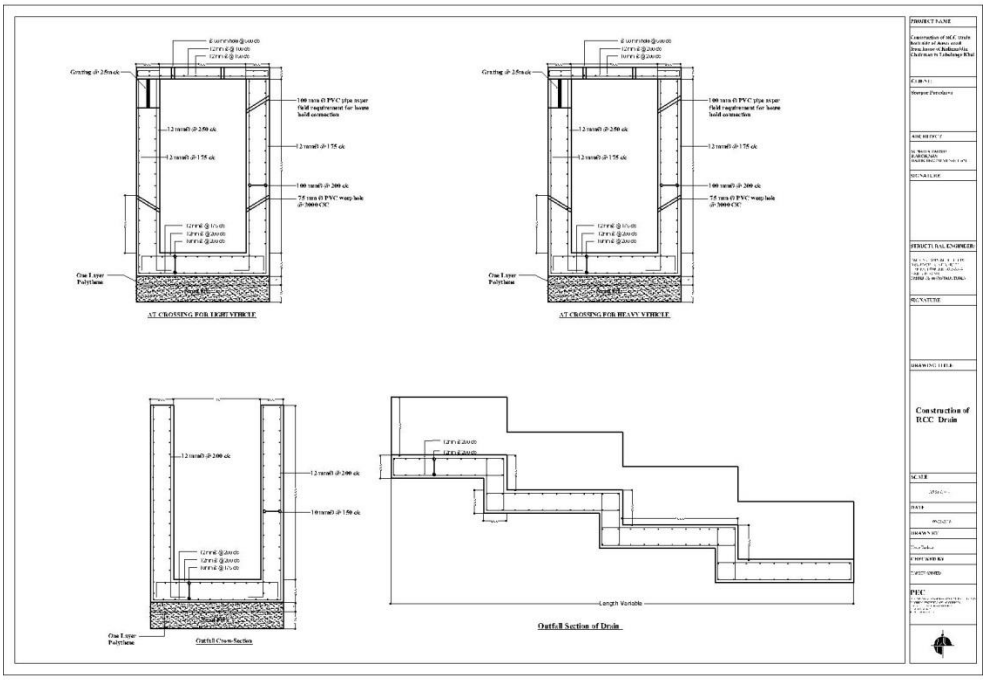
Map 3: Location map of proposed Road and Drain

3.4. Layout of the Subproject

The design of RCC road and drain is given as below:



Design 1: Design of pavement of RCC road



Design 2: Sectional design of RCC drain

3.5. Ownership of the Subproject Land

Sreepur Municipality is the legal owner of the proposed road. But, the widening of existing 20 feet road to 27 feet requires addition 7 feet land at 3.5 feet each at both sides of the road. This additional land will be acquired from the community people voluntarily. The mutual agreement between the Pourashava and respective land owners is attached in **Annexure 6**. In the Master Plan of the Municipality, the proposed width of the road is mentioned as 60 feet.

3.6. Present Condition of the Proposed Subproject's Site

The Answer road that will be improved to RCC road under this subproject is a bituminous carpeting (BC) road. But, the condition of the existing road is too bad that no BC pavement is found all over the road. Due to long time use by the heavy vehicles the BC road is severely damaged containing cracks, pot holes, edge broken and depressions. Waterlogging and melted earth are found all along the road during the field observation. Due to its damaged condition, the movement of vehicles particularly light vehicles used for carrying local people within the Municipality is remarkably decreased and the light vehicles those are passing through this road has been facing accidents due to broken of the parts and passengers are being injured. The present condition of the Answer road at different locations is shown in **Picture 1, Picture 2**, **Picture 3** and **Picture 4** here.

Picture 1: Present condition of Answer road at Kalimuddin Chairmanbari Morh (at the starting of the site)

Picture 2: Present condition of Answer road at Baherarchala (at the end of the site)

Picture 3: Present condition of Answer road at Beriaderchala area

Picture 4: Present condition of Answer road at the middle location of the road

The existing road varies 18 to 23 feet in width at different places which is not inadequate to accommodate the growing high volume of traffic and thereby causing severe traffic jams, slow movement and frequent accidents. After implementation of the subproject the problems will be alleviated and road users will be benefitted. The single lane road will be widened to 27 feet with walkway, new roads has been proposed to be RCC road from Kalimuddin Chairmanbari Rorh to Baherarchala to cater for increased traffic volume. This will reduce the accident, existing traffic congestion, reduce journey time and will also enhance the connectivity of the road network to meet the forecast economic and traffic growth targets.

On the other hand, there is no drainage facility along the existing road and adjacent areas. Hence, water stagnation on the road is a general phenomenon during the rain at any season that quickens the damage of road and hampering the normal traffic operations, daily lives and livelihood of the influence area individuals. To improve the drainage congestion, construction of new RCC drain is needed. Hence, under this subproject, the proposed RCC drain will be constructed at both side of the road in proposed areas.The storm water of the proposed rain will be discharged in to the Chhaka khal at Kalimuddin Charimanbari Morh area and Labolang Khal at Baherarchala area.

In addition, there is a culvert at Baherarchala area on the alignment of the Answer road which is in good condition.

3.7. Key Activities of the Subproject and Implementation Process

The major activities to be carried out during preconstruction phase of RCC road and drain include:

- Site cleaning and grabbing works;
- Construction of semi-pucca site office;
- Construction of separate laber shed with latrine facilities for male and female;
- Relocation of electric poles and GI poles;
- Dismantling of existing culvert;
- Removal of illegal establishment at the both sides of the road;
- Voluntarily acquisition of land for expansion of road and drain;
- Construction of temporary fence around the labor shed and stockyard; and
- Construction of pucca platform for stocking construction materials;

The major activities to be carried out during the construction phase of RCC road include:

- Loosing, leveling and dressing of the damaged BC road;
- Sand filling on the existing road bed and on the extended portions at the both sides;
- Construction of aggregated sand sub base;
- Box cutting;
- Mechanical compaction;
- Laying of polythene sheet; and
- Casting of pavement by RCC mixture.

The major activities to be carried out during the construction phase of RCC drain include:

- Earth work in excavation of the foundation;
- Pumping and bailing out of water as per requirement;
- Lying of polythene sheet;
- Sand filling for the preparing foundation bed;

- Plain cement concrete work in foundation;
- Manufacturing and placing of CC blocks;
- Fabrication of the ribbed or deformed bar;
- Reinforced cement concrete work;
- Construction of collection box or hole;
- Construction of drain slabs; and
- Placing of pavement tiles on the top of the drain.

3.8. Category of the Subproject

Environmental Screening (ES) for the RCC road and drain has been conducted with the purpose of fulfilling the requirements of Government of Bangladesh (GOB) and the World Bank (WB). Environmental Screening ensures that environmental issues are properly identified in terms of extent of negative and positive impacts. Environmental Screening Checklist, as adopted in Appendix C of the Environmental Management Framework (EMF) of the MGSP, was administered for identifying the impacts and their extents.

- According to ECR 1997: Green □ Orange A □ **Orange B** □ √ Red □ Not Listed □
- According to WB classification: **Category B** □ √ Category C □

Considering the potential environmental impacts, primarily RCC road and drain can be considered as Orange B as per ECR-97. According to the WB classification, it is of Category B.

3.9. Analysis of Alternatives

The analysis of alternatives of the proposed subproject is done with respect to site, technology, design, and operation in terms of their potential environmental impacts, and the feasibility of mitigating these impacts. It also states the basis for selecting alternative options for the component. The analysis of alternatives for the subproject components was carried out as part of the feasibility study, and has been taken forward.

(a) Analysis of the alternative routes/ alignments/ location

(i) Analysis of alternative routes/alignments of RCC road

This is a reconstruction subproject where the existing BC road will be replaced by the new RCC pavement using the same alignment. Therefore, analysis of alternatives routes/ alignment is not really applicable.

(ii) Analysis of alternative routes/alignments of RCC drain

The following three alignments given in **Table 3-1** as below can primarily be considered for alternative analysis.

Table 3-1: Analysis of alternative routes/alignments of RCC drain

Route/Alignment	Advantages	Disadvantages
Alternative 1: Both sides of the road	▪ Easier house connection ▪ Ease of construction without much disruption to traffic. ▪ Top of the drain can be used as footpath for pedestrians and hence, can reduce the risk of accidents and ensure safe movement.	▪ Two drainage lines need to be constructed ▪ It is expensive. It needs more money, area and time.
Alternative 2: Median/center of the road	▪ Single drain needs to be constructed along the median	▪ Difficult to make house connection
Alternative 3: One side of the road	▪ Single drain needs to be constructed ▪ It is suitable for single lane road	▪ Difficult to make house connections from other side of the road ▪ It is not suitable for more than single lane road.

As per sites requirement and in consultation with ULB Engineers, the **Alternative 1: Both side of the road** is recommended.

(b) Analysis of Alternative Design

(i) Analysis of alternative design of RCC road

For a road subproject, alternative designs may include asphalt road and RCC road. Through a comparative study considering the advantages of the BC road and RCC road, the consultants examined which one is feasible. General advantage and disadvantage of the BC, CC and RCC roads are shown in following **Table 3-2**.

Table 3-2: Analysis of alternative design of RCC road

Design Alternatives	Advantages	Disadvantages
Alternative 1: Bituminous Carpeting (BC) Road	▪ Low Construction cost ▪ Provide smooth surface ▪ Aesthetic value is high	▪ Frequency of maintenance is relatively high; ▪ Early damaged in heavy rainfall

Alternative 2: CC Road	▪ Do not require frequent repairing like BC roads. ▪ Durability is more than BC road but less than RCC road	▪ Concrete roads do not require frequent maintenance but if damaged the whole concrete slab needs to be replaced. ▪ Costly higher than BC road
Alternative 3: RCC Road	▪ Capacity of passing heavy loaded vehicles ▪ RCC road is not damaged in heavy rainfall ▪ Frequency of maintenance is relatively low.	▪ High construction cost ▪ Provide relatively less smooth surface

Bituminous Carpeting road provides comparatively smooth surfaces which have more aesthetic value than rough surface that provided by RCC and CC road. The provision of the further expansion of the utility services for instance water supply line, gas line etc is also easier for BC road. However, from environmental and capacity point of view, RCC and CC road is more feasible and less prone to damage and requires low frequency of maintenance. Therefore, considering the environmental and capacity value of RCC road, chance of damage, frequency of maintenance and as a whole to meet the Municipality demands as industrial area, **Alternative 3: RCC road** is recommended in consultation with the ULB Engineers.

(ii) Analysis of alternative design of RCC drain

For a RCC drain subproject, alternative designs may include RCC drain, earthen drain and pipe drain. The following **Table 3-3** discusses the general advantages and disadvantages of RCC drain, earthen drain and pipe drain.

Table 3-3: Analysis of alternative design of RCC drain

Design Alternatives	Advantages	Disadvantages
Alternative 1: RCC drain	▪ Not prone to encroachment ▪ Area above RCC drain could be used as a part of road/footpath ▪ Comparatively durable ▪ Easier to maintenance	▪ Higher cost of construction

Alternative 2: Earthen drain	▪ Less construction cost	▪ Need more land for construction of open earthen drain ▪ Prone to encroachment, disposal of solid waste/ debris ▪ Comparatively less durable
Alternative 3: Pipe drain	▪ Require less time to construction ▪ Comparatively durable	▪ Maintenance is difficult

Considering the use of the top of RCC drain as footpath, it's durability and scope of maintenance Alternative **1: RCC drain** is recommended in consultation with ULB Engineers.

(c) Analysis of Alternative Technologies/Methods of the Construction

Method of the construction should be selected based on the available technologies in Bangladesh and with the assistance of the consultant and the Pourashava Officials. However, to minimize occupational health and safety risks and for effective use of the human labors, it is highly recommended to adapt mechanical system where possible for instance concrete mixer machine for casting, mechanical vibrator machine, and other electro-mechanical equipment as per requirement. From the field investigation, it is revealed that, the existing road width is not enough to use the mechanical excavator. Hence, it is recommended to use manual trenching work for these sites.

3.10. Estimated Cost of the Subproject

The estimated cost of the proposed RCC road and drain is BDT 180 million.

3.11. Schedule of Implementation

The proposed subproject will be started on July 2018 and will be completed by the end of December 2019. Therefore, the subproject will be implemented within a period of 18 months.

4. BASELINE ANALYSIS OF ENVIRONMENTAL CONDITION

4.1. Physicochemical Environment

4.1.1.Important environmental features

Important environmental features in influence areas (both sides of the proposed road and drain) were observed and documented through field investigation. The detail investigation and assessment were made on identified key environmental and infrastructural features at the both sides of the proposed road and drain and the investigation findings shows that there are trees, open lands, ditches, educational institutes, shops, industries, electric poles and markets. The land use pattern of the influence areas was also observed and found human settlement, offices, commercial establishments, industrial establishments, health care facilities, educational institutions, and water bodies as depicted in **Table 4-1** as below. As an essential ingredient, an engineering and topographical survey was done that may need to be adjusted minor during the construction phase.

Table 4-1: List of key environmental and infrastructural features at the both sides of the proposed road and drain

Chainage (in meter)	Left side	Right side	Key environmental and infrastructural features
Location: Answer Road (From Kalimuddin Chairman Bari Morh to Baherarchala Bazar at the East side of Dhaka-Mymensingh High Way)			
0-100		√	Shops (7) and Trees (14).
	√		Shops (12), Trees (6), Electric poles (5), Factory, Septic tank, and Madrasha.
101-200		√	Market (1), Residence, Factory of S.M. Group and Trees (8).
	√		Grave yard (1), Mosque (1), Trees (2), Shops (10), Electric poles (3), Barren land, and Residence.
201-300		√	Market (1), Factory of S.M. Group, Temporary shops and Trees (6).
	√		Factory (1), Markets (2) and Electric poles (6).
301-400		√	Temporary shops, shops (2) and Trees (10).
	√		Shops (7), Trees (9), and Electric poles (3).
401-500		√	Market (1), Temporary shops, shop (1), residence, Bamboo bush (1) and Tree (1).
	√		Electric poles (5), Trees (2), Shops (20) and Residence.

501-600		√	Factory of Meghna and Denim Groups, Factory of Lijim Group, Temporary shops, and Electric poles (3).
	√		Market (1), Grave yard (1) and Shops (7).
601-700		√	Electric poles (3), Temporary shops, Barren land, Residence, and Shops (12).
	√		Shops (25), Electric poles (4) and Tree (1).
701-800		√	Electric poles (2), Shops (16) and Trees (9).
	√		Mosque (1), Electric pole (1), Trees (8) and Shops (9).
801-900		√	Shops (20), Electric poles (3) and Tree (1).
	√		Shops (11), Residence, Barren land, Trees (3) and Electric pole (1).
901-1000		√	Residence, Shops (11) and Trees (16).
	√		Factory (1), Electric poles (4), Shops (15) and Trees (3).
1001-1100		√	S.K. Sweaters Ltd., and Electric poles (2).
	√		Shop (1), Residence, Trees (9), Barren land, Electric poles (2) and Temporary shops (8)
1101-1200		√	S.K. Sweaters Ltd, Shops (7), Temporary shops (3), Electric pole (1), Residence (1) and Trees (4)
	√		Grave yard (1), Trees (7), Electric poles (3) and Shops (8).
1201-1300		√	Barren land, Electric poles (3), Shops (11) and Trees (5).
	√		Multi-storied building (1), Shops (6) and Under construction multi-storied building (1).
Location: Answer Road (From Beraiderchala to Culvert of Baherarchala at the West side of Dhaka-Mymensingh High Way)			
1301-1400		√	Electric poles (5), Shops (17) and Trees (6).
	√		Shops (19), Residence and Electric poles (3).
1401-1500		√	Shops (14), Residence, Electric poles (3) and Tree (1).
	√		Shops (13), Residence and Electric poles (3).
1501-1600		√	Factory (1), Shops (3), Electric poles (4) and Trees (2).
	√		Shops (4), Residence, Electric poles (4) and Trees (8).

1601-1700		√	Trees (5), Electric poles (4) and Shops (7).
	√		Residence, Electric poles (2) and Trees (4).
1701-1800		√	Shamin Residential Building, Electric poles (4), Electric Transmitter (1) and Trees (5).
	√		Residence, Electric poles (3) and Tree (1).
1801-1900		√	Electric poles (4), Shops (2) and Tree (1).
	√		School (1), Shops (16), Residence, Trees (6) and Electric poles (4).
1901-2000		√	Factory (1), Bamboo bush (1), Shops (2), Electric poles (3) and Trees (2)
	√		Shops (6), Trees (8), Electric poles (2) and Residence.
2001-2100		√	Residence, Shops (11) and Electric poles (3).
	√		Residence, Shops (4), Electric poles (6), Grave yard (1) and Tree (1).
2101-2200		√	Shops (13), Trees (3), Residence and Electric pole (1).
	√		Residence, Electric poles (4), Shops (16) and Trees (8).
2201-2300		√	Market (1), Electric poles (4), Trees (3), Bamboo bush (1), Pond and Shops (7).
	√		Residence, Shops (12), Electric poles (4), Factory (1) and Tree (1).
2301-2400		√	Shops (3), Electric poles (5), Grave yard (1), Kitchen market (1), Mosque (1) and Temporary shops (2).
	√		Residence, Shops (30) and Electric poles (4).
2401-2500		√	Asowad Composite Factory, Generator pipe of the factory, and Electric poles (2).
	√		Residence, Shops (25), Factor (1), Electric poles (6) and Water bodies.
2501-2600		√	Pond (1), Eidgah Math, Culvert (1) and Trees (4).
	√		Water body, Culvert (1), Trees (15) and Barren land.
2601-2700		√	Eidgah math, Electric poles (2) and Trees (9).
	√		Factory (1), Trees (8) and Electric poles (3).
2701-2800		√	Trees (17), Barren land and Electric poles (3)

	√		Electric poles (3), Trees (6), Temporary shops (3) and Residence.
2801-2900		√	Electric pole (1), Residence, Shops (2) and Trees (7).
	√		Electric poles (2), Trees (17), Shops (10) and Residence.
2901-3000		√	Takowa Factory, Shops (12), Temporary shop (2), Electric poles (3) and Trees (8).
	√		Electric poles (5), Takuwa Factory, Jammuna Bank, ATM Booth, Residence and Tree (1).
3001-3100		√	Residence, Takuwa Factory, Tree (1), Electric poles (4) and Shops (4).
	√		Electric poles (2), Shops (18), Trees (4) and Residence.
3101-3200		√	Shops (26), Temporary shops (1) and Electric poles (5).
	√		Electric poles (3), Shops (8), K.T. Dying Factory, Grave yard (1), Residence, and Trees (7).
3201-3300		√	Trees (6), Electric poles (4) and Shops (21).
	√		Electric poles (5), Shops (10) and Trees (6).
3301-3400		√	Shops (7), Electric poles (5), X-Ceramics Factory (1) and Tree (1).
	√		Electric poles (3), Trees (3), Barren land and filled in land.
3401-3500		√	Electric poles (4) and X-Ceramics Factory.
	√		Shops (8), Electric poles (5) and Residence.
3501-3600		√	X-Ceramics Factory, Electric Poles (5) and Trees (5).
	√		Shops (6) and Electric poles (6) and Barren land.
3601-3700		√	Vintage Denim factory and Electric poles (2).
	√		Factory (1), Shops (2) and Electric poles (2).

The infrastructures and trees those are on the right-of-way of the road should be removed and cleaned before starting the construction activities.

4.1.2. Transportation facilities, road network and traffic volume

Railway and road are the major mode of transportation in the Municipality. There is no waterway within the Municipality and its surrounding areas. Sreepur Municipality is well connected with national railway network. The railway track passes through the eastern side of the Municipality. A total of 5323.75 meters railway track found in the Municipality areas. (Source: Master Plan 2011-2031 of Sreepur Municipality).

The total length of the road network of the Municipality is 240.50 km amongst which 25 km are bituminous carpeting road, 1.5 km are cement concrete road, 99.5 km are brick soiling called herring bone bond road, 107.5 km are katcha road called earthen road and 7 km are footpath. Besides, Dhaka-Mymensingh highway runs through the Sreepur Municipality area.

Both motorized and non-motorized vehicles are operated in all the roads of the Municipality. The motorized vehicles are mostly intercity passenger buses, and trucks and lorry, mainly carry agro and industrial products. In addition, CNG driven auto rickshaws, private cars, motorcycles and battery-engine driven rickshaws are operated within the Municipality areas to meet the local demand. The non-motorized vehicles mainly man-driven rickshaws and vans are operated mainly short distance and meet the local demand for carrying passengers and goods. (Source: Master Plan 2011-2031 of Sreepur Municipality)

A traffic volume study is conducted at the proposed Answer road areas at some specific intersections or points namely kalimuddin Chariman Bari Morh, Beraiderchala (Answer road bus stand at the east side of the Dhaka-Mymensingh highway), Beraiderchala (West side of the Dhaka-Mymensingh highway) and Baherarchala Nuton Bazar Morh from which the vehicles are enter and exit to determine the number, movements and classification of roadway vehicles. The study reveals that a significant number of vehicles move through the proposed road and of which mostly are motorized. The motorized vehicles include both light and heavy vehicles. The heavy vehicles namely truck, dump truck and lorry carry huge load at a maximum of 90 tons. These heavily loaded vehicles will cause damage of the road. Hence, the road should be design in such a way that it can bear the maximum reported load. The findings of the study are given in **Figure 1, Figure 2, Figure 3** and **Figure 4** as below:

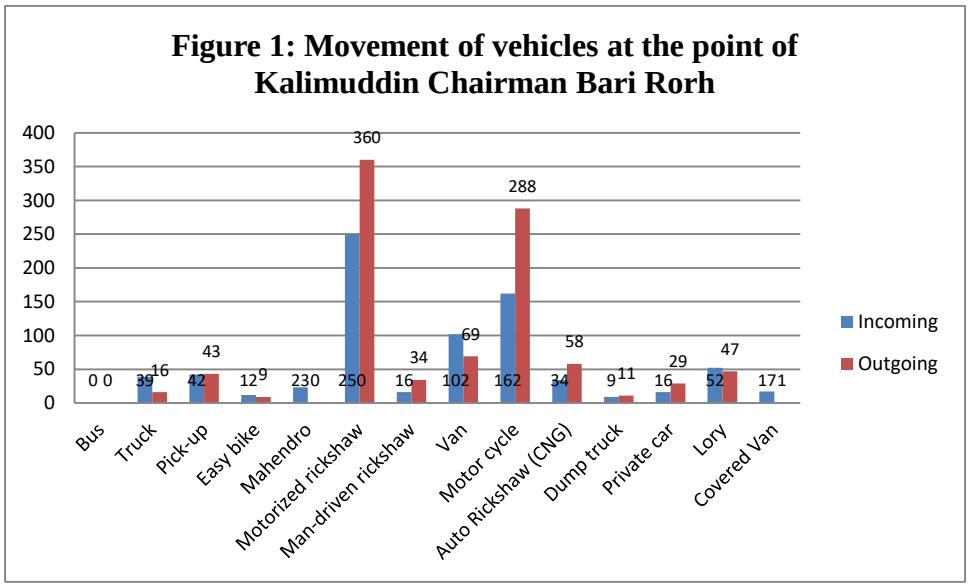


Figure 1 shows that a total of 774 times incoming and 965 times outgoing movements of both motorized and non-motorized vehicles happened per day through Kalimuddin Chairman Bari Morh.

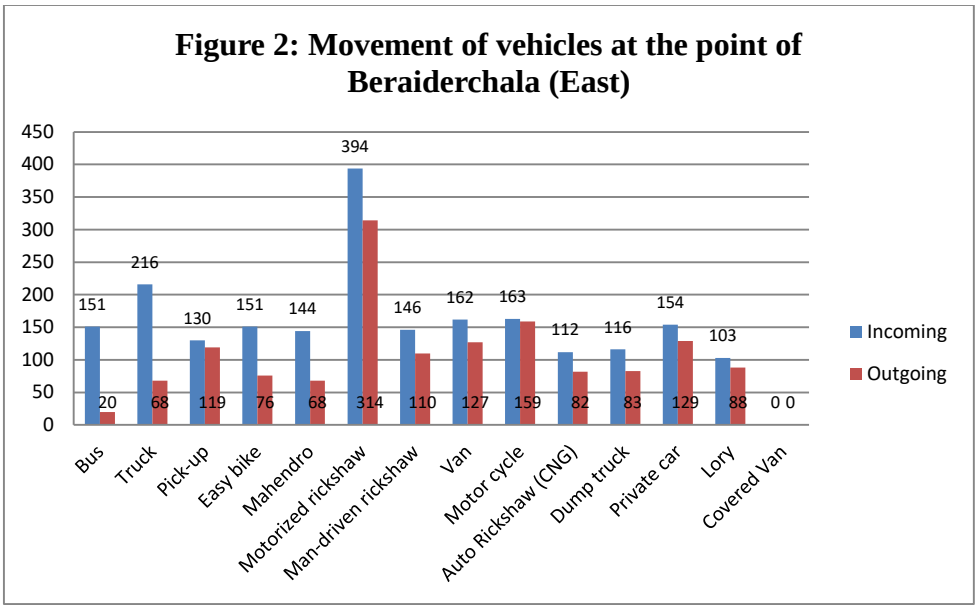


Figure 2 shows that a total of 2142 times incoming and 1443 times outgoing movements of both motorized and non-motorized vehicles happened per day through Beraiderchala (Answer road bus stand) (at the east side of the Dhaka-Mymensingh highway).

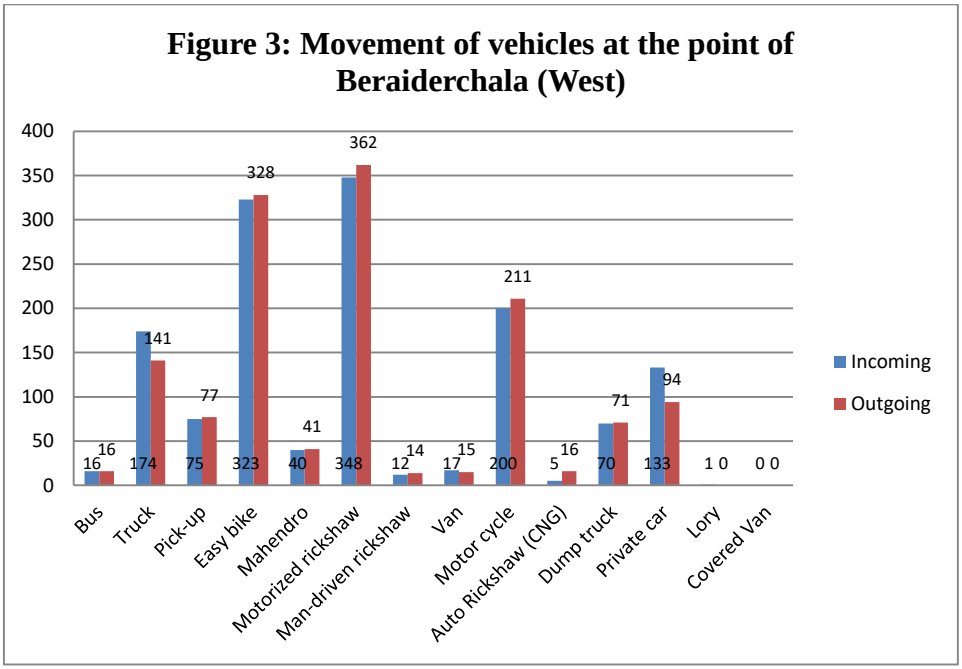


Figure 3 shows that a total of 1414 times incoming and 1386 times outgoing movements of both motorized and non-motorized vehicles happened per day through Beraiderchala (Answer road bus stand) (at the west side of the Dhaka-Mymensingh highway).

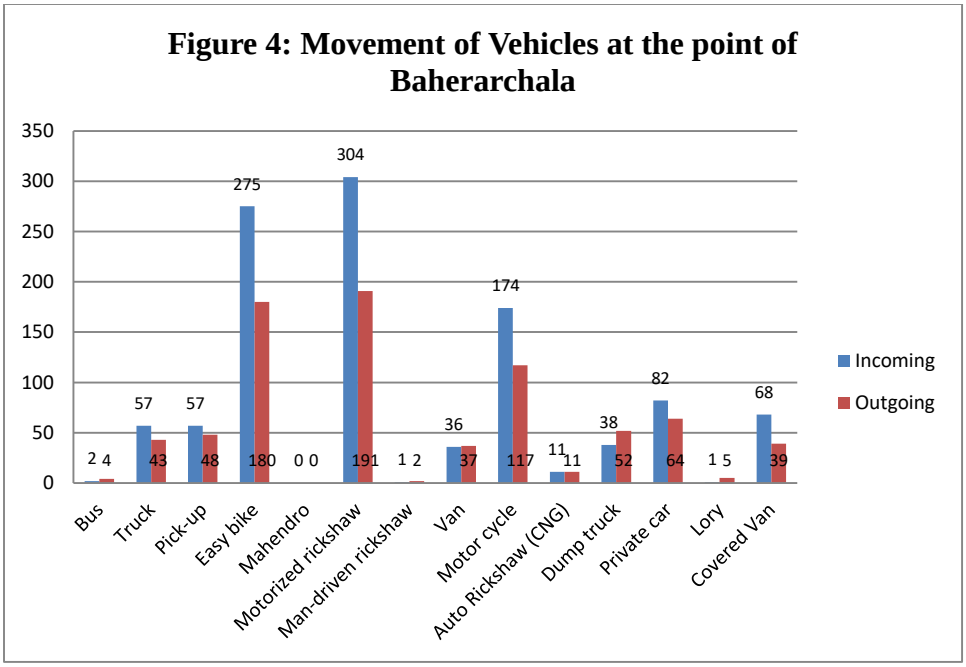


Figure 4 shows that a total of 1106 times incoming and 793 times outgoing movements of both motorized and non-motorized vehicles happened per day through Baherarchala Nutan Bazar Morh.

In addition, consultation with community people reveals that the movement of vehicles through the proposed road at the day of study is much less than the actual movement of vehicles. It is anticipated that five times more movement of vehicles will be happened after the construction of the road.

4.1.3. Climate

The Sreepur Municipality area experiences the Indian Ocean Monsoon climate. The area experiences four meteorological seasons: Pre-monsoon (March to May), Monsoon (June to September), Post-monsoon (October to November) and Dry (December to February).

4.1.3.1. Temperature, rainfall and humidity

The maximum temperature in the year is reached between the last week of March and the end of April. In June, there is a marked fall in the temperature because of the commencement of monsoon season. From October, the temperature begins to decline. In January, minimum daily values become below 10^0C, while, In April, maximum daily temperature in the region can often exceed 35^0C. Average temperature range is between 25^0C to 31^0C.

Average annual rainfall in Sreepur area is in the range of 1700 to 2200 mm. About 70 percent rainfall occurs during the period from June to September. Average humidity remains at 80 percent to 90 percent. (Source: Water Supply System Development: Volume 3 of 4 of Final Report of Sreepur Pourashava, DPHE, February 2014)

4.1.3.2. Occurrence of flood and river erosion

The area of Sreepur Municipality is comparatively high lands. Only 7% land of the Municipality is flooded while the rest of the land is flood free. The flooded areas are in the plains along the khal system. The average year flood level at the Municipality is estimated to 10.94 mPWD.

There is no river within the Municipality area. The nearest river, named Lakhay river is 9.5 km far from the Municipality. Hence, there is chance of erosion at the Municipality due to river. (Source: Drainage, Sanitation and SWM: Volume 4 of 4 of Final Report of Sreepur Pourashava, DPHE, February 2014).

4.1.4. Topography and drainage

The land elevation of the Sreepur Municipality effectively ranges between 8.04 mPWD and 16.94 mPWD. It is assessed that 3% land of the Municipality is below 9.71 mPWD while 10% , 19%, 28%, 37%, 49%, 69% and 89% of the land are below 11.93 mPWD, 13.05 mPWD, 13.60 mPWD, 14.16 mPWD, 14.71 mPWD, 15.27 mPWD and 15.82 mPWD respectively.

The use of present Municipality area can be broadly divided into lands for agricultural (12%) and non-agricultural (88%) use. Major settlements are located in Ward No. 1, 2, 6, 7 and 8 with some scattered settlements in Ward No. 3, 4, 5 and 9.

There is no river flow through the Sreepur Municipality. The Lakhay river flows off the east of the Municipality from north to south direction. It is about 6 km from the core area of the Municipality.

There are three khals named Labolang Sagar, Maricha Khal and Chokkar Khal. The Labolang Sagar flows from west to south direction along the west and south boundary of the Municipality.Other two khals flow inside the Municipality towards south direction. These two khals meet Labolang Sagar and finally it routes to Turag river. These khals are very important for the drainage of the Municipality. (Source: Drainage, Sanitation and SWM: Volume 4 of 4 of Final Report of Sreepur Pourashava, DPHE, February 2014).

The Municipality has only 17.75 km long drain amongst which 4 km, 3 km and 10.75 km are primary, secondary and tertiary drains respectively. Most of the drain is narrow. These existing drains are not enough to carry storm and domestic waste water. (Source: Municipality Data, 2018)

4.1.5. Geology and soil

Sreepur Upazilla is under the physiographic unit of Madhupur Tract. It is situated between the courses of the Old Brahmaputra and the Jamuna Rivers. The area belongs to a Pleistocene terrace consisting of mainly of red colored and mottled clay. Madhupur Tract is isolated circular to elongated low hillocks standing at a higher level than the surrounding flat alluvial plain and is affected by a series of faults. It is characterized by plateau-like hillocks varying in height from 9 to 18.5 m and a dendritic drainage pattern, typical to all Pleistocene terraces in Bangladesh. Surface

geology is consisted of sedimentary rocks originated by riverine processes. (Source: Water Supply System Development: Volume 3 of 4, DPHE, February 2014)

The red lateritic soils are the major soil type of the Sreepur area. The soils of this tract have clayey texture and contain large quantity of iron and aluminum, which are highly aggregated. The pH value ranges from 5.5 to 6.0 in the top soil. The soils are deficient in organic matter, nitrogen, phosphate and lime. (Source: Islam and Islam, 1956)

4.1.6. Hydrology and water resources

Hydrology parameters of the Sreepur area are governed by the litho-stratigraphic and prevailing tectonic activities, which is the part of regional hydrogeological setting and tectonic features. The aquifer systems are generally thick multilayered with low transmissivity and storage coefficient. The aquifer systems can broadly be distinguished in the area is recent sands forming both semi confined and confined aquifer. The productive aquifer is present from 189 m to 207 m. The productive aquifer varies from place to place. In some areas, the thickness of aquifer decrease because of some clay and fine sand lens.

4.1.7. Air quality and dust

Air quality data of the sub-project area is not readily available. However, from visual observation of air condition seems to be clear in the subproject area. The profile of the Municipality is mainly urban area, which has mix of semi-densely settlements and commercial areas. Some major industrial activities are also reported in the study area. However, the possibilities of air pollution from the industries are insignificant as there is no notable amount of air polluting industries in the subproject area. The major sources of air pollution noted within the study area include normal vehicular pollution in roads as well as commercial activities, and domestic emissions. Moreover, to evaluate the existing condition of air quality contractor will perform the air quality test prior to construction. Following **Table 4-2** shows the Bangladesh National Ambient Air Quality Standard comparing the WHO Guideline standard.

Table 4-2: Bangladesh National Ambient Air Quality Standard comparing the WHO Guideline standard

Parameter	Environmental Conservation Rules,1997				WHO
	microgram/m^3				
	Industrial	Commercial and Mix use	Residential and Rural area	Sensitive area	
SPM	500	400	200	100	-
PM 2.5	65				10
PM10	150				20

SO_2	120	110	80	30	20
NO_2	100	100	80	30	40
Pb	.5				

4.1.8. Noise level

The purpose of ambient noise level measurement is to determine sound intensity at the different locations along the road alignment. Noise level measurement is performed during daytime with a calibrated noise level meter (Extech HD-600). 2-minutes continuous noise level measurements are carried out at the selected locations in 'A' weighting and slow response mode with 1 sec interval, and the equivalent noise levels (Leq) as well as the maximum noise levels (L_{max}) are determined. **Table 4-3** shows the summary of noise level measurements carried out in different locations. It also shows the Bangladesh noise level standards for mixed areas.

Table 4-3: Noise level measurements during day time at selected locations of the proposed road and drain

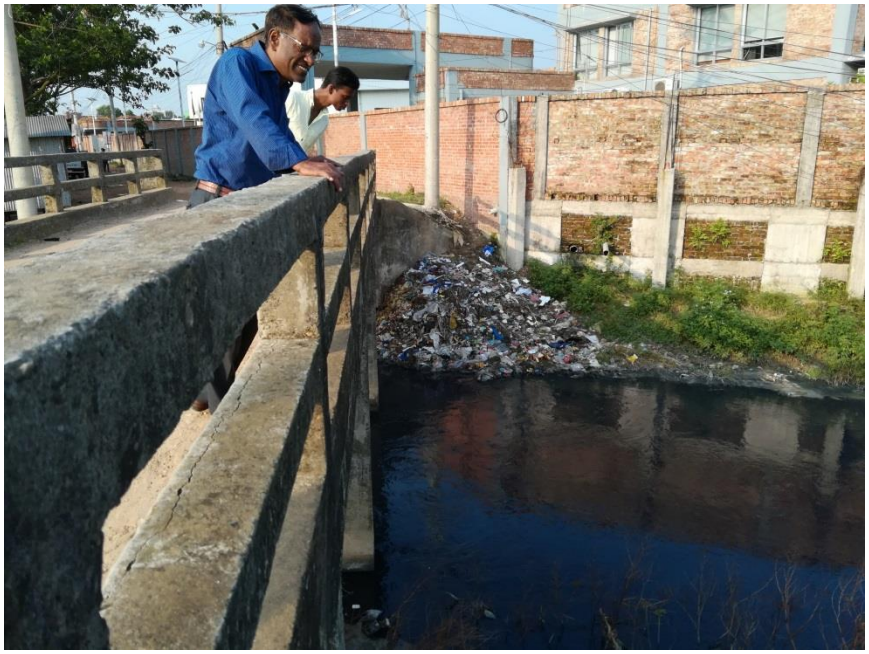
Location of noise level measurement	GPS Co-ordinate	Day-time		Bangladesh standard for mixed area (dBA),L_{max} (GoB 2006)
		Equivalent Noise level (dBA),L_{eq}	Maximum Noise level (dBA),L_{max}	
Kalimuddin Chairmanbari Morh	$23^0 48' 29.1''$ N $90^0 26' 9.5''$ E	56.8	70.3	60
Probriddhi Apparels ltd, Kewa, Channapara	$24^0 12' 1.8''$ N $90^0 25' 47.9''$E	58.4	73.5	60
S.K. Sweaters Ltd, Beraiderchala	$24^0 12' 1.8''$ N $90^0 25' 30.3''$E	75.4	87.8	60
Answer Road Bus Stand (East side of Dhaka-Mymensingh High Way), Beraiderchala	$24^0 11' 59''$ N $90^0 25' 23''$E	69.2	82.7	60
Answer Road Bus Stand (West side of Dhaka-Mymensingh	$24^0 11' 23.1''$ N $90^0 25' 21.5''$E	68.7	87.4	60

High Way), Beraiderchala				
Abed Ali Girls High School, Beriadershala	$24^0 11^/ 58.9^{//}$ N $90^0 25^/ 22.2^{//}$E	75.5	82.3	60
Shamsuddin Master Super Market, Baherarchala	$24^0 11^/ 46.6^{//}$ N $90^0 24^/ 40.1^{//}$E	67.2	73.6	60

Source: Field Survey, May 2018

4.1.9. Water Quality

There are some ponds and low lands at the surrounding areas of the subproject. All the ponds are man-made and used for fishing, water supply and domestic uses. In addition, there is a khal named Labolang khal adjacent to the subproject area which is the main discharge point of the proposed drain.



Picture 5: Present color of water at Labolang khal (the outfall of the drain)

The water of the Labolang Khal is badly degraded due to disposing industrial effluents into the khal through drain. There is a river named Lakhya which is the nearest river of the Municipality and 11 km far from the Municipality office. The distance of Lakhya river from the Municipality makes the river un-economic surface water source. There are significant numbers of industries observed near the subproject areas which are the remarkable source of water pollution. It is noted

that the water quality of the outfall has already been contaminated by untreated discharge of the industrial effluent. Hence, the anticipated impact on the aquatic environment from the discharge of the storm water of the proposed drain is minor. (Source: Water Supply System Development: Volume 3 of 4 of Final report of Sreepur Pourashava, DPHE, February 2014). The present surface water condition at the Labolang khal is shown in the **Picture 5**.

The groundwater quality results that was tested by DPHE, in February 2014, during Production Tube Well construction of Sreepur Pourashava is given in **Table 4-4** as below:

Table 4-4: Groundwater quality of GWM project production well at Sreepur Municipality

Parameters	**Fe**	**Mn**	**As**	**CI**
Allowable limit	0.3-1.0 mg/l	0.1 mg/l	0.05 mg/l	150-600 mg/l
Measured	<LOQ	0.1	<LOQ	10

4.2. Biological Environment

4.2.1. Floral habitat and diversity (terrestrial and aquatic)

Various types of agricultural crops are grown in the district. Among cereal crops, boro covers the largest area followed by aman, aus and wheat mixed aus and aman are also grown. Other crops include jute, mesta, mustard, vegetables and spices, sesame, sugarcane, pineapple, (*Ananas comosus*), guava (*Psidium guajava*) etc. Jack- fruit (*Artocarpus heterophyllus*) is extensively grown and is an important cash crop. A wide variety of trees, shrubs and thickets of bamboos and bananas and form the groves that surround the village homestead.

Homestead agricultural plots and forests are closely interspersed and it appears that the forest is rapidly disappearing because of lumber poaching and conversion of forest lands into agricultural plots. The Madhupur tract (*Bhawal Garh*) is dominated by coppice sal (shorea robusta), *garjan*, (Dipterocarpus turbinatus) covering about 80% of the tree stands in association with sheel koroy (*Albizzia procera*), kadam (*Anthocephalus cadamba*), ajuli (*Dillenia pentagyma*), jarul (*Legerstroemia speciosa*), banian tree (*Ficus benghalensis*), ashwatha (*Ficus religlosa*), bahera (*Terminalia bellirica*), haritaki (*Terminalia chebula*), black berry (*Syzygium cumini*) etc. The middle canopy comprises of neem (*Azadirachta indica*), kanchan (*Bauhinia variegate*), sonalu (*Cassia fistula*), minjiri (*Cassia siamea*), kumbhi (*careya arborea*), mango (*Mangifera indica*), amra (*Spondias mangifera*). Amloki (*Phyllanthus emblica*), bonboroi (*Zizyphus rugosa*), sinduri (*Mallotas philippensis*), ashoka (Saraca indica), sheora (Streblus asper), gab (Diospyros precatorius), mahaneem (*Garuga pinnata*), etc. The lower canopy and the climbers-cum-lianas are composed of spatholobus roxburghii, gila entada pursaetha, kul (Zizyphus mauritiana), kumarika (*Smilax aspera*), gach alu (*Dioscorea sp*), babul (*Acacia arabica*), wood (*Fordia fruticosa*), bamboo (*Bambusa sp*.), sotthi (*Curcuma zedoaria*) etc. In the poorer forested areas there are large tracts with koroy as the main

species and an under growth of kurchi, akanda, mankata (*Randia dumetorum*), thatch grass (*Arundinacea cylindrica*) and mimosa pudica. Furthermore, some aqua plants like lotus (*Nelumbo nucifera*), few species of waterlily (*Nymphaea nouchalia*), various hydrophytes and the weed known as water hyacinth (Telanthera philoxeroides), etc. are commonly seen in different ponds, ditches and shallow water bodies of this area. (Source: District Statistics 2011 of Gazipur)

4.2.2. Faunal habitat and diversity (terrestrial and aquatic)

Mammals: With the ruthless destruction of forests in the Modhupur tract (Bhawal Garh), most of the wild animals have disappeared from this area. However, some animals belonging to mammalian fauna are still found in the Gazipur district. They are rhesus monkey (*Macaca mullata*), wild boar (*Sus scrofa*), hispid hare (*Caprolagus hispidus*), jungle cat (*Felis chaus*), flying fox (*Pteropus giganteus*), shortnosed fruit bat (*Cynopterus spinx*), jackal (*Canis aureus*), common otter (*Lutra perspicillata*), common mongoose (*Herpestes edwardsi*), house mouse (*Musmusculus*), common house rat (*Bandicota bengalensis*), Indian porcupine (*Hystrix indica*), etc.

Birds: Different species of birds that are commonly found in this district are little cormorant (*Phalacrococan niger*), pond heron (*Ardeola grayii*), white breasted water hen (*Amaurornis phoenicurus*), spotted dove(*Streptopelia chinensis*), redbreasted parakeet (*Psittacula alexandari*), roseringed parakeet (*Psittacula enpatria*), koel (*Eudynamis scolopacea*), spotted owlet (*Athene brama*), barn owl (*Tyto alba*), house swift (*Apus affinis*), whitebreasted kingfisher (*Helcyon smyrnensis*), green bee-eater (*Merops orientalis*), lesser golden backed wood pecker (Picus *myrmecophoneus*), black drongo (*Dicurus macrocercus*), greater racket-tailed drongo (*Dicrurus paradiseus*), common mayna (*Acridotheres tristis*), house crow (*Corvus splendens*), jungle mayna (*Acredotheres fuscus*), redvented bulbul (*Pycnotus cafer*), tailor bird (*Orthotomus sutorius*), magpie-robin (*Copsychus saularis*), shyama (*Copsychus malabaricus*), house sparrow (*Passerdomesticus*), weaver bird (*Ploceus phillippinus*), spotted munia (*Lonchura punctulata*) etc. Besides, different species of winter migrants that visit Bangladesh are also seen in the beel and char areas of the district. These include little ringed plover (*Charadrius hiaticus*), common sand piper (*Tringa hypoleucos*), common teal (*Anas crecca*), pintail (*Anas acuta*), common sheldduck (*Tadorna tadorna*), grey leg goose (*Anser anser*), common swallow (*Hirundo rustica*), large pariah kite (*Milvusmigrant lineatas*), brown shrike (*Lanius cristatus*), pied harrier (*Circus melenoleucos*), little stint (*Calidris minuta*), fantail snipe (*Gallinago gallinago*), pintailed snipe (*Gallinagostenura*), grey wagtail (*Motacilla cinerea*) etc.

Reptiles and Amphibians: Reptiles that are commonly found in this district are peacock soft shell (*Trionyx hurum*), roofed turtle (*Kachuga tecta*), house lizard (*Hemidactylus frenatus*), shundh (*Gekko gecko*), bengal grey lizard (*Varanus bengalensis*), yellow speckled wolf snake (*Lycodonjara*), checkered keelback (*Xenochrophis piscator*), rat snake (*Ptyas nigromarginatus*), common smooth water snake (*Enhydris enhydris*), common krait (*Bungarus cacruleus*), banded krait (*Bungarus fasciatus*) etc. Amphibians are not rich in species but very much in numbers. Common amphibian includes Indian bull frog (*Rana trgerina*), skipper frog (*Rana cyanophlyctis*),

cricket frog (*Rana limnocharis*), common toad (*Bufo melanostictus*), ballon frog (*Uperodon globulosus*).

Fishes: Various water bodies of the district constitute habitats for fish population. A large veriety of fish that are found here are ruhi (*Labeo rohita*), katla (*Catla catla*), mrigel (Cirrhinus mrigala), kalibaush (Labeo calbasu), magur (*Clarias batrachus*), shing (*Heteropneustes fossilis*), shoil (*Channa striatus*), airh (*Mystus aor*), bele (G*lossogobius giuris*), boal (*Wallago attu*), phalli (*Notopterus notopterus*), koi (*Anabas testudineus*), datina (*Acanthopagrus latus*), tengra (*Mystus vittatus*), chanda (*Mene muculata*), bain (*Mastacembelus armatus*), gozar *(Channa marulius*), kholisha (*Colisa fasciatus*), mola (*Amblypharyngodon mola*), pabda (*Ompok pabda*), sharputi (*Puntius sarana*), pangas (*Pangasius pangasius*) chingri (*Palaemon malcolmsonic*) etc. Inaddition, some exotic varieties of fish like tilapia (*Oreochromis mossambicus*), nailotica (*Oreochromis niloticus)*, silvercarp (*Hypophthalmicthys molitrix*), grasscarp (*Cteopharyngodon idella*) etc are also cultivated. (Source: District Statistics 2011 of Gazipur)

4.3. Socioeconomic Environment

4.3.1. Status of land use pattern, housing and built-up infrastructure

The major part (59.91%) of the Sreepur Municipality area is being used for agricultural purposes. Residential use is the second highest land use of the Municipality containing 28.46% of land. A large part (1.47%) of the land is occupied by the water bodies including one river. Commercial and Processing & Manufacturing use occupied 0.75% and 3.80% of land respectively. The circular network and mixed use occupied 3.09% and 0.13% of land respectively. While 0.22% of land is available for community services and 0.35% of land is used for educational facilities. (Source: Master Plan 2011-2031 of Sreepur Pourashava)

According to the Population and Housing Census 2011, the highest percentage of general households by type of structure of the Municipality is semi-pucca (48.1 percent). The percentage of other general household by the type of structure of the Municipality are 38.3 percent kutcha households, 10.9 percent pucca households and only 2.7 percent jhupri households.

In addition, the average household size of the Municipality is 4. The percentage of tenancy of households in the Municipality area shows that 44.9 percent people live in own house, 51.9 percent people live in rented house and 3.2 percent people live in rent free house.

There are markets, shops, educational institutes, private and government offices, business establishments, industries etc in the surrounding areas of the subproject.

4.3.2. Beneficiary population

All the people living in Sreepur Municipality will be benefited by the proposed subproject. Therefore, a total of 126249 people of the Municipality will be benefited of which more than half of the people of the Municipality who are living in Ward No. 2, 4, 5, 6, 7 and 9 will be benefited just after the construction of the subproject.

Considering the current growth rate of population of the Sreepur Municipality as 5.17 percent per year and using the geometric progression method of population projection formula, the estimated number of the people of the Municipality will be 294294 in 2030 and 404422 in 2040. All these people will be benefitted from the proposed road and drain. In addition, people coming from different parts of the Sreepur Upazill as well as Gazipur district to the Municipality will also be benefitted. (Source: Population and Housing Census 2011)

4.3.3. Educational status

According to the Population and Housing Census 2011, the literacy rate of the Municipality is 63.3 percent among the both sex where the literacy rate among the male is 66.8 percent and the female is 59.3 percent, slightly below from the male counterpart.

There are 15 government and non-government primary schools, 6 secondary schools, 6 secondary school cum colleges, 3 colleges and 3 vocational institutes which are contributing in enhancing the educational status of the citizen living within the Municipality area.

4.3.4. Livelihood and economic situation

The subproject area is inhabited by the people of mixed occupation. Livelihood of the people of Sreepur Municipality is mainly dominated by agriculture. The commerce and industries also play significant role in maintaining the livelihood here. The main sources of income include agriculture 54.62%, non-agricultural labourer 3.67%, industry 0.79%, commerce 15.63%, transport and communication 4.98%, service 8.52%, construction 1.52%, religious service 0.19%, rent and remittance 2.02% and others 7.71%. (Source: Bangla Pedia)

The economy of the Sreepur is predominantly agriculture. However, non-farming activities plays significant role in the economy of this area. The income from non-farm establishments mainly comes from garments industries, ceramic industries, saw mills, rice mills, electricity, gas and water supply, construction, wholesale and retail trade, hotel and restaurant, transport storage and communication, bank, insurance and financial institution, real estate and renting, public administration and defense, education, health and social work, and community, social and personal services.

There are about 88 industries, 63 livestock farms, 4 food processing industries, 4 rice mills, 7 markets, 7 banks, 3 technical colleges, 170 mosques, 3 churches, 2 government hospitals and 5 post-offices in the Municipality area. The relative importance of the town has ever been growing as a regional centre of trade and commerce. (Water Supply System Development: Volume 3 of 4, DPHE, February 2014)

4.3.5. Water Supply and Sanitation

According to the Population and Household Census 2011, the most of the people (79.8%) of the Municipality collect drinking water from tube well while 17.9% of the people collect drinking water from tap and 2.3% of the people from other sources.

The sanitary condition of the Municipality is no so good. Most of the people (62.3%) use sanitary latrine without water seal which is not environmentally hygienic while 20.3% people use sanitary latrine with water seal, 16.3% people use non-sanitary latrine and 1.1% people have no latrine. There is only one public toilet installed by the Municipality.

4.3.6. Land acquisition and resettlement

The entire subproject area is almost owned by the Municipality. However, in order to extent the width of the road, it will require land acquisition from the general people. During the community consultation, the participants spontaneously agreed to voluntarily contribute land for the subproject for their own business and community interest. Hence, there is no issue of compensation for acquiring the land. Prior to the construction, the built in structures mainly boundary wall, extended portion of semi-pucca market and residence, electric poles and trees need to be clear. The Municipality will clear the site by amicable discussion and agreement with the owners of the structures prior to the works. In addition, the social expert will evaluate the anticipated social issues regarding the subproject intervention and measures will be given accordingly.

4.3.7. Tribal communities

There is no indigenous or tribal people settlement in the subproject area. Therefore, there is no need to take any kind of protective measures for indigenous peoples' safeguard. However, there are 69 households, mainly Garo people, live in the Municipality areas who will be benefited from the subproject.

4.3.8. Cultural heritage and protected areas

No known remarkable archeological or historically important structure and protected areas are reported in the subproject site. So, no negative cultural impact is expected by the proposed subproject.

5. ENVIRONMENTAL SCREENING

Environmental Screening (ES) for the subproject have been conducted with the purpose of fulfilling the requirements of GOB and WB in participation with different stakeholders including community people. The list of the participants of screening exercise is attached as **Annexure 1**. ES ensures that environmental issues are properly identified in terms of extent of the impacts. Environmental Screening Checklist, as adopted in Appendix C of the Environmental Management Framework of the MGSP, was administered for identifying the impacts and their extents. The screening data and information for the **RCC Road and Drain along with allied works** have been formulated and are shown as below.

5.1. Potential Environmental Impact during Construction Phase

(A) Ecological Impacts:

- Felling of trees : **Significant** □√ Moderate □ Minor □
  Number of trees : 300
- Clearing of vegetation : significant□ Moderate □**Minor** □√
- Potential impact on aquatic species environment : Significant □ Moderate □**Minor** □√

The proposed road and drain goes through developed mixed zone of residential, commercial and industrial areas. However, for site clearing work, 300 trees to be cut down. The trees to be cut down are: Jackfruits, Mango, Mahogony, Plum, Battle nut, Coconut and Jam. Taking the amount of trees to be felled down, overall ecological impact is considered as significant.

There is no need to clean vegetation for the implementation of the subproject. So, the impact of subproject on vegetation is minor.

There are some surface water bodies like ponds, low ditches, and khals nearby the subproject area. The khals are already badly polluted by the industrial effluents. So, the impact of the subproject is minor on it. However, the other surface water bodies may be polluted due to accidental leakage and spillage of oil, grace etc. or throwing of waste material into the road side water bodies. Therefore, the impact of the subproject on the water bodies and its aquatic environment is considered as minor.

(B) Physico-Chemical Impacts:

- Noise pollution : Significant □**Moderate** √□Insignificant□
- Air pollution : Significant □**Moderate** □√ Insignificant□
- Drainage congestion : Very likely □ Likely□ **Unlikely** □√ **(There is no drain)**
- Water pollution : Significant □Moderate□ **Insignificant** □√
- Solid waste pollution :Significant □**Moderate** □√Insignificant □
- Construction wastes : Significant □**Moderate**□√ Insignificant □

- Water logging : Significant □**Moderate** □√ Insignificant □

Most of the subproject will have negative impact on the physicochemical parameter (noise and air) due to use of hydraulic excavator, mechanical compaction machine, concrete mixer machine, vibrator machine, and mobilization of the equipment, vehicles movement for the transportation of the materials. However, the potential impact on air and noise from these subproject activities is manageable because these impact are site specific and context of impact is limited. Moreover, the construction work will be performed section wise to minimize the impact. Therefore, anticipated impact on noise and air is considered as moderate.

There is no drain and running water bodies adjacent to the construction areas. So, there is no chance of being drainage congestion. However, the generated construction waste like loose soil, dismantling debris etc. perhaps disturbs the nearby community people if proper measures are not taken. Additionally, generated debris may also get worse condition for the road side water bodies if not properly collected and disposed. In addition, aesthetic landscape value and surrounding environment may be degraded from the improper collection and disposal of the generated wastes materials. Generally, there will be no drainage congestion or water logging because most of earth work will be performed at dry season. Even, there will be provision for submergible pump to drain off the water, if required.

(C) Socio-Economic Impacts:

- Traffic congestion **: Likely** □√ Unlikely □
- Health and safety : Significant □ **Moderate** □√ Insignificant □
- Impact on archaeological : Significant □ Moderate □ **Insignificant** □√
- Impact on historical : Significant □ Moderate □ **Insignificant** □√
- Employment generation : **Significant** □√ Moderate □ Insignificant □

All of the roads are used for a significant number of both light and heavy motorized vehicles movements. However, no vehicles will be allowed to move during the construction of the proposed road. There are some other roads in the Municipality areas those will be used as alternatives during the construction of the proposed road to avoid the traffic congestion. The proposed construction activities do not require use of heavy equipment and construction work and will follow simple procedure with commonly used equipment. Hence, anticipated impact on health and safety is moderate. There is no archaeological and historical site within the influence area. The subproject has positive impact by generating work opportunities for the local people.

5.2. Potential Environmental Impact during Operational Phase

(A) Ecological Impacts:

- Potential impact on species of aquatic : Significant □ Moderate □**Minor** □√

During operation of road, there will be no impact on ecology. On the other hand, the drains may have minor impact on the aquatic environment as it will carry the polluted industrial effluents to the outfall. The storm water that will flow through this drain will not be any impact on the aquatic environment if the drains are to be used properly. However, dumping of solid wastes and household wastewater directly into the drains from the households beside the drains may create pollution in the aquatic environment of the outfall by the discharge water through these drains.

(B) Physico-Chemical Impacts:

- Potential air quality & noise level : Improvement □ No-improvement□ **Deterioration** □√
- Drainage congestion : **Improvement** □√ Minor Improvement □ No Impact □
- Risk of water pollution : Significant □ **Moderate**□√ Minor □
- Pollution from solid waste : Improvement □**No-improvement**□√ Deterioration □

During operation phase, improved and widened road may increase traffic volume. This may degrade the air quality and noise level due to black smoke emission and un-due use of hydraulic horn from the vehicles. The new drain will minimize drainage congestion and water logging problem. The storm water to be discharged through the drain may degrade the water quality of the outfall if it carries pollutants from any sources. Pollution from solid waste will be improved by restricting the throwing of the household waste material into the drain.

(C) Socio-Economic Impacts:

- Traffic **:** Improvement □**No-improvement** √ □ Adverse□
- Safety : **Improvement** □ √ No-improvement□ Adverse □
- Employment generation : **Significant** □√ Moderate □ Minor □

After completion of the construction, this road will improve the transportation facilities. By providing uniform pavement, it will also enhance traffic safety. New drain will improve drainage facilities and prevent the accumulation of the stagnant water on the road surface. This will prevent formation of muddy and slippery surface on the road. Consequently, it will enhance traffic safety. In addition, it will create for business opportunities, input supply facilities for industries and employment opportunities for local community people.

5.3. Summary of Possible Environmental Impacts of the Subproject

The ecological impact due to the subproject implementation is mainly due to felled down of the 300 trees. The possible disturbances of the aquatic environment due to the discharge of the storm water and industrial effluents which carries washed out waste material and polluted effluents may have ecological impact. There will be temporary negative impacts on air and noise quality during construction. Solid wastes generated from the construction activities should be disposed in a designated dump site. Some earthwork will be involved; however, no agricultural productive soil

will be used for the purpose. The inputs will be mainly at construction phase and limited within the subproject boundary. Moreover, mitigation measures will be taken according to the EMP for minimizing the air, dust, and noise pollution.

The socio-economic component mainly includes health and safety and employment generation. Safety concern is an important issue during both the construction and operation phases. This subproject will have positive impacts in terms of the generation of the employment and business activities by supplying construction materials and equipment.

6. ASSESSMENT OF ENVIORMENTAL IMPACTS AND ITS MITIGATION & ENHANCEMENT MEASURES

6.1. Potential Significant Environmental Impacts and Its Mitigation & Enhancement Measures during Pre-Construction Phase

6.1.1. Loss and displacement from agricultural land

Cause of Impact

There is no agricultural land involved with this subproject sites. Most of the roads go through right way of the Pourashava. However, for road widening at different segments of the sites need to be cleared by demolishing the existing infrastructure (boundary wall, semi-pucca, and tin shed structure). Thus, there is no loss of agricultural land as well as agricultural product in the country.

Mitigation Measures

For economic development of the country, Municipality has no option other than going for developing of road and drain infrastructure. To do so, some portion land of Sreepur Municipality would have to be cleared which is being used by the encroachers. Hence, in this regard the Municipality will clear the site with the amicable discussion with the concerned land owner. Detail mitigation for this issue has been incorporated in the SMP (Social Management Plan) report.

6.1.2. Disorder of earth surface

Cause of Impact

After site clearing work, to elevate the cleared land up to the existing road level a part of land filling would be required to develop the site. This land filling will be from its original level which will not disrupt the natural surface of earth and obstruct the natural drainage system of the area.

Mitigation Measure

The subproject intervention will not create any water logging and drainage problem as the Municipality authority collects the soil to develop the area by carried sand from different places. Cross drainage works should be constructed to bypass the surface water and other discharges if required.

6.1.3. Constuction of labour shed

Cause of Impact

To meet the subproject basic demand, two separate labor sheds, one for male and one for female, need to be constructed or renovated any structure which will have to be constructed or renovated prior to starting the construction works. The proposed locations for the labor sheds are at Municipality owned vacant place near Kalimuddin Chairmanbari Morh. Unhygienic condition at the labor sheds and generation of sewage and solid waste at the labor sheds may cause degradation of the surrounding environment.

Mitigation Measures

To meet the workers basic needs labor sheds will be constructed or renovated which will contains adequate ventilation facilities and standard living condition and it never be overcrowded. In

addition, safe potable drinking water will be provided. Furthermore, contractor will construct two sanitary latrines considering 15 persons for one toilet at the labor shed (one for male and other for female). Proper health and safety of workers will be ensured through providing health and hygiene training to the workers by the Municipality and the contractor. Waste bins will be placed at the labor sheds, and the workers will be encouraged to dispose of all their garbage at the waste bins. All the waste will be collected daily and taken to the Municipality garbage disposing sites.

6.1.4. Ecological impact due to felling of trees and clearing of vegetation

Cause of Impact

Due to site clearing work for the road widening, a total of 300 numbers of trees need to be cut down along the right-of-way of the subproject. But, no vegetation clearing will be needed to implement the subproject.

Mitigation Measures

900 trees will be planted to compensate the felled down trees preferably local fruits, medicinal and ornamental trees such as Mango, Jackfruit, Jam, Palm, Bettle nut, Neem, Amloki, Horitoki, Bohera, Krishnachura, Bakul, Mahogany, Rain Tree, Koroi at both sides of the Answer road and anywhere suitable Municipality owned places within the influence area of the subproject. Planting trees will enhance the ecological balance of the subproject area after their successful growth.

6.2. Potential Significant Environmental Impacts during Construction Phase

6.2.1. Earth work and site clearing work

Cause of Impact

The subproject less requires site preparation. The preparation works for this road and drain will be done during construction stage that includes cutting and filling work, soil removal and collection for filling the existing BC road. The mentioned activities will cause huge noise, generation of dust, soil erosion, drainage congestion and safety concern.

Mitigation Measures

Cutting and filling operation should be kept minimal. During earth work, it will be tried to avoid loss of the topsoil. In addition, for backfilling work use of sand will be ensured. The subproject contractor should ensure construction of proper drainage facility. Regular water sprinkle should be ensured by the contractor to minimize elusive dust emission. Cover the exposed earth works with much fabric to minimize the dust. Moreover, proper care will be taken by the contractor during earth work and disposal work to avoid any undue disturbances to the nearby people. As a part of safe working procedures, contractor should ensure the use of PPEs as per requirement. Undertaking construction work during dry seasons will minimize the water logging. The heavy equipment should be operated at the day time. The generated waste from the dismantling work will be deposed regularly and quickly into the designated dump site of the Municipality.

6.2.2. Pollution from transportation and storage of the construction materials

Cause of Impact

Lack of proper guideline for the construction material transportations, handling and storage may lead the occupational health and safety risk. On the contrary, dumping of the construction spoils, including accidental leakage of the oil, grease, and fuel in equipment yards is a significant hazard. These substances can be washed-out by the storm water and can be discharged into the surface water. Even, the people to be engaged for the construction activities and local communities might endanger the physical and human habitats of the area.

Mitigation Measures

Safe transport, storage, and disposal of the construction materials, and the equipment have to be carried out in order to avoid the accidental spillage and loss and to minimize any health risk. Fuels, lubricants, and other hazardous materials should store over raised platforms and not directly on the ground. Place storage areas for fuels and lubricants away from any drainage leading to water bodies. Maintain adequate moisture content of sand during transportation, compaction and handling. Carry the materials especially loose soil and sand with adequate cover. Contractor will be responsible to avoid head loads for carrying soil, construction materials and construction equipment and disposal of the wastes at the designated dump site.

6.2.3. Air quality and dust

Cause of Impact

The air quality in the subproject area may slightly deteriorate for the time being during construction activities. The major construction activities from which air emission mostly dust emission may occur are; unpaved road width, transportation of construction materials (especially fine aggregate), opening-up of cement bags and empting the cement in order to mix with other construction material; black smoke emission from the subproject vehicles and equipment, handling of sand, stone/brick chips may contain loose dust particles. These activities will temporally disturb the nearby resident and associates construction worker by creating eye irritation, skin irritation, respiratory difficulties and difficulties of breathing. However, emissions are temporary and not expected to contribute significantly to the ambient air quality and will be within prescribed limits.

Mitigation Measures

Regular sprinkling of water to be done on open surface and dust grounds until paving is done. Maintain adequate moisture content of soil and sand for transportation, compaction, bed preparation, backfilling and handling. Avoid use of dust generating equipment which produce significant amount of particulate matter far from the local residents. Contractor will be responsible to ensure that all subproject vehicles and equipment are in good operating condition. Even periodically air quality test near subproject vehicles will be performed. The Subproject Implementation Unit (PIU) and contractor to enforce strictly use of personal protective as per requirement especially face mask and proper clothing to minimize the skin irritation, respiratory difficulties and difficulties of breathing.

6.2.4. Noise and vibration

Cause of Impact

Noise and vibration caused by the equipment (concrete mixture machine, vibrator, asphalt plant, road cutter and excavator etc.) and movement of the construction vehicles may temporarily disturb nearby residents and the sensitive areas. In the subproject, sensitive areas like roadsides houses, shops, and educational institutes are likely to be affected from the roadside noise, though the impacts are limited to the premises and very short-term.

Mitigation Measures

Transportation of the construction materials and noisy construction work have to be carried during the scheduled times, and mainly during the day. Even transportation of construction materials have to be carried with scheduled time. Where applicable and possible, exceptionally noisy machines to be fitted with noise abating gear such as mufflers for effective sound reduction. Providing suitable hearing protection to all workers exposed to noise levels where it is more than regulatory limit.

6.2.5. Water quality

Cause of Impact

The water quality may deteriorate if the construction materials, sand, construction wastes, effluent from the work camps, and food wastes are dumped in the roadside water bodies.

Mitigation Measure

Proper construction management including waste management as well as training of the operators and other workers should provide to avoid pollution of the water bodies. In addition, construction waste will carefully remove and taken to the municipal selected dumping place for organic waste and inorganic waste (not in the water bodies or lowland), for which contractor will be responsible.

6.2.6. Drainage and impact on surface water

Cause of Impact

The potential impacts on local hydrology are mainly those of altered patterns as a result of onside construction and earthwork activities. The proposed subproject will affect natural drainage, surface and ground water quality if not managed the construction works properly. There could be siltation of water system or drainage from uncovered piles of construction materials.

Mitigation Measure

To avoid the drainage, earthwork of the subproject will mostly cover in the dry season. Additionally, surface drainage shall be controlled to divert surface runoff away from the construction area. Even at construction sites, pumping provision will be ensured by the contractor. Stock piling of spoil soil shall be selected at a safe distance from the drainage system. Containment

of sanitary waste from camp site should be adequately disposed off to avoid surface and ground water contamination.

6.2.7. Impact on host comminutes from out sides worker

Cause of Impact

The differences in the cultures of workers (in case hiring is required) and local community may create some problems. Therefore, the unknown identity of the hired labor to the host communities has possibilities to create social crisis by involving with local politics, disturbing campsite communities by asking water entering into the house and other regularly required household goods, eve teasing or sexual abuse of the campsite female worker or campsite nearby neighboring people.

Mitigation measures

The subproject proponent and his organization have practice of working with the workers of different cultures. It is recommended to aware of the out sides workers about the social and cultural actability in the area so that they could maintain those when they will have touch with local community.

6.2.8. Occupational health and safety, and aesthetics

Cause of Impact

Construction activities lead to generation of dust, unpleasant view, obstruction in access of public properties due to excavation etc. which may have negative impact. Adequate waste management plan, air, soil, noise and water pollution controls are required to be adopted to prevent any impact on locality. Also various health hazards are associated with construction activity which may significantly impact the workers if not taken care like as mechanical failure of the equipment, traffic collision or accidents during operation of the equipment such as hydraulic excavator, steel cutter, head loads for carrying soil, construction materials and construction equipment; the sudden bad weather working conditions such as storm, thunder storm and earth quake etc, hazardous substances and wastes pose risks of the infections and diseases.

Mitigation Measures

- Provision of proper training to all workers for handling the construction equipment;
- Provision of cautionary and guiding signage in local and English language indicating the hazard associated with the site;
- Provision of the adequate latrines and separate toilets for the female workers;
- Wastewater from the toilet should be disposed off in septic tanks and soak pits and should not be allowed to accumulate at labor camp site or construction site;
- Dustbins should be provided at labor camps for collection of waste and waste should be regularly disposed off through the concerned agency;

- Temporary storm water drainage system should also be provided at camp site so as to drain the storm water and prevent accumulation of storm water at site and thus breeding of mosquitoes/flies;
- Provision of personal protective equipment like safety jackets, helmets, gumboots, gloves, face mask, ear buds, goggles, safety shoes etc as per requirement and nature of job in which they are involved;
- Job rotation should be carried out for workers exposed to high noise and dust areas;
- Provision of First aid facility at the site and the labor camp;
- Labor camps should be located at neat and clean location with no water logging issues;
- Proper sanitation facility including toilets, bathing facility and washing facility should be provided at site and at labor camps for workers;
- Clean drinking water supply should be provided to laborers;
- Brest feeding facility should be provided for kids if breast-feeding female workers are employed;
- Regular inspection for hygiene and safety in labor camps should be done;
- Construction debris should not be allowed to enter into aquaculture ponds located along the road;
- Entrance to any road/structure should not be blocked for construction material;
- Contractors will bear medical treatment costs. If any sever accidents such as loss of hands, legs or loss of working ability or any case of death needs compensation-(the amount of the compensation should be fixed considering the type of accidents).

6.2.9. Impacts on social environment

The subproject has some positive impacts on the local community and stakeholders. The positive impacts from the subproject are from the engagement of local labor force during construction works. All the positive and adverse impacts and mitigation measures for the social environment have been described in the social safeguard assessment (SSA) report.

6.2.10. Traffic management

Generally, the construction of road interrupts the traffic movement and selects alternative routes or a side of the constructed road for vehicles movement. But, considering the width of the project road, it will not be feasible to construct one side of the road leaving another side for vehicle movement. Hence, the alternative routes of the Municipality to be used in this case and no motorized or non-motorized vehicles will not be able to move through the proposed road during construction phase. Therefore, the Municipality authority will inform the local people about subproject activities and inspiring them to use the alternative road. It is observed that the alternative road at Baherarchala area under Ward number 9 is not capable to bear the load of heavy vehicles mainly engaged in carrying raw materials and final products of the Ceramic Industry. This road will be damaged if it allows the heavy vehicles. Hence, the Municipality authority should inform

the authority of the industry to use comparatively small truck to transport goods from the industry to Dhaka-Mymensingh highway to avoid the damage of the alternative route.

Besides, the drain will be constructed simultaneously with the construction of the road. So, there is no separate impact of drain on the traffic movement as well as management.

During construction phase, interruption of the traffic movement and impact on the local traffic system due to the subproject activities will be monitored closely. Then separate traffic management plan will be provided if required. However, the following safeguard measures are recommended to minimize the impacts associated to the traffic movement:

- Inform local people about the subproject activities;
- Inspire local people to use connecting and diversion roads;
- Ensure schedule deliveries of material/ equipment during off-peak hours;
- Place traffic sign/cautionary sign to avoid undue traffic congestion and associated traffic control measures to limit possible disruption;
- The place of construction works should be fenced off with fences if required and should be isolated from general public access and marked with signs to ensure safe movement;
- At the points where traffic is to deviate from its normal path (whether on temporary diversion or part of the width of the carriageway), the channel for traffic shall be clearly marked with the aid of pavement markings, painted drums, or a similar device to the directions of the vehicles;
- At night, the passage shall be delineated with lanterns or other suitable light source.
- For regulation of traffic, the flagmen shall be equipped with red and green flags especially near at intersection;
- For notification of construction activities, at least two signs shall be put up for each road, one close to the point of carriageway begins, and another will put on the end of the carriageway.

6.3. Potential Significant Environmental Impacts and Its Mitigation and Enhancement Measures during Operational Phase

6.3.1. Air quality degradation

Once in operation, the improved roadway will encourage the increased movement of different motorized and non-motorized vehicles. On the other hand, as the constructed road is the key road of movement of vehicles covering all the areas of Ward number 2, 4, 5, 6 7 and 9 of the Municipality where there are many residential, commercial and industrial establishments, many heavy vehicles will also be moved. The emission of carbon dioxide as black smoke from the vehicles will degrade the air quality. This might affect the health of the local community people, young children passing through the road for schooling, businessmen and workers working within the area.

The following mitigation and enhancement measures should be taken to minimize the air quality degradation:

- Vehicles those are emitting black smoke should not be allowed to move through this road; and
- Traffic police should be deployed in consultation with Traffic Control Authority at two sides of the entry points of Dhaka-Mymensingh highway to Answer road.

6.3.2. Noise pollution

Increased vehicular traffic and its use of hydraulic horns can create noise pollution. In addition, there is a chance of traffic congestion due to the movement of huge number of vehicles through this busy road and unnecessary blowing of horns during traffic congestion. This might affect the health of the local community people, young children passing through the road for schooling, businessmen and workers working within the area.

The following mitigation and enhancement measures should be taken to minimize the noise pollution:

- The traffic control authority should control the use of hydraulic horn in motorized vehicles and minimize the traffic congestion at peak-hours.

6.3.3. Solid wastes generation and disposal

Throwing of solid wastes such as leftover food, foils, bottle and plastic from food and drink, market wastes etc on road and drain can be happened. If these generated solid wastes are not disposed properly, it will create unpleasant environment and pedestrians will feel discomfort.

The following mitigation and enhancement measures should be taken to ensure proper solid waste disposal and minimize its impact on environment:

- Sufficient numbers of waste bins should be in place at different market premises along the road sides.
- Solid wastes to be generated at the market along the road sides should be collected and disposed in selected landfill or dumping place by the Municipality Authority.

6.3.4. Traffic congestion

There is a possibility of traffic congestion on this road due to the movement of motorized and non-motorized as well as small and large sized vehicles. Traffic congestion may also happen due to down loading and upload commercial materials and products stopping the carrying vehicles on any sites of the carriageway.

The following mitigation and enhancement measures should be taken to minimize the impact of traffic congestions:

- Traffic police in consultation with Traffic Control Authority should be ensured at the cross-sections throughout the road to ensure proper traffic management and to reduce traffic congestion.
- Local transportation vehicles should not be allowed to stay long time at any diversion road and in front of the market.
- Direction/control sign for vehicle movement should be ensured at any diversion road and in front of the market.

6.3.5. Accident due to high speed of vehicles

There will be a tendency for increasing speed because of an improved driving surface that can result accidents. A huge number of garments workers, local people, shop keepers and school going children will pass through the road regularly. There are also some schools adjacent to the road. Hence, the issue of accident should be considered as an important.

The following mitigation and enhancement measures should be taken to minimize the impact of traffic congestions:

- Speed breakers should be placed at certain interval of the road as well as in front schools and other important establishments; and
- Sign of speed limit should be placed at different places at the both side of the road.

6.3.6. Waste water disposal

The waste water to be generated from different households, markets and industries will be discharged into the constructed drain and finally will fall into the water bodies of outfall areas. The waste water particularly with industrial effluents can badly pollute the water of down fall water bodies, and subsequently decrease the water quality. It requires proper waste water collection, treatment and disposal facilities to minimize the water pollution.

Following measures should be taken to minimize the impacts:

- Every industry should have an Industrial Waste Water Treatment Plants. Lime products can be used in industrial waste water treatment to adjust pH and alkalinity in coagulation, flocculation and biological treatment processes. Lime can also be used in industrial waste water treatment to soften process or boiler feed water, precipitate metals and non-metals and to adjust pH with membrane treatment.
- Finally, the treated water can be discharged into the constructed drain to run off to outfalls.

6.3.7. Impact on local community

In operation phase, the proposed subproject has a positive impact on the community people by creating business and employment opportunity. The local economy will be highly influenced by the constructed road by easing the transportation facilities for business and daily household services, and enhancing the land value of the surrounding areas. The improved road will encourage other industries to be installed by the industrialists which will create more employment

opportunities. In addition, it will create more employment opportunity by engaging young people in transportation business and driving of motorized vehicles. The local people will be benefited by getting opportunity of easy and quick movement from one place to another place within the Municipality as well as outside of the Municipality.

By discharging the household waste water into the drain, the local community people will enjoy a pleasant environment without water logging and dirty condition in and around their house.

7. ENVIRONMENTAL MANAGEMENT PLAN

The objective of the environmental management plan (EMP) is to record environmental impacts resulting from the sub-project activities and to ensure implementation of the identified "mitigation measures", in order to reduce adverse impacts and enhance positive impacts. Besides, it would also address any unexpected or unforeseen environmental impacts that may arise during construction and operational phases of the sub-projects. The identified environmental impacts and its mitigation and enhancement measures are given in **Table 7-1** and in **Table 7-2** as below:

7.1.Environmental Management Plan (EMP) Matrix

The anticipated environmental impacts and corresponding mitigation and enhancement measures have been outlined in **Table 7-1** for preconstruction and construction phases and in **Table 7-7** for operational phase**.**

Table 7-1: Anticipated Impacts during Construction and Corresponding Mitigation Measures with Monitoring guide line

Activity/ Issues	Potential Impact	Proposed Mitigation &Enhancement Measure	Monitoring Method	Frequency of Monitoring	Responsible for Monitoring	
					Implement	Supervision
Pre-construction stage						
Construction and operation of labor shed for the workers (Workforce and labor shed management)	Generation of sewage and solid waste may cause water/ environmental pollution/	• Ensure construction of new labor sheds or renovate the selected houses and stockyard to be designated by the Municipality. • Construction of sanitary latrine considering 15 persons for one toilet at the labor shed and separate toilet for male and female; • Erection of "no litter" sign, provision of waste bins (introduce separate waste bins for organic and inorganic wastes); • Ensure wastes (solid wastes and other forms of the wastes) disposal at the dumping yard to be selected by the Municipality. • Ensure emptying and cleaning of the waste bins regularly; • Drum trucks are available in the Municiplaity. Hence, drum truck should be used for transportation of the wastes; • Cleanliness of premises and workers living places and at the Labor Shed; • Arrangement of the proper ventilation and temperature at the Labor Shed; • Protection against dust by using masks and covering of the head and body; • Proper disposal of the wastes and effluents;	Visual Observation	Regularly	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
	Health Hazard of Labor	• Conduct formal and unofficial discussion to increase awareness about hygiene practices among the workers;	Visual Observation	Regularly and As per requirement	Contractor	Primarily by the PIU of the Municipality

		• Arrange for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances • Ensure that all site personnel have a basic level of environmental awareness training. If necessary, the environmental management specialist and/or a translator shall be called to the sites to further explain aspects of environmental or social behavior that are unclear. • Comply with requirements of Government of Bangladesh Labor law of 2006 and all applicable laws and standards on worker's Health and Safety; • Provide construction workers and local people with basic information on infectious diseases including HIV/AIDS • Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal				and Secondarily by the PMU of BMDF
	Possible development of labor camp into permanent settlement	• Contractor to remove labor camp at the completion of contract.	Visual Observation	End of the Construction work	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
	Outside labor force causing negative impact on health and	• Ensure that contractor employ local work force to provide work opportunity to the local people and conduct formal and unofficial awareness	Visual Observation	Regularly	Contractor	Primarily by the PIU of the Municipality and

	social well-being of local people	program for the health and social well-being of the local people.				Secondarily by the PMU of BMDF
Construction Stage						
General construction works (Site Clearing, Earth work, Backfilling, fueling of subproject vehicles etc)	Drainage congestion and flooding	• Ensure provision for adequate drainage of storm water, if needed; • Ensure provision for pumping of congested water, if needed; • Ensure adequate monitoring of drainage effects, especially if construction works are carried out during the wet season.	Visual Observation	Regularly	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
	Air pollution	• Check regularly and ensure that all the subproject vehicles are in good operating condition; • Ensure contractor spray water on dry surfaces regularly to reduce dust generation; • Maintain adequate moisture content of soil and sand for transportation, compaction, bed preparation, backfilling and handling; • Ensure contractor sprinkle and cover stockpiles of loose materials (e.g., fine aggregates);	Visual Observation /Analytical	Regularly and Periodically	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
	Traffic congestion, effect on traffic and pedestrian safety	• Ensure schedule deliveries of material/ equipment during off-peak hours; • Avoid road side storage of the construction materials; • Place cautionary sign for the pedestrian and safety traffic movement. • Inform the local people about subproject activities and inspire them use to alternative road to avoid traffic jam. • Ensure flag man especially at road crossing	Visual Observation	Regularly	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF

		• Increase workforce in front of critical areas such as institutions, establishment, hospitals, and schools.				
	Noise pollution	• Check and maintenance the equipment properly; • Avoid using of construction equipment producing excessive noise at night; • Avoid prolonged exposure to noise (produced by equipment) by the workers; • Regulate use of horns and avoid use of hydraulic horns in subproject vehicles. • Any noise generating equipment should be performed after office or school hour. • Arrange ear plugging or ear muff if noise level at the construction site is severe.	Visual Observation /Analytical	Regularly and Periodically	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
	Water and soil pollution	• Prevent discharge of fuel, lubricants, chemicals, and wastes into adjacent water bodies and soil; • Vehicle maintenance and refueling should be confined to the designated areas with sealing to prevent the spillage of lubricants and fuels on the water bodies and soil; • Restrict disposal of any construction waste into the nearby water bodies. • Location of stockyards for construction materials shall be identified at a safe distance from watercourses.	Visual Observation / Analytical	Regularly/ Periodically	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
	Accidents	• Conduct formal and informal discussion for creating awareness about the accident; • Provides PPEs and ensure using of the personal protective equipment by the workers.	Visual Observation	Regularly	Contractor	Primarily by the PIU of the Municipality and Secondarily

		• Maintain the register to record accidental events if occur;				by the PMU of BMDF
	Spills and leaks of oil, toxic chemicals	• Proper handling of lubricating oil and fuel so that it does not fall on the soil and adjacent water bodies; • Collection and disposal of spills; • Waste petro-chemicals must be properly collected, stored and not directly disposed on the ground.	Visual Observation	Regularly	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
Dismantle work/ Excavation/Earth work/	Generation of solid and construction waste due to the dismantle works; Generation of loose soil due to the earth excavation work and earth work.	• Cover expose construction wastes and loose dry soil with fabric; • Disposal of soil and construction wastes at Municipality designated dumping site.	Visual Observation	Regularly	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
IGS (improve sub grade) /sand filling	Air and dust pollution affecting nearby settlement	• Maintain adequate moisture content of the soil during construction transportation, compaction and handling; • Carry the materials especially loose soil and sand with adequate cover.	Visual Observation	Regularly	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
Setting up and operation of asphalt plant	Possible degradation of the air quality by the suspended particles and	• Locate plant away from residential settlements; • Consider use of emulsified bitumen.	Visual Observation	Regularly	Contractor	Primarily by the PIU of the Municipality and Secondarily

	increase of the noise level from asphalt plant affecting nearby settlements.					by the PMU of BMDF
	Possible water pollution (surface and ground water) by bitumen and solvents.	• Avoid spills and proper collection and disposal of the generated spills.	Visual Observation	Regularly	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
	Possible preparation of the bitumen in open air and using of charcoal and wood as fuel.	• Strictly prohibit bitumen preparation in the open air and use of charcoal and wood as fuel.	Visual Observation	Regularly	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
Dismantling work for site clearing and excavation work	Generation of loose and clay soil due to the earth excavation work.	• Cover exposed loose dry soil and wastes materials before disposal; • Disposal of soil and construction wastes at Municipality designated dumping site.	Visual Observation	Regularly	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
	Accidents from careless use of hydraulic excavator and hammer if needed.	• Carefully handle of the hydraulic excavator and hammer if needed.				

	Possible damage of road side infrastructure due to earth excavation for drain construction.	• Ensure drum sheet palisading work for shallow depth to stabilize the structure; • Ensure plunk palisading work for shallow depth to stabilize the structure; • Bolly drive for deep depth construction works.				
	Air pollution due to black smoke emission from excavator.	• Regular maintenance of the equipment.				
Sand filling /Back filling work	Air and dust pollution affecting nearby settlement	• Maintain adequate moisture content of soil and sand during transportation, compaction and handling; • Carry the materials especially loose soil and sand with adequate cover.	Visual Observation	Regularly	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
Cutting & welding of the reinforcement for RCC work	Noise pollution due to using of rod cutter and welding machine	• Avoid using of rod cutter and welding machine at night; • Avoid prolonged exposure to noise (produced by equipment) by workers.	Visual Observation / Analytical	Regularly/Periodically	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
	Potential health and safety risks from rod cutter and welding machine if any	• Ensure use of the personal protective equipment (helmet, goggles, gloves, safety boot); • Availability and access to first-aid equipment and medical supplies in case of any accidents.	Visual Observation	Regularly	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of

						BMDF
RCC (reinforcement cement concrete) work	Air pollution due to black smoke emission from concrete mixer machine and vibrator machine	• Regular maintenance of the concrete mixer and vibrator machine to avoid any black smoke emission.	Visual Observation / Analytical	Regularly/Periodically	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF
	Noise nuisance from concrete mixer machine and vibrator machine	• Avoid operation of the concrete mixer and vibrator machine at night; • RCC work should be avoided at schooling time; • Inform local people about casting work and potential impacts.	Visual Observation / Analytical	Regularly/Periodically	Contractor	Primarily by the PIU of the Municipality and Secondarily by the PMU of BMDF

Table 7-2: Anticipated Environmental Impacts during Operation Phase and Corresponding Mitigation and Enhancement Measures

Activity / Issues	Potentials Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Operation of the RCC road	• Increase in traffic speed and accidents; • Increased traffic congestion due to movement of increased number of vehicles; • Damage to road by movement of heavy vehicles;	• Better traffic management; • Control heavy traffic movement.	By the Municipality
	• Increased air and noise pollution affecting surrounding areas	• Traffic management, increased vehicle inspection	
Operation of the RCC drain	• Pollution of downstream water body due to disposal of polluted water from the drain	• Ensure installation of septic tank by the household people in all establishment;	

		• Stop connecting sanitation facilities to storm drain directly.	By the Municipality
	• Blockage in the drain due to disposal of solid waste/debris	• Creation of awareness, introduce SWM system and install and maintenance cover in open manholes; • Regular maintenance / cleaning of the drain; • Stop throwing of the wastes materials in to the drain by the community people.	
	• Possible backflow of water due to blockage in the drain and at outfall	• Proper maintenance and cleaning of the drain and outfall on regular basis.	

Most of the monitoring parameter evaluation will be done by visual observation except noise, air, and water quality parameter. These parameters will be monitored by analytically. Hence, analytical monitoring guideline is shown below in tabular form.

7.2.Environmental Monitoring Plan

The Environmental Monitoring is important to record environmental impacts resulting from the subproject activities and to ensure implementation of the mitigation measures identified earlier in order to reduce adverse impacts and enhance positive impacts from the subproject activities. The environmental monitoring should be done at both constructional and operational phases.

Environmental monitoring requires a set of indicators that could be conveniently measured, assessed and evaluated periodically to observe the trends of change in base line environmental quality.

The following environmental monitoring plan should be adopted to monitor the activities of both construction and operational phases mentioned in the environmental management plan.

7.2.1. Monitoring during construction phase

The mitigation or enhancement measures outlines in EMP should be monitoring during construction period with regular interval in order to ensure its effective implementation to avoid the adverse effect of subproject activities and to gain the positive impacts resulting for the activities. The environmental monitoring plan during the construction period is given in **Table 7-3** as below:

Table 7-3: Monitoring Plan (Analytical Monitoring during construction phase)

Monitored Parameter/ Issues	Monitoring Method/Key Aspects	Location of Monitoring	Period & Monitoring Frequency
Noise level measurement	• Through digital instruments	• Sub-project site	• Two times at construction phase; • Reporting: Once in a month and immediately after measurement
Ambient air quality/ Stack Emission	• Visually-black smoke; • Sampling; • Analysis at laboratory; • Data analysis of merits determination by using quality standards; • Through digital instruments.	• Sub-project site	• Two times at construction phase; • Reporting: Once in a month and immediately after measurement
Waste Water quality	• Sampling; • Analysis at laboratory; • Data analysis of merits determination by using quality standards.	• At intake and outfall	• Two times at construction phase; • Reporting: Once in a month and immediately after measurement

7.2.2. Monitoring during operational phase

Environmental monitoring during operational phase is limited to a number of impact parameters to see the actual performance of the subproject. Monitoring of some issues might be necessary during the operational period of the subproject those are given in **Table 7-4** as below.

Table 7-4: Monitoring plan (Visual observation during operation phase)

SL No	Issue	Key aspects	Monitoring frequency per year
1	Complaint from local people	Any significant complaint from local people and it's remedial procedure	4
2	Local drainage system	Maintaining proper drainage	4
3	Solid Waste Management	Proper management of solid wastes to be thrown on road	4

The environmental parameters to be monitored during operational phase are given in **Table 7-5** as below:

Table 7-5: Environmental parameters to be monitored (monitoring frequency)

Parameter	Location	Monitoring frequency per year
Air quality (SPM, PM_{10}, and $PM_{2.5}$)	At different points of the road	2
Water quality (BOD, pH, DO, TDS, Turbidity, NH_3)	At the nearby, surface water, ground water and drain water	2
Noise and Vibration	At different points of the road	2

7.3. Grievance Redress Mechanism

The project-specific Grievance Redress Mechanism (GRM) will be established by the PIU of Sreepur Municipality to receive, evaluate, and facilitate the solution of affected people's (APs) concerns, complaints and grievances concerning the social and environmental performance of the subproject. The GRM is aimed to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the subproject.

The grievance mechanism is related to resolve the risks and adverse impacts of the subproject. It addresses APs' concerns and complaints promptly, using an understandable and transparent process that is also gender responsive, and culturally appropriate. It is readily accessible to all segments of the affected people at no costs and without retribution. The mechanism should not impede access to the country's judicial or administrative remedies. The affected people will be appropriately informed about the mechanism.

BMDF has its own Grievance Redress Procedure (GRP) and they operate it to address any dissatisfaction and complaints by the local people regarding its activities. This procedure is being applied to address any complaints or grievances through negotiations with the community leaders and representatives of the APs during implementation of the MGSP.

7.3.1. Grievance redress committee (GRC)

Sreepur Municipality has formed a Grievance Redress Committee (GRC) headed by The Mayor. With the facilitation of Consultant, the Mayor nominated the GRC members and included representative from the Government Agencies, local NGO, and Civil Society. The GRC will nominate a focal person. Complaints will be received through drop box, by post, email and website of Municipality. The grievance box will be set up at construction site to received complaints. The grievance response focal point will be available at the Municipality for recording the complaints and necessary response to an aggrieved person. It will receive complaints or suggestions, and produce them to the GRC for hearing and resolution. If any complaint is not resolved at Municipality level then the complaint will be produced to MD-BMDF. If it is not resolved by the MD-BMDF, then the subproject will be dropped.

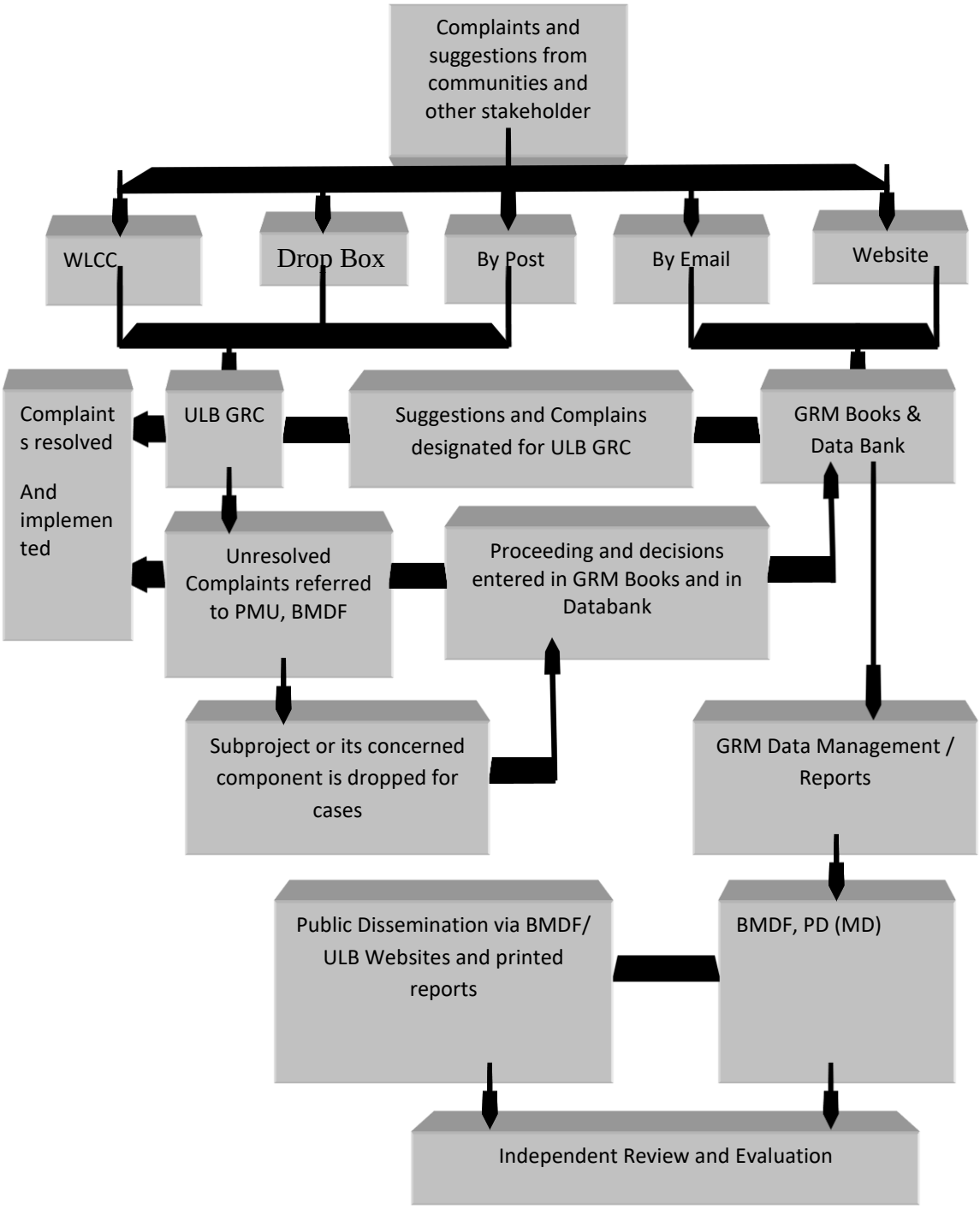
The structure of the GRC and membership are given as below:

Chairman	: ULB Mayor
Member-Secretary	: Head of the Engineering Section of ULB
Member	: Representative from local administration
	: Teacher from a local educational institution
	: Representative of a local NGO
	: Representative of civil society
	: Female ward councilor (of respective area)

The GRC will play their roles and maintain proper documents as the guidelines of EMF of BMDF. The list of the GRC members along with office order of the Mayor is attached as **Annexure 2**.

7.3.2. Grievance resolution process

Given flow chart will be followed for grievance resolution process of this subproject.



Flow diagram 7-1: Grievance resolution process

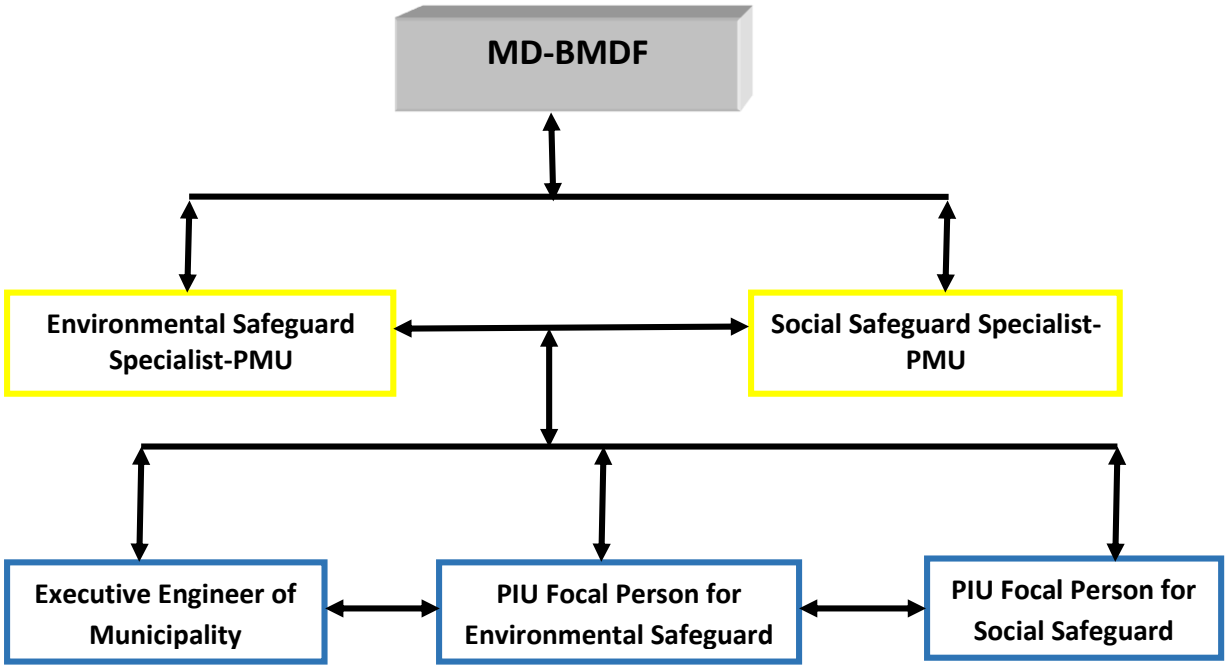
Note: If the appellant is still not satisfied, he or she has the right to take the case to the public courts. Sreepur Municipality should also publish the outcome of the cases on the public notice

boards. All costs involved in resolving the complaints (meetings, consultations, communication, and information dissemination) will be borne by the Sreepur Municipality. The Municipality authority will try to resolve the issues (in most of the cases, in amicable settlement) within shortest possible time. However, the public court system is always open to resolve the issues.

7.4. Institutional Arrangement for Implementation of EMP

The Environmental Safeguard Compliance issues are directly vested the Municipality Officials especially the Executive Engineer will be responsible for supporting the construction supervision with the facilitation of BMDF. The civil works contractors will implement the environmental mitigation measures.

The BMDF, with the help of Environmental Safeguard Specialist will submit the monthly monitoring reports on Environmental Compliances to the World Bank.



Flow diagram 7-2: Institutional arrangement for implementation of EMP

7.5. Capacity Building

A two-day long training program in participation of PIU members of Sreepur Municipality was organized by the PMU of BMDF to build the capability of PIU of Sreepur Municipality. The Consultant, hired by the Sreepur Municipality also participated in the training program. The PMU of BMDF organized this training program in order to enhance their capacity to conduct Environmental Assessment and Social Impact Assessment to be done for any proposed subproject. A series of sessions were conducted by the Specialists of the PMU of BMDF. The major sessions

includes: (i) Environmental Screening, (ii) EMP Implementation, including environmental monitoring requirements related to mitigation measures; and (iii) taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of the implementation. The PIU of Sreepur Municipality will organized an orientation of contractor, workers and other support staff on environmental issues to be considered and mitigation measures to be taken during pre-construction, construction and operational phases before deploying to the work sites in order to achieve the expected standards.

7.6. Estimation of Environmental Safeguard Cost of EMP

Considering the environmental impacts and their mitigation measures for the subproject, several items are included in the BOQ for the environmental management. **Table 7-6** presents the estimated cost during construction phase and **Table 7-7** presents the estimated cost during operation phase for the environmental management. Cost during construction phase will be included in BOQ but Cost during operation phase will be bearded by Sreepur Municipality.

Table 7-6: Environmental Management Budget during construction phase

Item No.	Description of the Items	Costs (in BDT)
1	Establishment of labor camp (male shed - 15 ft x 30 ft and female shed 12 ft x 15 ft1) with living arrangement, drinking water facilities, cooking arrangement, mosquito net, waste bin etc.	200,000.00
2	Masonry pucca platform (at least 100 sft size), providing brick soling and net cement finishing for keeping fuel and lubricants for machineries.	15,000.00
3	Arrangement of temporary/ earthen drainage to drain out extra water logging due to rain and during construction works. All the temporary drains shall be filled up properly either at the end of event or at the end of works	50,000.00
4	Dust suppression measures by water spraying throughout the construction period in and around the subproject site, uncovered aggregates and loose materials such as stockpiles of the sands, excavated earth etc. (Lump sum)	50,000.00
5	Air quality (SPM, PM_{10}, and $PM_{2.5}$) measurement- it can be measured from the recognized environmental survey company, public institute/ university one time before starting construction, two times during construction phase and one time just after construction.	90,000.00
6	Noise level measurement- it can be measured from the recognized environmental survey company, public institute/ university two times during construction phase and one time just after construction.	30,000.00

7	Water quality (pH, DO, TDS, BOD, Turbidity, NH_3) of both sides drain and underground water measurement- it can be measured from the recognized environmental survey company, public institute/ university one time before starting the construction, one time after the construction phase and two times during operation. (at 5 locations)	45,000.00
8	Wastes disposal facility during the construction period; collection, transportation, and dumping of the wastes at landfill site and providing sufficient bins; at least 6 bins (500 litre size) to be provided.	45,000.00
9	Water supply facilities (for the labor shed and work site):1 no. of tube well (depending on the site condition the contractor will select the option)	60,000.00
10	Sanitation facilities (at the labor shed): 2 nos. of the toilets preferably portable toilets (1 no. for women and 1 no. for men)	50,000.00
11	Providing PPE like hand gloves, spectacles for eye protection, helmets, masks, visible jacket, ear plug, safety boots for at least 30 person (25 for workers and 5 for visitor) and one first aid box with necessary medicine	100,000.00
12	Cautionary signs during construction: 8 nos.	15000.00
13	Tree plantation for ecological enhancement work- preferably local fruits, flowers, medicinal and ornamental trees- (including protection and conservation during project defect liability period) 900 nos. of the trees @Tk 500.00 per tree.	45000.00
	Total	**7,95,000.00**

Table 7-7: Environmental Management Budget during operation phase (Annual)

Item No.	Description of the Items	Costs (in BDT)
1	Air quality (SPM, PM_{10}, and $PM_{2.5}$) measurement- it can be measured from the recognized environmental survey company, public institute/ university two times per year at operation	60,000.00

2	Noise level measurement- it can be measured from the recognized environmental survey company, public institute/ university two times per year at operation	20000.00
3	Water quality (pH, DO, TDS, BOD, Turbidity, NH_3) measurement. It can be measured from the pre-approved public institute/ university during operation period for waste water at underground water, drain and outfall @Tk. 10,000.00 per sample (2*3*5,000.00 Tk).	30000.00

Note: The environmental safeguard compliance issues and cost (like solid waste management, water supply, traffic management, drain cleaning, test of environment parameter etc.) are to be done by Sreepur Municipality.

8. COMPLIANCE WITH ENVIRONMENTAL CODE OF PRACTICES

The environmental code of practices (ECoPs) provides guidelines for environment management of the subprojects to be implemented in different urban local bodies (ULBs) under MGSP. The main objective of the ECoP is to manage construction operations in harmony with the environment in an effort to contribute to the well-being of the community and the environment by (i) minimizing pollution, (ii) sustaining eco-systems, (iii) conserving cultural heritage, and (iv) enhancing amenity. In compliance with ECoP, following issues associated with the proposed subproject are addressed during environmental assessment:

- Planning and design of the subproject;
- Site preparation;
- Construction camps;
- Waste management;
- Water bodies;
- Water quality;
- Drainage;
- Public health and safety;
- Material storage, transport and handling;

In this assessment, it is found that some of the issues are not relevant to this subproject. The issues those are found as relevant are addressed properly in this report.

9. PUBLIC CONSULTATION AND ACCESS TO INFORMATION

9.1. Introduction

Pubic consultation is an effective tool for maintaining communication among the Municipality authority, BMDF as funding authority, different stakeholders of the subproject and community

people where the subproject will be implemented. It helps to facilitate and streamline decision making as well as fosters an atmosphere of common understanding among individuals, group and organizations that could be affected or be affected by the subproject. It also ensures the transparency of the subproject at all levels of planning, design, construction and operation. It is a continuous process by which opinion from public is sought on matters affecting them. Hence, as a part of IEE/EIA, an effective public consultation and access to information is important.

9.2. Objectives

The main objectives of the public consultation and access to information under this subproject are: (i) to generate public awareness by providing information about the subproject to all stakeholders, particularly the subproject affected persons (PAPs) in a timely manner, and (ii) to provide opportunity to the stakeholders to raise their opinions and concerns on different aspects of the subproject.

9.3. Methodology

Public consultation about the planning, design, implementation and operation is done at different stages following different participatory methods. The methods followed in public consultation are: (1) consultative meeting with different stakeholders, (ii) Focus group discussion with community people through the participation of male participants, and (iii) Focus group discussion with community people through the participation of female participants, girls and boys, and disable people.

One consultative meeting was organized at community level through the participation of concern stakeholders including Councilors of Sreepur Municipality, traders, shopkeepers, local leaders, community elites and representatives of business men from different locations of the road influence area. The participants were informed about the detail design and activities of subproject going to be implemented. Environmental screening of the subproject was also done in this meeting using the prescribed form mentioned in EMF of BMDF. They were asked to share their opinion, feedback and suggestions on environmental and social impacts of the subprojects as well as the mitigation measures to avoid or reduce the potential impacts. The list of participants of this meeting is attached as **Annexure 3.**

Picture 6: Consultative meeting with stakeholders

One focus group discussion was organized with male community participants from different professions residing along the both sides of the proposed subproject site. The participants were informed about the detail design and activities of subproject going to be implemented and asked about their opinion, feedback and suggestions on environmental and social impacts of the subprojects as well as the mitigation measures to avoid or reduce the potential impacts. They spontaneously discussed about the problems and economic losses that they have been facing for a long time as well as benefits and importance of the road and drain for the community and business of the areas. The list of participants of this FGD is attached as **Annexure 4.**

Picture 7: FGD with community people (Male)

Another focus group discussion was organized with female community participants living along the both sides of the proposed subproject site. The participants were also informed about the detail design and activities of subproject going to be implemented and asked about their opinion, feedback and suggestions on environmental and social impacts of the subprojects as well as the mitigation measures to avoid or reduce the potential impacts on women's point of view. In this session, boys and girls, and disable people were also present. The list of participants of this FGD is attached as **Annexure 5**.

Picture 8: FGD with community people (female)

Special efforts were made to include the elderly, women, and vulnerable groups and to allow them to express their views regarding the subproject implementation and operation. In all cases, the impression of stakeholders and general mass regarding sub-project implementation was highly positive and also expressed that they have been suffering a lot due to the lack of repair, reconstruction

or improvement of the road as it is the only road to travel at different parts of the Municipality and out of Municipality.

9.4. Issues Raised by the Participants

The stakeholders and community people are highly interested about the subproject. It is long pending demand of them to the Municipality to construct the road and drain. They are ready to provide additionally required land for the widening of the road and drain voluntarily. Following issues were raised during community consultation:

- Noise pollution due to the construction work;
- Protection against the spreading of construction materials during construction work;
- Starting and completion of works within least possible time;
- Solid waste management;
- Water pollution due to industrial effluents;
- Footpath over the drain for pedestrians;
- Widening of road;
- Street lights;
- Occurrence of accident due the high speed of vehicles; and
- Quality of construction work;

9.5. Feedback, Suggestions, and Recommendations of the Participants

Stakeholders and community people both male and female provided the feedback, suggestions and recommendations during the consultative meeting and FGDs those are given as below:

- The proposed road and drain is highly required for the community people, businessmen and industrialists;
- The road should be expanded at the both sides maintaining an equal distance from the middle or center of the existing road;
- The drain should be constructed at both sides with the walking provision for the pedestrians;
- The road should be constructed in such a way that no waterlogging is happened on the road;
- Noise and air pollution should be controlled so that its impact might be minimum on community people;
- The speed of the vehicles should be controlled by engaging traffic control authority and constructing speed breakers at certain interval of the road and at different vulnerable points like schools, markets etc, to avoid the accidents;
- Proper traffic control mechanism including sign of speed, sign of turning, community traffic police with flag at important points etc should be ensured;
- Street light should be given along all roads. It can be given with electric poles of REB. The Municipality can install separate poles for street light, if required;

- The angles of electric poles should be placed over the top of the house and declining to the road to avoid electric shot-circuit;
- For safety, any establishment should be built keeping minimum two feet distance from the road;
- Re-measurement with identification mark at infrastructures and trees should be done by the Municipality to remove the infrastructures and cut down the trees;
- The drain should be constructed in such a way that the household waste water can discharge easily to drain and no water can flow from one house to another house. It will help to avoid quarrels among the neighbor households;
- Water supply and toilet facilities for the workers should be ensured so that they could not disturb the community people by entering into household premises;
- The major source of polluting surface water is industrial effluents. The Municipality Authority should consult with the respective authority of the industries so that they can treat the waste water first and then discharge into drain; and
- Community people and shop keepers should be mobilized through awareness campaign so that they can keep generated solid waste in own waste bin and no waste is thrown on the road and drain. The Municipality should ensure the collect, treatment and disposal of solid waste properly.

9.6. Access to Information

The environmental assessment report would be translated into Bengali and disseminated locally. The copies of the report (both in English and Bengali) will be sent to all the concerned personnel responsible for subproject implementation. It will also be made available to the public. The final assessment report (both English and Bangla) will also be uploaded in the Sreepur Municipality website, BMDF website and the World Bank website after approval.

10. CONCLUSION AND RECOMMENDATIONS

10.1. Conclusion

On the basis of the findings of the environmental assessment, it could be concluded that the subproject is environmentally sound and sustainable. Significant improvement in quality of life and public welfare will result once the subproject is in operation. The potential environmental impacts seem very minimum and manageable, and it would be minimized by taking proposed mitigation measures. The adverse environmental impacts from the subproject will mostly take place during the construction stage. No endangered or protected species of flora or fauna are reported at the subproject site. The benefits of the subproject will be significant by creating employment and business opportunities during the construction and operational phases. There is no significant cumulative adverse impact during operation that is identifiable at this stage. The proposed subproject activities have no significant adverse environmental impact so far as a time bound execution program with application of advanced construction technology is ensured. The

mitigation measures are well within such codes and practices of construction and operation of the proposed subproject.

10.2. Recommendations

The attitude of the community people towards the proposed road and drain is highly positive as well as they have some recommendations to minimize some negative impacts on the environmental and social environment during its construction and operation. The Government of Bangladesh and World Bank have some legal and social safeguard compliances issues those are applicable during constructing and operating the proposed subproject. Considering the above-mentioned issues and findings of the study, following key recommendations are made for smooth construction and successful operation of the road and drain:

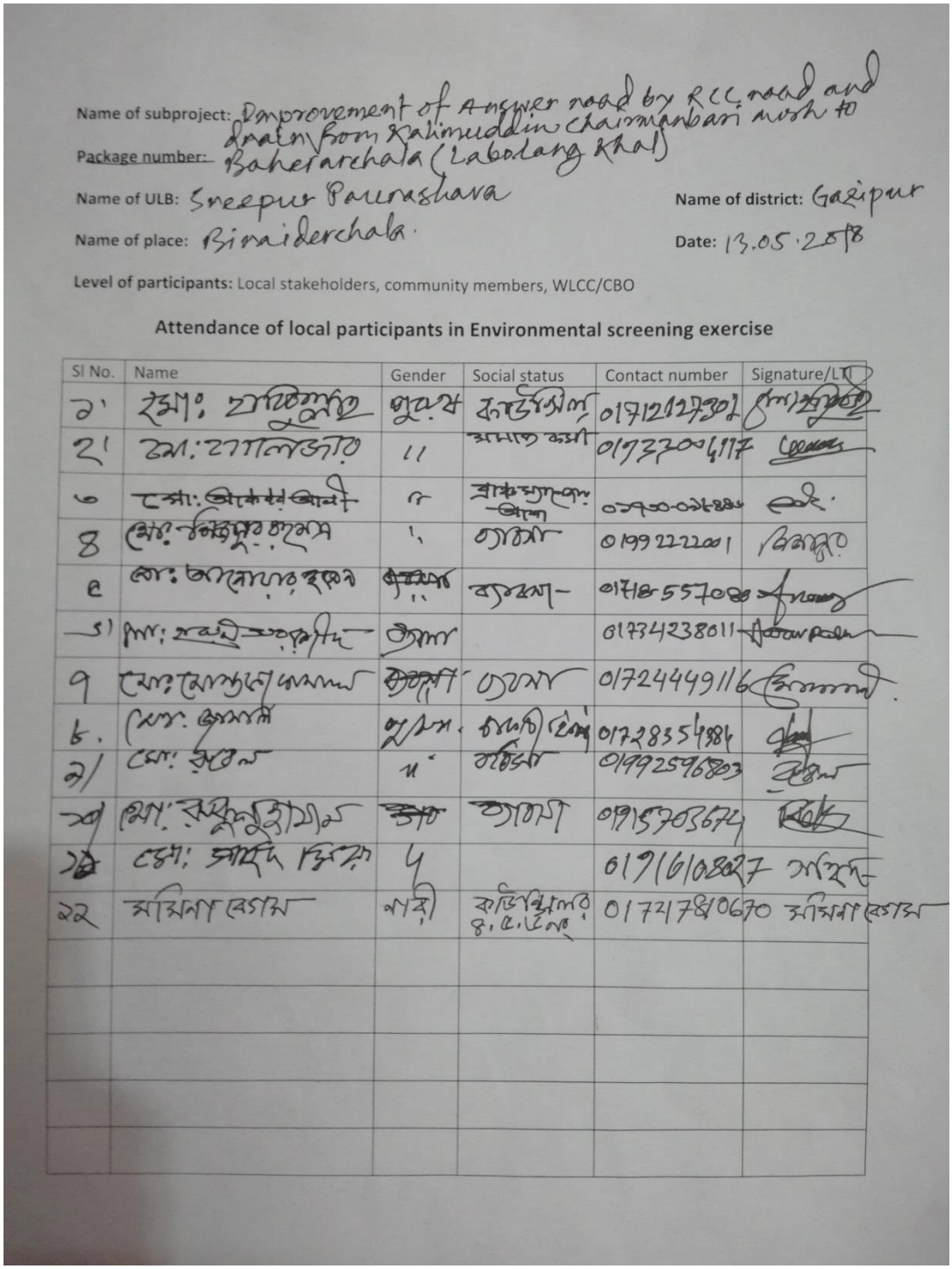
- The condition of the road is very bad and public demand for this road is very high. The construction of the road should be started as soon as possible and should be completed within least possible time;
- Proposed environmental management plan should be implemented strictly both during operation and construction phase of the project;
- The Municipality authority should consult with the respective authority of different industries to install their own waste water treatment plant and discharge waste water into constructed drain after proper treatment;
- Compensatory plantation should be done for trees to be cut down for off-site development minimum in ratio of 1:3;
- Suggestions and recommendation made by public for design and construction of road and drain, traffic management, solid waste management and waste water discharge should be taken into consideration;
- Proper training of maintaining environment, health and safety should be given to subproject management unit, contractor and workers in both construction and operation phase;
- Environmental monitoring should be conducted as proposed in environment management plan.

REFERENCES

1. Bangladesh Bureau of Statistics. District Statistics 2011 of Gazipur.
2. Bangladesh Bureau of Statistics. Bangladesh Population and Housing Census 2011.
3. Bangladesh Municipal Development Fund. Environmental Management Framework, 2017.
4. Sreepur Pourashava Master Plan: 2011-2031.
5. Final report of Sreepur Paurashava. Groundwater Management and TPP for Survey, Investigation and Feasibility Study in Upazilla and Growth Centre Level Pourashava having no Piped Water Supply System, 2014.
6. Sreepur Municipality Data, 2018.
7. http://en.banglapedia.org/index.php?title=Sreepur_Sadar_Upazila dated on 18 May 2018.

ANNEXURES

Annexure 1: Attendance of local participants in screening exercise



Name of subproject: Improvement of Angwer road by RCC road and drain from Kalimuddin chairmanbari moor to Baherarchala (Labodang Khal)

Name of ULB: Sreepur Paurashava

Name of district: Gazipur

Name of place: Binaiderchala.

Date: 13.05.2018

Level of participants: Local stakeholders, community members, WLCC/CBO

Attendance of local participants in Environmental screening exercise

Sl No.	Name	Gender	Social status	Contact number	Signature/LTI
১	[illegible]	পুরুষ	[illegible]	01712127301	[illegible]
২	[illegible]	"	[illegible]	01737064117	[illegible]
৩	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
৪	[illegible]	[illegible]	[illegible]	01992222001	[illegible]
৫	[illegible]	[illegible]	[illegible]	01718557088	[illegible]
৬	[illegible]	[illegible]	[illegible]	01734238011	[illegible]
৭	[illegible]	[illegible]	[illegible]	01724449116	[illegible]
৮	[illegible]	[illegible]	[illegible]	01728354984	[illegible]
৯	[illegible]	"	[illegible]	01992596803	[illegible]
১০	[illegible]	[illegible]	[illegible]	01915703674	[illegible]
১১	[illegible]	[illegible]	[illegible]	01716108827	[illegible]
১২	[illegible]	[illegible]	[illegible]	01721780670	[illegible]

Annexure 2: The list of GRC members along with the office order of the Mayor

শ্রীপুর পৌরসভা কার্যালয়

শ্রীপুর, গাজীপুর।

স্থাপিতঃ-২০০০ খ্রিঃ

স্মারক নং- শ্রীপস/ প্রশাঃ/ ২০১৮/৩৮৫ তারিখ ঃ ২৮/০৫/২০১৮খ্রিঃ .

বিষয়ঃ পৌর শালিশী বোর্ড কমিটি গঠন প্রসঙ্গে।

উপর্যুক্ত বিষয়ের আলোকে জানানো যাচ্ছে যে, গত ১৭/০৫/২০১৮ইং তারিখের মাসিক সভার সিদ্ধান্ত মোতাবেক পৌর শালিশী বোর্ডে কমিটি গঠন করা হয়।

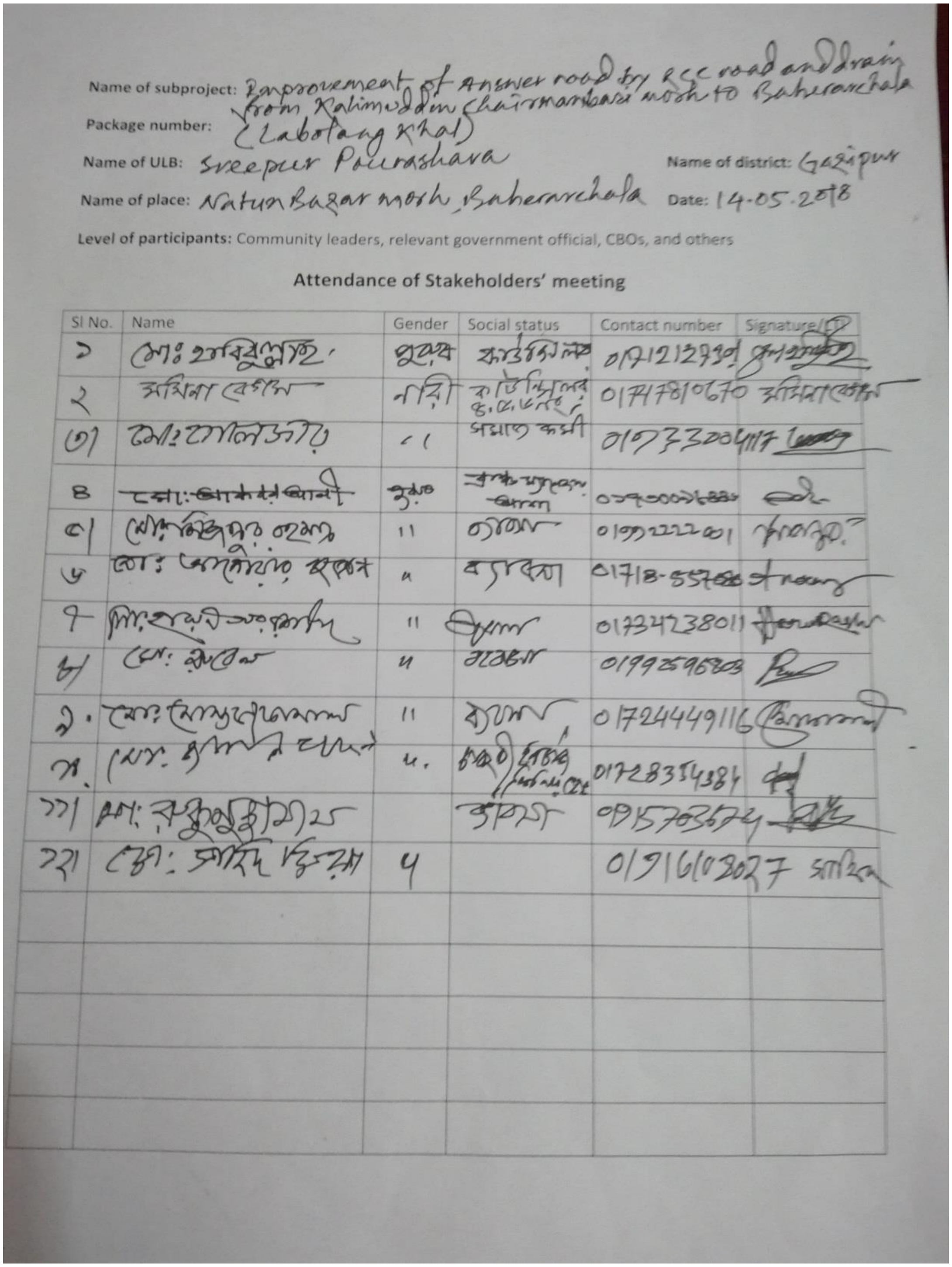
পৌর শালিশী বোর্ড এর কমিটি(GRC)

ক্র.নং	নাম	কমিটিতে পদবী	পদবী
০১	মোঃ আনিছুর রহমান	মেয়র	মেয়র শ্রীপুর পৌরসভা, গাজীপুর।
০২	জেলা প্রশাসক গাজীপুর এর প্রতিনিধি।	সদস্য	সহকারী কমিশনার ভূমি শ্রীপুর,গাজীপুর।
০৩	মোঃ আফজাল হোসাইন	সদস্য	সমন্বয়কারী ,প্লান বাংলাদেশ শ্রীপুর শাখা।
০৪	মোঃ আনোয়ার ফকির	সদস্য	অধ্যক্ষ মিজানুর রহমান খান মহিলা কলেজ।
০৫	মোঃ মাহবুবুর রহমান	সদস্য	সাংবাদিক বাংলাদেশ প্রতিদিন, শ্রীপুর,গাজীপুর।
০৬	মোঃ আমজাদ হোসেন	সদস্য	কাউন্সিলর শ্রীপুর পৌরসভা,গাজীপুর।
০৭	মোছাঃ মমতাজ মহল পারভীন	সদস্য	কাউন্সিলর শ্রীপুর পৌরসভা,গাজীপুর।
০৮	মোঃ লিয়াকত আলী মোল্লাহ	সদস্য	নির্বাহী প্রকৌশলী শ্রীপুর পৌরসভা,গাজীপুর।

28.05.18

(মোঃ আনিছুর রহমান)
মেয়র
শ্রীপুর পৌরসভা, গাজীপুর।

Annexure 3: Attendance of stakeholders' meeting



Name of subproject: Improvement of Answer road by RCC road and drain from Kalimuddin Chairmanbari morh to Baheranchala (Labotang Khal)

Package number:

Name of ULB: Sreepur Pourashava

Name of district: Gazipur

Name of place: Natun Bazar morh, Baheranchala

Date: 14-05-2018

Level of participants: Community leaders, relevant government official, CBOs, and others

Attendance of Stakeholders' meeting

Sl No.	Name	Gender	Social status	Contact number	Signature/TIP
১	মোঃ [illegible]	পুরুষ	কাউন্সিলর	01712127939	[illegible]
২	আমিনা বেগম	নারী	কাউন্সিলর ৪,৫,৬ নং	01717810670	আমিনা বেগম
৩।	মোঃ [illegible]	"	সমাজ কর্মী	01733004117	[illegible]
৪	~~মোঃ [illegible]~~	পুরুষ	[illegible]	[illegible]	[illegible]
৫।	মোঃ [illegible]	"	[illegible]	0199[illegible]	[illegible]
৬	মোঃ [illegible]	"	ব্যবসা	01718-557[illegible]	[illegible]
৭	[illegible]	"	[illegible]	01734238011	[illegible]
৮।	মোঃ [illegible]	"	[illegible]	01992596803	[illegible]
৯.	মোঃ [illegible]	"	[illegible]	01724449116	[illegible]
১০.	মোঃ [illegible]	".	[illegible]	01728354384	[illegible]
১১।	মোঃ [illegible]		[illegible]	[illegible]	[illegible]
১২।	মোঃ [illegible]	"		01916103027	[illegible]

Annexure 4: Attendance of community people in FGD (male)

Name of subproject: Improvement of Ansuer road by RCC road and drain from Kalimuddin Chairmanbari mosh to Baherarchala (Labolang Khal)

Package number:

Name of ULB: Sreepur Paurashava Name of district: Gazipur

Name of place: Natun Bazar mosh, Baherarchala Date: 13.05.2018

Level of participants: Community people (Male group)

Attendance of Community People in FGD

Sl No.	Name	Gender	Social status	Contact number	Signature/LTI
০১	মো. মোজাম্মেল হোসেন	পুরুষ	কাউন্সিলর	01711489119	[illegible]
02	সখিনা বেগম	মহিলা	কাউন্সিলর	01717810670	সখিনা বেগম
03	মো: তোফাজ্জল	পুরুষ	ব্যবসা	01715866477	[illegible]
04	মো: মাহজাহারুল ইসলাম	"	"	01712478690	[illegible]
05	মো: আশরাফ আলী খান	"	চাকরী টি এন্টারপ্রাইজ লি:	01720031915	[illegible]
06	" সিয়াম উদ্দিন সাকী	"	কৃষক	নাই	সিয়াম উদ্দিন
07	জহিরুল	"	চালক	01774777333	জহিরুল
08	মো: রুবেল মিয়া	"	ব্যবসা	01748957300	[illegible]
09	ABDUL Salam Akond	"	চাকরী গার্মেন্টস	01710975292	[illegible]
10	মো: রফিকুল ইসলাম	"	ব্যবসা	01721937609	[illegible]
11	" আজিজুল	"	"	01713543510	[illegible]
12	হাজী রোকনুজ্জামান	"	"	01713-539312	[illegible]
13	মো: কামাল হোসেন	"	"	01712923120	Kamal
14	মো: আকরাম	"	চালক	01950807364	আকরাম
15	মো: আলী বাবু	"	চালক	নাই	আলী
16	মো: কাজল	"	ব্যবসা	01760065024	কাজল
17.	মো: মজনু	"	"	018660093217	[illegible]

Annexure 5: Attendance of community people in FGD (female)

Name of subproject: Improvement of Ansyer road by RCC road and drain from Kalimuddin Chairmanbari mosh to Baherarchala (Labolang Khal)

~~Package number:~~

Name of ULB: Sreepur Paurashava   Name of district: Gazipur

Name of place: Natun Bazar mosh, Baherar chala   Date: 13.05.2018

Level of participants: Community people (Male group)

Attendance of Community People in FGD

Sl No.	Name	Gender	Social status	Contact number	Signature/LTI
01	মো: মোজাম্মেল হোসেন	পুরুষ	কাউন্সিলর	01711489119	Alom
02	সখিনা বেগম	মহিলা	কাউন্সিলর	01747810670	সখিনা বেগম
03	মো: তোফাজ্জল	পুরুষ	ব্যবসা	01715866477	মো: তোফাজ্জল
04	মো: মাহজাহারুল ইসলাম	〃	〃	01712478690	[illegible]
05	মো: আনোয়ারুল আলম খান	〃	চাকরী টেক্সটাইল মিঃ	01720031915	[illegible]
06	〃 সিরাজ উদ্দিন আকন্দ	〃	কৃষক	নাই	সিরাজ উদ্দিন
07	জহিরুল	〃	চালক	01774773333	জহিরুল
08	মো: কবিল মিয়া	〃	ব্যবসা	01748957300	কবিল
09	ABDUL Salam Akond	〃	চাকরী ম্যানেজার	01710975292	ASAkond
10	মো: রফিকুল ইসলাম	〃	ব্যবসা	01721937609	রফিকুল
11	〃 আজিজুল	〃	〃	01713543510	আজিজুল
12	হাজী রোকনুজ্জামান	〃	〃	01713-539312	[illegible]
13	মো: কামাল হোসেন	〃	〃	01712323120	Kamal
14	মো: আকরাম	〃	চালক	01950807364	আকরাম
15	মো: আলী বাবু	〃	চালক	নাই	আলী
16	মো: কাজল	〃	ব্যবসা	01760065024	কাজল
17	মো: মজনু	〃	〃	01866093217	মজনু

Annexure 6: Deed of agreement between PAPs and Sreepur Municipality

৳১০০ ৳১০০

একশত টাকা

কপ ০২২৬৯৯৮

Agreement between PAPs and ULB

আমরা নিম্নবর্নিত স্বাক্ষরকারীগণ অঙ্গীকার করছি যে, গাজীপুর জেলার শ্রীপুর পৌরসভা এলাকার আওতাধীন ০৫, ০৬, ০৭ ও ০৯ নং ওয়ার্ডের পৌরসভার জায়গায় মোঃ কলিমুদ্দিন চেয়ারম্যান বাড়ী মোড় হতে বহেরারচালা লবলংগ খাল পর্যন্ত রাস্তার পাশের কিছু জায়গা আমরা অবৈধভাবে দখল করে বিভিন্ন ধরনের স্থায়ী ও অস্থায়ী স্থাপনা নির্মান করে যে ব্যবসা-বানিজ্য কার্যক্রম পরিচালনা করছি তা শ্রীপুর পৌরসভা কর্তৃক বিএমডিএফ- এর আর্থিক সহায়তায় গৃহিত ড্রেন ও রাস্তা উন্নয়ন প্রকল্পের প্রস্তাবিত জায়গা। আমরা জনস্বার্থে সকলে সেচ্ছায়, নিজ দায়িত্বে ও নিজ খরচে উক্ত জায়গায় স্থাপিত সকল স্থাপনা অপসারন করবো এবং তাতে আমাদের কোনো বাঁধা বা আপত্তি থাকবেনা।

আমরা আরো অঙ্গীকার করছি যে, প্রকল্পটি সঠিকভাবে বাস্তবায়নের লক্ষে আগামী ১ (এক) মাসের মধ্যে রাস্তার পাশে যে সকল স্থায়ী-অস্থায়ী স্থাপনা আছে তাহা স্বজ্ঞানে, সেচ্ছায়, নিজ দায়িত্বে ও নিজেদের খরচে অপসারন করবো এবং কোন ধরনের ক্ষতিপূরন দাবি করবো না এবং এই মর্মে নিম্নে স্বাক্ষর করছি।

রাস্তার পার্শ্ববর্তী স্থায়ী ও অস্থায়ী স্থাপনা স্থানান্তরকারীদের নাম, পূর্ণ ঠিকানা ও স্বাক্ষর

ক্রমিক নং	নাম	পিতার নাম ও স্থায়ী ঠিকানা	মোবাইল নম্বর	স্থাপনার নাম	স্বাক্ষর
০১	শফিকুল ইসলাম	মোঃ কুদরত আলী, বেহেরাই মোড় চালার, ওয়ার্ড-০৭, শ্রীপুর	01713-517593	রড সিমেন্ট এর দোকান	শফিকুল ইসলাম
০২	মোঃ সুলেমান মিয়া	উসমান গনি, বেহেরাই মোড় চালার ওয়ার্ড নং-০৭	01725-384360	দোকান, ফার্নিচার	[illegible]
০৩	মোঃ সিদ্দিকুর রহমান	মৃত সামসুদ্দিন, বেহেরাই মোড় চালার, ওয়ার্ড-০৭	01718-267250	দোকান ফার্মেসী	[illegible]
০৩	মোঃ শফিকুল ফরাজী, পিতা হাজী করিম ফরাজী	বেহেরাই মোড়, চালার, শ্রীপুর পৌর; ওয়ার্ড-০৭.	01918-198205	দোকান -	শফিকুল ফরাজী
০৪	মোঃ নুরুল হক	সামসুদ্দিন, বেহেরাই মোড় চালার ওয়ার্ড নং-০৭	01726-543991	দোকান	[illegible]
০৫	মোঃ সোহাগ মিয়া, পিতা- মোবারক হোসেন	বেহেরাই মোড় চালার, ওয়ার্ড নং-০৭	01714-538596	বাড়ী -	[illegible]
০৬	মোঃ মিজানুর রহমান, পিতা- চাঁন আলী	বেহেরাই মোড় চালার, ওয়ার্ড নং-০৭	01992222001	বাড়ী -	মোঃ মিজানুর রহমান

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একশত টাকা

কপ ০২২৬৯৯৯

ক্রমিক নং	নাম	পিতার নাম ও স্থায়ী ঠিকানা	মোবাইল নম্বর	স্থাপনার নাম	স্বাক্ষর
07	মো: সাইফুল ইসলাম	আলমগীর হোসেন তেভাই মোড় চালা, ওয়ার্ড নং-07 শ্রীপুর	01713-54 8865	দোকান	[signature]
০৮	মো: আনোয়ার হোসেন	হাবিজ উদ্দিন	0171855 7080	বাড়ী	আনোয়ার
০৯	চায়না লেক পাওয়ার মোহ মো: রুকন উদ্দিন	তেভাই মোড় চালা নগর, গাজীপুর	0172835 4384. ওয়ার্ড নং-07	মিলস লি:	
১০	আসওয়াদ কম্পোজিট মো: জনাব নাদিম সিকদার	ঐ	017300 10397.	মিলস লি:	
১১	মো: সাখাওয়াত হোসেন পিতা- চাঁদে আলী	ঐ	0172063 9318	দোকান	[signature]
১২	মো: আজিজুল হক পিতা- জামাল আলী	বাংলা চালা- ওয়ার্ড নং-০৭	0171354 03510	দোকান + বাড়ী	আজিজুল
১৩	মো: নজরুল ইসলাম পিতা- সুরুজ আলী	ঐ	0173197 3419	দোকান	[signature]
১৪	মো: হাফিজুল হক পিতা- সামসুদ্দিন	ঐ	0171803 6686	দোকান	হাফিজ
১৫	মাহমুদ ও মাহফুজ আহমেদ / আ: খালেক	তেভাই মোড় চালা ওয়ার্ড নং-07	0171620 2795	দোকান	[signature]
১৬	মো: আবুল হাসেম পি: আ: সুবাহান	ঐ	0171432 6207.	বাড়ী + দোকান	আবুল হাসেম
১৭	মো: আজাহার- আলমগীর চান	ঐ	01710- 324378	দোকান	আজাহার
১৮	মো: আজগর আলী পিতা- হোসেন আলী-	ঐ	01711-20 9625	মার্কেট	আজগর
১৯	মো: আমজাদ হোসেন জামাল বক্স	ঐ	01	দোকান	আমজাদ

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একশত টাকা

কপ ০২২৭০০০

ক্রমিক নং	নাম	পিতার নাম ও স্থায়ী ঠিকানা	মোবাইল নম্বর	স্থাপনার নাম	স্বাক্ষর
২০	মো: আলী পিতা- হোসেন আলী	কেন্দুয়া সে, টালী ওয়ার্ড নং- ০৭	01713- 504974	দোকান + বাড়ী	মো: আবদুল আলিম
২১	এস কে সুয়েটার্স লি: এমডি এস আবুল কালাম	"	01716-333 706	ফ্যাক্টরী জি.এম,	
২২	সাইফুল হোসেন আজিজুল হক	"	01914 064796	বাড়ী	সাইফুল
২৩	মো: মাহফুজুর রহমান পিতা- মো: মমতাজুল হক	"	01924 849178	বাড়ী	[illegible]
২৪	মো: মোশারফ হোসেন পিতা- ময়েজ উদ্দিন	"	019910 22835	দোকান	মোশারফ হোসেন
২৫	মো: জামাল উদ্দিন পিতা- আমজাদ আলী	"	01930896369		[illegible]
২৬	মো: বাবুল উদ্দিন হোসেন আলী	"	01924-71 8192	বাড়ী	[illegible]
২৭	মো: ইমান আলী পিতা- মৃ: আম্মদ আলী	"	01911-79 8965	দোকান	ইমান
২৮	মো: আজিজুল হক পিং ইদ্রিস আলী	"	01730 160284	দোকান	[illegible]
২৯	মো: ওমেদ আলী পিতা- কাসেম আলী		01712-60 0167	দোকান মালিক	ওমেদ আলী
৩০	মো: নুরুজ্জামান আলী পিতা: কাসেম আলী	"	01717-33 5289	বাড়ী দোকান	[illegible]
৩১	মো: কাওছার হোসেন পিতা- মো: মমতাজুল হক	"	01711-51 7442	দোকান	[illegible]
৩২	মো: বাবুল মিয়া পিতা: নুরুল আলী	"	01915 666748	দোকান	বাবুল
৩৩	মো: আ: মজিদ [illegible]	"	0172460 584	দোকান	[illegible]

"দেশপ্রেমের শপথ নিন, দুর্নীতিকে বিদায় দিন"