Final Initial Environmental Examination

July 2015

BAN: Third Urban Governance and Infrastructure Improvement (Sector) Project—Sherpur Roads Subproject (Phase 1)
UGIIP-III-I/SHER/UT/01/2014
UGIIP-III/I/SHER/UT+DR/01/2014

Prepared by the Local Government Engineering Department, Government of Bangladesh for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of July 2015)

Currency Unit	=	BDT
BDT1.00	=	$0.0129
$1.00	=	BDT77.775

ABRREVIATIONS

ADB	–	Asian Development Bank
AP	–	affected person
BWDB	–	Bangladesh Water Development Board
DoE	–	Department of Environment
DPHE	–	Department of Public Health Engineering
EARF	–	environmental assessment and review framework
ECA	–	Environmental Conservation Act
ECC	–	environmental clearance certificate
ECR	–	Environmental Conservation Rules
EIA	–	environmental impact assessment
EMP	–	environmental management plan
ETP	–	effluent treatment plant
FGD	–	focus group discussion
GICDC	–	Governance Improvement and Capacity Development Consultant
GRC	–	grievance redressal cell
GRM	–	grievance redress mechanism
IEE	–	initial environmental examination
LCC	–	location clearance certificate
LGED	–	Local Government Engineering Department
MDSC	–	Management Design and Supervision Consultant
MLGRDC	–	Ministry of Local Government, Rural Development, and Cooperatives
O&M	–	operations and maintenance
PIU	–	project implementation unit
PMO	–	project management office
PPTA	–	project preparatory technical assistance
REA	–	rapid environmental assessment
RP	–	resettlement plan
SPS	–	Safeguard Policy Statement
ToR	–	terms of reference

WEIGHTS AND MEASURES

ha	–	hectare
km	–	kilometer
m	–	meter
mm	–	millimeter

GLOSSARY OF BANGLADESHI TERMS

crore	–	10 million (= 100 lakh)
ghat	–	boat landing station
hartal	–	nationwide strike/demonstration called by opposition parties
khal	–	drainage ditch/canal
khas, khash	–	belongs to government (e.g. land)
katcha	–	poor quality, poorly built
lakh, lac	–	100,000
madrasha	–	Islamic college
mahalla	–	community area
mouza	–	government-recognized land area
parashad	–	authority (pourashava)
pourashava	–	municipality
pucca	–	good quality, well built, solid
thana	–	police station
upazila	–	sub district

NOTES

(i) In this report, "$" refers to US dollars.
(ii) —BDT refers to Bangladeshi Taka

Asian Development Bank

Government of the People's Republic of Bangladesh
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Local Government Engineering Department

FINAL REPORT

Name of Project :
Third Urban Governance and Infrastructure Improvement Sector Project (UGIIP-III)

(39295 - 032 BAN)
TA - 8339 BAN

INITIAL ENVIRONMENTAL EXAMINATION (IEE FOR ROADS)

Pourashava : Sherpur

Package No. : UGIIP-III-I/SHER/UT/01/2014

Joint Venture of

Hifab International AB, Sweden
KS Consultants Ltd., Bangladesh
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CONTENTS

Page

I. INTRODUCTION 1
II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK 2
A. ADB Policy 2
B. National Laws 3
C. Government of Bangladesh Environmental Assessment Procedures 4
III. DESCRIPTION OF THE PROJECT 5
A. The Study Area 5
B. Existing Condition and Need for the Project 5
C. Proposed Components 5
D. Implementation Schedule 11
IV. DESCRIPTION OF THE ENVIRONMENT 15
A. Methodology Used for the Baseline Study 15
B. Physical Characteristics 15
C. Biological Characteristics 16
D. Socioeconomic Characteristics 17
E. Historical, Cultural and Archaeological Characteristics 19
V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES 19
A. Methodology 19
B. Screening out Areas of No Significant Impact 19
C. Anticipated Impacts and Mitigation Measures – Planning and Design Phase 20
D. Anticipated Impacts and Mitigation Measures – Construction Phase 22
E. Anticipated Impacts and Mitigation Measures – Operations and Maintenance Phase 28
F. Cumulative Impact Assessment 31
VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION 32
A. Public Consultation Conducted 32
B. Future Consultation and Disclosure 33
VII. GRIEVANCE REDRESS MECHANISM 33
VIII. ENVIRONMENTAL MANAGEMENT PLAN 36
A. Institutional Arrangement 37
B. Safeguard Implementation Arrangement 37
C. Institutional Capacity Development Program 64
D. Staffing Requirement and Budget 64
IX. MONITORING AND REPORTING 69
X. CONCLUSION AND RECOMMENDATIONS 70

Appendixes

Appendix 1: Rapid Environmental Assessment Checklist 72
Appendix 2: Environmental Standards and Application Fees 74
Appendix 3: Levels of Service for Proposed Interventions – Roads 76
Appendix 4: Sample Outline Spoils Management Plan 77
Appendix 5: Sample Outline Traffic Management Plan 78
Appendix 6: RECORDS OF PUBLIC CONSULTATIONS AND FGDS 88
Appendix 7: Sample Grievance Registration Form 98
Appendix 8: Sample Semi-Annual Reporting Format 99

EXECUTIVE SUMMARY

1. After the successful implementation of the First and Second Urban Governance and Infrastructure Improvement Projects (UGIIP I and II)1 in 74 selected pourashavas, the Local Government Engineering Department (LGED) within the Ministry of Local Government, Rural Development and Cooperatives (MLGRDC) with the financial assistance of Asian Development Bank (ADB) have planned to implement the third phase of the project titled the Third Urban Governance and Infrastructure Improvement Project (UGIIP-3) in selected 30 pourashavas over a period of 6 years (2014 to 2020).

2. The impact will be improved living environment in project towns. The outcome will be improved municipal service delivery and urban governance in project towns. Project towns are pre-selected 30 towns to be supported in an integrated manner under the project.

3. A sector-lending approach will be used for the project as it has been well established and successfully practiced in the UGIIP I and II.

4. The Local Government Engineering Department (LGED) and the Department of Public Health Engineering (DPHE), both under the Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives (MLGRD&C) and having extensive experience in managing urban and water supply projects financed by ADB, will be the executing agencies of the project.

5. The Sherpur roads subproject is one of the subprojects proposed under UGIIP-3. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for environmental assessment are described in ADB's Safeguard Policy Statement (SPS), 2009. This is the draft initial environmental examination (IEE) based on the feasibility study and preliminary engineering designs prepared during project preparation. This IEE will be finalized during detailed design stage to reflect any changes and latest subproject designs.

6. Categorization. An environmental assessment using ADB's Rapid Environmental Assessment (REA) checklist for roads (Appendix 1) was conducted and results of the assessment show that the subproject is unlikely to cause significant adverse impacts. Sherpur roads subproject is classified as environmental category B as per ADB SPS. This initial environmental examination (IEE) has been prepared in accordance with ADB SPS's requirements for environment category B projects and provides mitigation and monitoring measures to ensure no significant impacts as a result of the subproject.

7. As per Government of Bangladesh Environment Conservation Act, 1995 (ECA, 1995) and Environment Conservation Rules (ECR, 1997), Sherpur roads subproject is categorized as

[1] The Government of Bangladesh with the assistance of ADB has introduced a system whereby funds/loans for development are disbursed in a phased manner based on the successful accomplishment by the recipient *pourashavas* of a set of performance-criteria in the area of urban governance. UGIIP I and II reflect this approach which aims to incentivize participating *pourashavas* to become well-managed and maintained towns in a sustainable way through systems of governance ensuring citizen's participation and inclusion of women, poor and the minority groups in *pourashava* activities. UGIIP I targeted for 27 and UGIIP II for 47*pourashavas*. The subprojects were (i) water supply (ii) sanitation, (iii) solid waste management, (iv) urban drainage, (v) urban transport & communication and (vi) public use facilities.

"Orange-B" and location clearance certificate (LCC) and environmental clearance certificate (ECC) must be obtained from the DoE.

8. Subproject scope. Phase 1 implementation will involve improvement of 28.915 km of existing roads.

9. Implementation arrangements. Local Government Engineering Department (LGED) and Department of Public Health Engineering (DPHE) are the executing agencies (EA). LGED is responsible for providing support and guidance to pourashavas concerning performance criteria and pourashava development planning. Department of Public Health Engineering (DPHE) will provide support in water supply and sanitation schemes. Implementation activities will be overseen by a Project Management Office (PMO). The participating pourashavas are the implementing agencies, with a project implementation unit (PIU) within the pourashava structure. Consultant teams2 are responsible for (i) detailed engineering design, contract documents preparation and safeguards facilitation; (ii) project management and administration support; (iii) assistance in supervising construction; (iii) strengthening of local governance, conducting required studies/surveys and (iv) awareness raising on behavioral change in water, sanitation and solid waste management activities.

10. Description of the environment. Subproject components are located in Sherpur urban area or in its immediate surroundings which were developed into urban land uses. The subproject sites are located in existing right of ways (ROWs) and government-owned land. There are no protected areas, wetlands, mangroves, or estuaries in or near the subproject location. There are no forest areas within or near Sherpur.

11. Environmental management. An environmental management plan (EMP) is included as part of this IEE, which includes (i) mitigation measures for environmental impacts during implementation; (ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting; (iii) public consultation and information disclosure; and (iv) a grievance redress mechanism. A number of impacts and their significance were reduced through mitigation measures in the preliminary design stage. The EMP will form part of the civil work bidding and contract documents.

12. Locations and siting of the proposed infrastructures were considered to further reduce impacts. The concepts considered in design of the Sherpur roads subproject are: (i) locating facilities on government-owned land to avoid the need for land acquisition and relocation of people; (ii) prioritizing rehabilitation over new construction using public right of ways (ROWs), and taking all possible measures in design and selection of site or alignment to avoid resettlement impacts; (iii) avoiding where possible locations that will result in destruction/disturbance to historical and cultural places/values; (iv) avoiding tree-cutting where possible; (v) ensuring all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultation and disclosure for site selection.

13. During the construction phase, impacts mainly arise from (i) disturbance of residents, businesses, and traffic; (ii) need to manage excess construction materials and spoils; and (iii) community and workers health and safety. These are common impacts of construction in urban

[2] Consultant teams are composed of Management Design and Supervision Consultants (MDSC) and Governance Improvement and Capacity Development Consultants (GICDC).

areas, and there are well developed methods for their mitigation. Measures such as conducting work in lean season and minimizing inconvenience by best construction methods will be employed. Traffic management will be necessary during excavation works on busy roads. In the operational phase, all facilities and infrastructure will operate with routine maintenance, which should not affect the environment. Facilities will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only.

14. Mitigation measures have been developed to reduce all negative impacts to acceptable levels and will be assured through a program of environmental monitoring. The monitoring program will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. The PMO will submit semi-annual monitoring reports to ADB which will include a detailed review of EMP implementation, including corrective actions taken.

15. Consultation, disclosure and grievance redress. The stakeholders were involved in developing the IEE through discussions on-site and public consultation, after which views expressed were incorporated into the IEE and in the planning and development of the subproject. The IEE will be made available at public locations in the pourashava and will be disclosed to a wider audience via the ADB and LGED project websites. The consultation process will be continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation. A grievance redress mechanism is described within the IEE to ensure any public grievances are addressed quickly.

16. Monitoring and reporting. The PMO, PIU (Sherpur pourashava), and Management Design and Supervision Consultants (MDSC) will be responsible for safeguard monitoring. The MDSC will submit monthly monitoring reports to PMO, and the PMO will send semi-annual monitoring reports to ADB. ADB will post the semi-annual environmental monitoring reports on its website as part of its disclosure requirements.

17. Conclusions and recommendations. The citizens of Sherpur will be the major beneficiaries of this subproject. The proposed subproject is unlikely to cause significant adverse impacts and net environmental benefits to citizens of Sherpur will be positive. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures.

18. Based on the findings of the IEE, there are no significant impacts and the classification of the subproject as Category “B” is confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS, 2009.

I. INTRODUCTION

1. After the successful implementation of the First and Second Urban Governance and Infrastructure Improvement Projects (UGIIP I and II)[3] in 74 selected *pourashavas*, the Local Government Engineering Department (LGED) within the Ministry of Local Government, Rural Development and Cooperatives (MLGRDC) with the financial assistance of Asian Development Bank (ADB) have planned to implement the third phase of the project titled the Third Urban Governance and Infrastructure Improvement Project (UGIIP-3) in selected 30 *pourashavas* over a period of 6 years (2014 to 2020).

2. The impact will be improved living environment in project towns. The outcome will be improved municipal service delivery and urban governance in project towns. Project towns are pre-selected 30 towns to be supported in an integrated manner under the project. UGIIP-III will improve existing and provide new municipal infrastructures including (i) roads; (ii) drainages; (iii) water supply system; (iv) solid waste management facilities; (v) slaughterhouses; (vi) markets, community center/auditorium, bus and truck terminals and river *ghats*; (vii) public toilets; and (viii) others such as provision for street lighting and improvement of slums.

3. A sector-lending approach will be used for the project as it has been well established and successfully practiced in the UGIIP I and II.

4. The Local Government Engineering Department (LGED) and the Department of Public Health Engineering (DPHE), both under the Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives (MLGRD&C) and having extensive experience in managing urban and water supply projects financed by ADB, will be the executing agencies of the project.

5. Sherpur roads subproject is one of the subprojects proposed under UGIIP-3. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for environmental assessment are described in ADB's Safeguard Policy Statement (SPS), 2009.

6. **Categorization.** An environmental assessment using ADB's Rapid Environmental Assessment (REA) checklist for roads (**Appendix 1**) was conducted and results of the assessment show that the subproject is unlikely to cause significant adverse impacts. Sherpur roads subproject is classified as environmental category B as per ADB SPS. This initial environmental examination (IEE) has been prepared in accordance with ADB SPS's requirements for environment category B projects and provides mitigation and monitoring measures to ensure no significant impacts as a result of the subproject.

[3]The Government of Bangladesh with the assistance of ADB has introduced a system whereby funds/loans for development are disbursed in a phased manner based on the successful accomplishment by the recipient *pourashavas* of a set of performance-criteria in the area of urban governance. UGIIP I and II reflect this approach which aims to incentivize participating *pourashavas* to become well-managed and maintained towns in a sustainable way through systems of governance ensuring citizen's participation and inclusion of women, poor and the minority groups in *pourashava* activities. UGIIP I targeted for 27 and UGIIP II for 47*pourashavas*. The subprojects were (i) water supply (ii) sanitation, (iii) solid waste management, (iv) urban drainage, (v) urban transport & communication and (vi) public use facilities.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

7. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. This states that ADB requires environmental assessment of all ADB investments.

8. **Screening and categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project; the sensitivity, scale, nature, and magnitude of its potential impacts; and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts, and are assigned to one of the following four categories:

(i) **Category A.** Projects could have significant adverse environmental impacts. An EIA is required to address significant impacts.

(ii) **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.

(iii) **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.

(iv) **Category FI.** Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all projects will result in insignificant impacts.

9. This draft IEE for the Sherpur roads subproject is based on the feasibility study and preliminary engineering designs prepared during project preparation. This IEE will be finalized during detailed design stage to reflect any changes and latest subproject designs.

10. **Environmental management plan.** An EMP, which addresses the potential impacts and risks identified by the environmental assessment, shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the project's impact and risks.

11. **Public disclosure.** ADB will post the following safeguard documents on its website. Relevant information from these documents will also be disclosed in local communities in a form and language understandable and accessible to the public. :

(i) for environmental category A projects, draft EIA report at least 120 days before Board consideration;
(ii) final or updated EIA and/or IEE upon receipt; and
(iii) environmental monitoring reports submitted by the Project Management Office (PMO) during project implementation upon receipt.

B. National Laws

12. Implementation of all subprojects will be governed by the environmental acts, rules, policies, and regulations of the Government of Bangladesh. These regulations impose restrictions on the activities to minimize/mitigate likely impacts on the environment. Many of these are cross-sectoral and several of them are directly related to environmental issues. The most important of these are the Environment Conservation Act, 1995 (ECA, 1995), and the Environment Conservation Rules (ECR, 1997).

13. Table 1 presents specific requirements for the Sherpur roads subproject. **Appendix 2** provides the environmental standards for air, surface water, groundwater, drinking water, emissions, noise and vehicular exhaust.

Table 1: Applicable Government of Bangladesh Environmental Legislations

	Legislation	Requirements for the Project	Relevance
1.	Environmental Conservation Act of 1995 and amendments in 2000, 2002 and 2010 [4]	• Restriction on operation and process, which can be continued or cannot be initiated in the ecologically critical areas • Regulation on vehicles emitting smoke harmful to the environment • Remedial measures for injuries to ecosystems • Standards for quality of air, water, noise and soil for different areas for various purposes and limits for discharging and emitting waste • Environmental guidelines	The provisions of the act apply to the entire subproject in the construction and operation and maintenance (O&M) phases.
2.	Environmental Conservation Rules of 1997 and amendments in 2002 and 2003	• Environmental clearances • Compliance to environmental quality standards	The subproject is categorized as Orange-B and requires locational clearance certificate (LCC) and environmental clearance certificate (ECC). All requisite clearances from DoE shall be obtained prior to commencement of civil works.
3.	Forest Act of 1927 and amendments (2000)	• Clearance for any felling, extraction, and transport of forest produce	Considered in subproject preparation and implementation.
4.	Bangladesh Climate Change Strategy and Action Plan of 2009	• Ensure existing assets is put in place to deal with the likely impacts of climate change. • Enhance the capacity government ministries, civil society and private sector to meet the challenge of climate change	Considered in subproject preparation and implementation.
5.	Bangladesh Labor Law of	• Compliance to the provisions on	Considered in the EMP.

[4] *ECA Amendment 2000* focuses on ascertaining responsibility for compensation in cases of damage to ecosystems, increased provision of punitive measures both for fines and imprisonment and the authority to take cognizance of offences. *ECA Amendment 2002* elaborates restrictions on polluting automobiles; restrictions on the sale, production of environmentally harmful items like polythene bags; assistance from law enforcement agencies for environmental actions; break up of punitive measures; and authority to try environmental cases. In *ECA Amendment 2010,* no individual or institution (government or semi-government/non-government/self-governing can cut any hill or hillock; fill-up or changed any remarked water body however in case of national interest; the mentioned activities can be done after getting clearance from respective the departments.

	Legislation	Requirements for the Project	Relevance
	2006	employment standards, occupational safety and health, welfare and social protection, labor relations and social dialogue, and enforcement • Prohibition of employment of children and adolescent	

C. Government of Bangladesh Environmental Assessment Procedures

14. Under ECA, 1995 and ECR, 1997 industrial units and projects are classified into four categories according to “their site and impact on the environment” and size of investment, and each category (Green, Orange-A, Orange-B and Red) requires a different level of environmental assessment as a prerequisite for the Department of Environment (DoE) in granting the LCC and ECC that allow the project to proceed.

15. As per Schedule 1 of ECA, 1995Sherpur roads subproject is likely to be classified as Orange-B category (Table 2). Thus ECC is required from the DoE prior to commencement of the subproject.

Table 2: Likely Government of Bangladesh Classification of Sherpur Roads Subproject

	Subproject	Component	Equivalent in Schedule I of ECR	DoE Classification
1.	Roads, and culverts	Road provisions (include new road, road resurfacing, roadside footpath, roadside drains, road signs, road/pavement markings, intersection improvement, or high mast lighting)	Construction, re-construction and extension of road (feeder road, local road)	Orange – B

16. Rule 7 of the ECR, 1997 indicates that the application for ECC must be made to the relevant DoE Divisional Officer, and the application for Orange-B category projects will include the following:

i. Completed Application for ECC, and the appropriate fee;
ii. Report on the feasibility of the project;
iii. Report on the IEE for the project;
iv. Report on the environmental management plan (EMP);
v. No objection certificate from the local authority;
vi. Emergency plan relating to adverse environmental impact and plan for mitigation of the effect of pollution; and
vii. Outline of the relocation and rehabilitation plan (where applicable).

17. DoE has 30 days to respond to receipt of the ECC application for an Orange-B category project.

18. This draft IEE will serve the basis for the ECC application and will be supplemented to fulfill any additional government requirements.

III. DESCRIPTION OF THE PROJECT

A. The Study Area

19. Sherpur is a district of Dhaka division in the north of Bangladesh and lies between 24º90´ and 26º93´ north latitudes and between 90º02´ and 90º03´ east longitudes. The area of the Sherpur Pourashava is 24.75 sq.km and its total population as of 2011 is 97,979.

20. Subproject components are located in Sherpur urban area or in its immediate surroundings which were converted into urban use for many years ago, and there is no natural habitat left at these sites. The subproject sites are located in existing right of way (RoWs) and government-owned land. There are no protected areas, wetlands, mangroves, or estuaries in or near the subproject location. There are no forest areas within or near Sherpur. The location map is shown as Figure 1.

B. Existing Condition and Need for the Project

21. The total length of the roads in Sherpur is 111.10km and generally fall into two categories: *kutcha* (earthen) construction and *pukka* (formed) roads.

22. Formed roads are mainly black-topped (BT) asphalt roads with some concrete (bituminous carpeting [BC] and cement concreting [CC]) roads in a few places for main roads, while minor roads may also be brick-on-edge soling, known locally as herring bone bond (HBB). Existing road conditions in Sherpur are given in Table 3.

Table 3: Existing Road Conditions of Sherpur Pourashava

Road type	Length in km	Present conditions
1. BC and CC Roads	57.02	Around 40% in good condition
2. Herring bone bond (HBB) roads	2.00	Nearly 60% in good condition
3. WBM Roads	26.42	Not in good condition
4. Earthen Roads	25.56	40% in good condition
Total	111.10	

Source: PPTA Consultant.
Note: BC = bituminous carpet; BT = black-topped; CC = cement concrete; HBB = herring bone bond

23. Most of the roads are no more than 3 meters (m) in width and in some cases smaller, hence cannot accommodate the present traffic flow. Besides, there is little or no footpath at all, so they are inconvenient for pedestrians and minor accidents are commonplace. Maintenance of the roads are largely poor and inadequate.

24. Mostly appropriate road designs may not be followed while building these roads so they remain vulnerable to damage and decay well before the normal design life. Roads mostly lack side drainages with consequent stagnation and water logging affecting the shearing parameters of these roads that shortens the road life.

C. Proposed Components

25. Figure 2 shows the locations of the proposed roads in the *pourashava*.

26. Roads necessary for improvement/rehabilitation were surveyed by the project preparatory technical assistance (PPTA) consultants during the project preparation stage and an inventory of required works was conducted with the assistance of the *pourashava* engineers

considering (i) all necessary issues and findings such as existing conditions, type, formation level (rise), widening, shoulder/footpath, side-drain, cross-drain/culvert, etc; (ii) roads with high target beneficiaries; and (iii) strategically important roads that have good linkage in the development of road communication networks. The identified roads were finalized through the workshop organized in the *pourashava* in the presence of the mayor, councilors, engineers; PPTA team and invited officials from relevant organizations.

27. To accommodate climate change related inundation and annual floods, each road was assessed against whether: (i) existing crest level is 600 millimeters (mm) above existing normal flood level; (ii) road embankments are protected against annual floods; and (iii) drainage is adequate to accommodate rainfall runoff. **Appendix 3** outlines proposed standards and additional climate change measures for level of service for proposed roads.

28. The major considerations adopted for preliminary design were as follows: (i) LGED's road design manual and standards followed. The road design type 6 for BC pavement was considered, with some modifications; (ii) guidelines on climate change resilience and adaptation measures (**Appendix 3**) were studied and accommodated as necessary; and (iii) existing bitumen finished surface (BFS) and HBB roads were considered for improvement with CC or reinforced cement concrete (RCC)pavement where necessary, with modified design standard. In general, the following are the major features of the roads and design guidelines:

i. The roads lying on low level of lands are vulnerable to flood water and/or rainwater and hence require CC/RCC surface instead of asphalt surface. Roads lying on low-lands with heavy traffic loads will be improved with RCC surface works.
ii. The roads with poor quality of side drains will be improved along with side drain improvement by replacing the existing brick-drains with RCC drains to withstand heavy traffic loads.

29. Table 4 presents the proposed roads for rehabilitation in Sherpur. Figures 3 to 5 show the typical sections of different types of roads that may be used in the subproject. This IEE covers twenty five roads with a total length of 28.915 km (Table 5) to be rehabilitated under Phase 1 (see implementation schedule). This IEE will be updated with the final road designs to be prepared during the detailed design phase.[5]

Table 4: Proposed Roads for Rehabilitation in Sherpur

Road ID No.	Name of Road	Length (km)
R-1	Development of B.C. Road from town hall mour at Raghunath bazer to Sajborkhila RHD Road via Afsorali Gails school (Ch. 0+00 to 0+900.00)	0.9
R-2	Development of road by B.C & R.C.C from Sherpur – Sribordi RHD road near Bisic I/A to Sherpur – jhinigati RHD road at kanadapara via nowhata govt primary School & h/o mojibor master (Ch. 0+00 to 0+1600.00)	1.6
R-3	Repairing of B.C. Road from Sherpur Jamalpur RHD road near Attimkhana to thanamour RHD road (Ch. 0+00 to 0+1100.00)	1.1
R-4	Development of road by R.C.C from Sherpur – Jamalpur RHD road near BRCK Office towards Pogalbari (Ch. 0+00 to 0+700.00)	0.7
R-5	Development of road by B.C. from Mirgonj B.C road near h/o Baiazid to Jaillkhana	0.7

[5] A new IEE will need to be prepared for each phase, which would require a simple updating of this IEE, as follows: Sherpur Roads (Phase II) IEE and Sherpur Roads (Phase III) IEE.

Road ID No.	Name of Road	Length (km)
	- Alfalaha B.C road (Ch. 0+00 to 0+700.00)	
R-6	Development of road by R.C.C from Sherpur Charsherpur B.C road near Bottola tampo stand to Sherpur- Jamalpur RHD road near LGED office via h/o Jahangir & Contractor Abdul Mannan (Ch. 0+00 to 0+700.00)	0.7
R-7	Development of road by B.C from Attimkhana-Dhupagate B.C road (Near Bairbaid mosque) to Sherpur Charsherpur B.C road near Talukdarbari via majibari mondir (Ch. 0+00 to 0+2000.00)	2.0
R-8	Development of road by R.C.C from Sherpur Shribordi RHD road near Likhon Cenema Hall towards Kudllapara via h/o Bulbul (Ch. 0+00 to 0+700.00)	0.7
R-9	Development of road by R.C.C from Jamur Dukan B.C road near H/o Minto to Barek para B.C road near Banglalink Tower at West Goripur(Ch. 0+00 to 0+600.00)	0.6
R-10	Development of road by B.C from Sherpur Shribordi RHD road near Mubarak Primary School to Sherpur Shribordi RHD road near h/o Johur Khalifa at Mubarkapur (Ch. 0+00 to 0+1000.00)	1.0
R-11	Repairing of road by B.C from Sherpur –Jamalpur RHD road to dhupaghat bridge (Ch. 0+00 to 0+3200.00)	3.2
R-12	Development of road by B.C from Kharampur mour to Sherpur -Jamalpur RHD road at west shiripura via Shingpura and dhupa vuri (Ch. 0+00 to 0+2050.00)	2.05
R-13	Repairing of road by B.C & R.C.C from Public library mour near laheri kacheri to dhupavuri B.C road via Madhobpur (Ch. 0+00 to 0+650.00)	0.65
R-14	Development of road by R.C.C from Kharampur mosque to Madhobpur B.C road via Madhobpur Govt Heigh School (Ch. 0+00 to 0+500.00)	0.5
R-15	Repairing of road by B.C from Gopalbari truck stand to dhakalhati B.C road via swiper coloni (Ch. 0+00 to 0+840.00)	0.84
R-16	Development of road by R.C.C from Attimkhana-Dhupagate B.C road near Bairbaid mosque towards near h/o Arshadur Rhaman (Ch. 0+00 to 0+500.00)	0.5
R-17	Development of road by R.C.C from Attimkhana-Dhupagate B.C road near shop of Sekam towards h/o Eidu at Kasbakatgor via Garopara (Ch. 0+00 to 0+600.00)	0.6
R-18	Development of road by R.C.C from Kaligong Kudal Bari to h/o Ismail Pondit (Ch. 0+00 to 1000.00)	1.0
R-19	Development of road by R.C.C from Kasba kacharipara B.C road near h/o Robbani Sharkar towards h/o nurul amain (Ch. 0+00 to 0+670.00)	0.67
R-20	Repairing of road by B.C from Dhaka Sherpur RHD road near nabinagor Farukia Madrasha towarda Pakuria UP via h/o Hamid Commisinoer (Ch. 0+00 to 0+1000.00)	1.0
R-21	Development of road by C.C from Sherpur – Gazirkamar R.H.D road towards h/o Paquaria UP Chairmen Anwer (Nijamuddin road) (Ch. 0+00 to 0+300.00)	0.3
R-22	Repairing of road by B.C from Tinani bazer Sherpur Khoarpur RHD road to Sherpur-Gajirkhamar B.C road at Shekhati Primary School via Bottola mour (Ch. 0+00 to 0+2100.00)	2.1
R-23	Repairing of road by B.C from old IRP mour towarda gridanarayonpur via Owarles office & Nagpara mour (Ch. 0+00 to 0+1400.00)	1.4
R-24	Development of road by R.C.C from Sherpur – Jamalpur RHD, road at East Shari to Sherpur – Jamalpur RHD road at West Shari via h/o Eng: Ishak (Ch. 0+00 to 0+485.00)	0.485
R-25	Development of road by R.C.C from nabinogor – Factory mour B.C road near h/o Sahain to Durganarayanpur B.C road near rice mill of mongol saha (Ch. 0+00 to 0+400.00)	0.4
R-26	Development of road by R.C.C from Dhaka – Sherpur by pass road near Shoni Mondir towards East Shari Palpara via h/o Harun Police (Ch. 0+00 to 0+190.00)	0.19
R-27	Development of road by B.C from Attimkhana-Dhupagate B.C road near shop of Sekam towards mrigi river via h/o tara (Ch. 0+00 to 0+500.00)	0.5
R-28	Development of road by R.C.C from Dhaka Sherpur RHD road near Gas office towards stadium Approach road (Ch. 0+00 to 0+300.00)	0.3
R-29	Development of road by R.C.C from Anarkoli Sallun – Rouhabill B.C road near North Nabinogor Mosque to Nabinogor Farokia madrasha – Pokoria UP B.C road via h/o Bakkar at Nabinogor (Ch. 0+00 to 0+270.00)	0.27
R-30	Development of road by R.C.C from Anarkoli Sallun – Rouhabill B.C road near h/o Amded to h/o Tohour Professer via h/o Jiaul B.Sc (Ch. 0+00 to 0+300.00)	0.3
R-31	Development of road by R.C.C from Sozborkhila RHD road near Borkot Bekary to	0.31

Road ID No.	Name of Road	Length (km)
	Gouripur B.C road near h/o Auzit Babu via rice mill of Kanchon mia (Ch. 0+00 to 0+310.00)	
R-32	Development of road by B.C from Indirar mour – Kamaria B.C road near Shampa rice mill towards Dhakalhati B.C road near Chicku Mullha's rice mill (Ch. 0+00 to 0+1000.00)	1.0
R-33	Repairing of road by B.C from Sherpur – Gazirkamar B.C road near Civilsurzen Quater to Dhakalhati B.C road near Shaki rice mill (Ch. 0+00 to 0+370.00)	0.37
R-34	Development of road by R.C.C from Old AIRP mour – Owarles mour B.C road near h/o Forid at Shivbari to Sherpur Guzerkamar B.C road near Zami clinic (Ch. 0+00 to 0+300.00)	0.3
R-35	Development of road by B.C from Sherpur -Charsherpur B.C road near h/o Guthu to Shri Brige- dhupaghat B.C road near Shop of Sekam via h/o Saidur (Ch. 0+00 to 0+350.00)	0.35
R-36	Development of road by R.C.C from Gouripur B.C road near h/o Salauddin Kazi to Moitribari Field via h/o Fazlul Haque Bdsha (Ch. 0+00 to 0+200.00)	0.2
R-37	Development of road by R.C.C from Razbollabpur B.C road near Poddomoni house towards h/o Faruque motor cycle Mechanic Masud via Nabarun School under Sherpur Pourashava. (Ch. 0+00 to 0+375.00)	0.375
R-38	Development of road by R.C.C from Sherpur -Charsherpur B.C road near Modina Bacari towards h/o Jakir (Ch. 0+00 to 0+230.00)	0.23
R-39	Development of road by R.C.C from Dhaka Sherpur RHD road near Shop of Mofazzal Hazi towards h/o Mosharof at nabinogor (Ch. 0+00 to 0+200.00)	0.2
R-40	Development of road by B.C & R. C.C from Singpara B.C road near h/o Bazlul Karim to Sherpur – Jamalpur RHD road near Sayedbari via Baroipara (Ch. 0+00 to 0+1000.00)	1.0
R-41	Development of road by R.C.C from Bagraksha Internal road near h/o Musharof towards Existing R.C.C road near pond of Sahid via h/o Adv. Touhid at Bagraksha (Ch. 0+00 to 0+210.00)	0.21
R-42	Repairing of road by B.C from Dhaka Sherpur RHD road at nabinagor mour to Sherpur Gajirkhamer RHD road near Factry mour via gridanarayonpur and Razbollavepur (Ch. 0+00 to 0+1500.00)	1.5
R-43	Development of road by R.C.C from h/o X Commisonar Abdul Hamid to h/o Ainul Ali at nabinogor (Ch. 0+00 to 0+100.00).	0.1
R-44	Development of road by R.C.C from Shari Bridge- Dhupaghat B.C road near h/o Noushad to Sherpur – Jamalpur RHD road- Pagolbari R.C.C road (proposed) (Ch. 0+00 to 0+1000.00).	1
R-45	Development of road by B.C from Sherpur –Jamalpur RHD road near sheri bridge to attimkhana – dhupaghat bridge B.C road (Ch. 0+00 to 0+2200.00).	2.2
R-46	Development of road by B.C from Shari Bridge – Dhupagate B.C road (proposed) near h/o Atauar towards mrigi river via h/o Eidu (Ch. 0+00 to 0+285.00).	0.285
R-47	Development of road by R.C.C from Sherpur Charsherpur B.C road near Hazrot Sha kamal mazur road to h/o Samad (Ch. 0+00 to 0+670.00).	0.67
R-48	Repairing of road by R.C.C from Sherpur – Gazirkamar B.C road near shop of Monda towards h/o Pothik (Ch. 0+00 to 0+350.00).	0.35
R-49	Development of road by R.C.C from h/o Shazu to h/o Khalifa at Rajballavpur (Ch. 0+00 to 0+200.00).	0.2
R-50	Road by B.C from Sherpur Shribordi B.C road near Akhermamud bazer to h/o Shafikul via Koinapara h/o mufazul (Ch. 0+00 to 0+1750.00).	1.75
R-51	Development of road by C.C from West Sheri BC road towards BM collage at West Sheri . (Ch. 0+00 to 0+550.00)	0.55
R-52	Development of road by C.C from Robi neiogi R.C.C road (near Shop of Bulu) towards H/O Dr: Sunil at Graiddanaraonpur (Ch. 0+00 to 0+150.00)	0.15
R-53	Development of road by C.C from Robi neiogi R.C.C road (near H/O Said master) towards H/O Md. Rabbani at Graiddanaraonpur (Ch. 0+00 to 0+230.00)	0.23
R-54	Development of road by R.C.C from H/O Akkis towards H/O Profulla at Rajbullavepur (Ch. 0+00 to 0+220.00)	0.22
R-55	Development of road by B.C from Rice mill of Chiku mulla towards shop of Bahur mia at Dhukulhati (Ch. 0+00 to 0+1500.00)	1.5
R-56	Development of road by C.C from h/o salum towards h/o Caramot alli at Dhukulhati (Ch. 0+00 to 0+120.00)	0.12

Road ID No.	Name of Road	Length (km)
R-57	Development of road by R.C.C from Dhukulhati B.C road (near shop of Pocha) towards h/o sokka mia at Dhukulhati (Ch. 0+00 to 0+300.00)	0.30
R-58	Development of road by C.C from Bagraksa R.C.C road (near pound of Shahid) towards h/o rubel at Bagraksa (Ch. 0+00 to 0+200.00)	0.20
R-59	Development of road by C.C from h/o Dr: Safi towards h/o Eng. Sayed at Sazborkhilla (Ch. 0+00 to 0+240.00)	0.24
R-60	Development of road by R.C.C from h/o Nathor at Digharpar towards h/o Josef at Digharpar (Ch. 0+00 to 0+165.00).	0.165
R-61	Development of road by C.C from East Sheri R.H.D road (near h/o moti) towards h/o Akkas on East Sheri C.C road (Ch. 0+00 to 0+190.00)	0.19
R-62	Development of road by C.C from East Sheri C.C road (near h/o Shaku Hazi) towards h/o Motiur Rahaman on East Sheri C.C road (Ch. 0+00 to 0+200.00)	0.2
R-63	Development of road by R.C.C from north side of Nouhata Alia mudrasha towards Sherpur - Jhinigati R.H.D road at Nouhata (Ch. 0+00 to 0+200.00).	0.2
R-64	Development of road by C.C from Sherpur – Gazirkamar R.H.D road towards Dhakulhati B.C road near Khandakur bari jama musque (Ch. 0+00 to 0+150.00)	0.15
R-65	Development of road by C.C from Dhakulhati B.C road towards h/o Pinto at Dhakulhati (Ch. 0+00 to 0+150.00)	0.15
R-66	Repairing of B.C. Road from Sherpur Gajirkhamar B.C road to Newmarket RHD road (Ch. 0+00 to 0+670.00)	0.67
R-67	Repairing of B.C. Road from Sherpur Jamulpur RHD road near Jamurdokan to Jaillkhana – Alfalaha B.C road (Ch. 0+00 to 0+900.00)	0.9
R-68	Repairing of road by B.C from Sherpur –Chorsherpur B.C road near Bottola tempo stand to Thana ghat mour (Ch. 0+00 to 0+1000.00)	1.0
R-69	Repairing of road by B.C from Civil surgen mour to Sherpur jhinaiguti RHD road at khoarpar mour via dhakalhati and kamarbari mour (Ch. 0+00 to 0+3050.00)	3.05
R-70	Development of road by R.C.C from Shri Brige- dhupaghat B.C road near Kasba namapara Mosque to h/o Abdul Hakim (Ch. 0+00 to 0+150.00)	0.15
R-71	Development of road by R.C.C from Sherpur – Jhanigati B.C road near Destoni office to Kudlapara R.C.C road near h/o Shakil via North Goripur Darul Ulum Madrasha (Ch. 0+00 to 0+900.00)	0.90
R-72	Repairing of road by B.C. from Dhaka Sherpur RHD road at nabinagor mour to Dhaka Sherpur bypass road near Sherpur Police line (Ch. 0+00 to 0+1500.00)	1.50
R-73	Repairing of road by B.C. from Civil surzen office – Khourpar mour RHD road near Dhakalhati Hossain Mullha rice mill to Sherpur – Guzerkamar B.C road near Shekhhati Primary School (Ch. 0+00 to 0+1425.00)	1.425
R-74	Repairing of road by B.C from Digharpar Indirar mour towards kamaria via shampa rice mill & Digharpar mour (Ch. 0+00 to 0+1800.00)	1.80
R-75	Repairing of road by B.C from Kamarbari mour to Sherpur – jhinigati RHD at Digharpar kandapara via h/o Ex Comisonear Idriss ali (Ch. 0+00 to 0+2400.00)	2.40
R-76	Repairing of road by R.C.C from swiper coloni B.C road to Sozborkhila RHD road near rong mohol (Ch. 0+00 to 0+235.00)	0.235
R-77	Development of road by R.C.C from Gouripur B.C road via near h/o Arif to Bus stund B.C road near Kazibari Eidgha Field via h/o Dr.Shelim (Ch. 0+00 to 0+380.00)	0.38
R-78	Development of road by R.C.C from Sozborkhila RHD road near Pioneer School to Swipur kaloni B.C road via h/o Add. Toriqul Islam Vasani (Ch. 0+00 to 0+400.00)	0.40
R-79	Development of road by R.C.C from Bus stand B.C road near Shop of Salam to Bagraksa Internal C.C road near pound of Zakir mullha at Bagraksa (Ch. 0+00 to 0+190.00)	0.19
R-80	Development of road by R.C.C from Chapatoli B.C road near Chapatoli Graveyard to Chapatoli B.C road near Chapatoli mosque via h/o Hanan (Ch. 0+00 to 0+480.00)	0.48
R-81	Development of road by R.C.C from Sherpur- Jamalpur RHD road near h/o Jahangir Choudhurybari to Bagraksa R.C.C road near Sherpur High School via h/o Ruman at Bagraksa (Ch. 0+00 to 0+210.00)	0.21
R-82	Development of road by R.C.C from Old AIRP mour – Owarles mour B.C road near Old Gohata Mosque to Padma Pukur & Towads h/o Mostack (Ch. 0+00 to 0+270.00)	0.27
R-83	Development of road by B.C& R.C.C from Dhaka -Sherpur RHD road at new market mour towards h/o Bokul at Baganbari via Sherpur Govt Mohila Collage road (Ch. 0+00 to 0+200.00)	0.20

Road ID No.	Name of Road	Length (km)
R-84	Development of road by R.C.C from Gopalbari Truck stund – Shatilpur B.C roab near lal mia mistri towards Digharpar via h/o Danes Commisonar (Ch. 0+00 to 0+160.00)	0.16
Total		**60.74**
* - to be implemented in UGIIP-3 Phase 1		

Source: PPTA Consultants

Table 5: Proposed Roads to be rehabilitated under Phase 1 Implementation - Sherpur

Road ID No.	Name of Road	Length (km)
R-1	Development of BC. Road from town hall mour at Raghunath bazer to Sajborkhila RHD Road via Afsorali Gails school (Ch. 0+00 to 0+900.00)	0.9
R-2	Development of road by BC & CC from Sherpur – Sribordi RHD road near Bisic I/A to Sherpur – jhinigati RHD road at kanadapara via nowhata govt primary School & h/o mojibor master (Ch. 0+00 to 0+1600.00)	1.6
R-3	Repairing of BC. Road from Sherpur Jamalpur RHD road near Attimkhana to thanamour RHD road (Ch. 0+00 to 0+1100.00)	1.1
R-4	Development of road by CC from Sherpur – Jamalpur RHD road near BRCK Office towards Pogalbari (Ch. 0+00 to 0+700.00)	0.7
R-6	Development of road by BC. from Mirgonj BC road near h/o Baiazid to Jaillkhana - Alfalaha BC road (Ch. 0+00 to 0+700.00)	0.7
R-7	Development of road by CC from Sherpur Charsherpur BC road near Bottola tampo stand to Sherpur- Jamalpur RHD road near LGED office via h/o Jahangir & Contractor Abdul Mannan (Ch. 0+00 to 0+700.00)	0.7
R-8	Development of road by BC from Attimkhana-Dhupagate BC road (Near Bairbaid mosque) to Sherpur Charsherpur BC road near Talukdarbari via majibari mondir (Ch. 0+00 to 0+2000.00)	2.0
R-9	Development of road by CC from Sherpur Shribordi RHD road near Likhon Cenema Hall towards Kudllapara via h/o Bulbul (Ch. 0+00 to 0+700.00)	0.7
R-10	Development of road by CC from Jamur Dukan BC road near H/o Minto to Barek para BC road near Banglalink Tower at West Goripur(Ch. 0+00 to 0+600.00)	0.6
R-11	Development of road by BC from Sherpur Shribordi RHD road near Mubarak Primary School to Sherpur Shribordi RHD road near h/o Johur Khalifa at Mubarkapur (Ch. 0+00 to 0+1000.00)	1.0
R-12	Repairing of road by BC from Sherpur –Jamalpur RHD road to dhupaghat bridge (Ch. 0+00 to 0+3200.00)	3.2
R-13	Repairing of road by BC & CC from Public library mour near laheri kacheri to dhupavuri BC road via Madhobpur (Ch. 0+00 to 0+650.00)	0.65
R-14	Development of road by CC from Kharampur mosque to Madhobpur BC road via Madhobpur Govt Heigh School (Ch. 0+00 to 0+500.00)	0.5
R-15	Repairing of road by BC from Gopalbari truck stand to dhakalhati BC road via swiper coloni (Ch. 0+00 to 0+840.00)	0.84
R-16	Development of road by CC from Attimkhana-Dhupagate BC road near Bairbaid mosque towards near h/o Arshadur Rhaman (Ch. 0+00 to 0+500.00)	0.5
R-17	Development of road by CC from Attimkhana-Dhupagate BC road near shop of Sekam towards h/o Eidu at Kasbakatgor via Garopara (Ch. 0+00 to 0+600.00)	0.6
R-18	Development of road by CC from Kaligong Kudal Bari to h/o Ismail Pondit (Ch. 0+00 to 1000.00)	1.0
R-19	Development of road by CC from Kasba kacharipara BC road near h/o Robbani Sharkar towards h/o nurul amain (Ch. 0+00 to 0+670.00)	0.67
R-20	Repairing of road by BC from Dhaka Sherpur RHD road near nabinagor Farukia Madrasha towarda Pakuria UP via h/o Hamid Commisinoer (Ch. 0+00 to 0+1000.00)	1.0
R-22	Repairing of road by BC from Tinani bazer Sherpur Khoarpur RHD road to Sherpur-Gajirkhamar BC road at Shekhati Primary School via Bottola mour (Ch. 0+00 to 0+2100.00)	2.1
R-23	Repairing of road by BC from old IRP mour towarda gridanarayonpur via Owarles office & Nagpara mour (Ch. 0+00 to 0+1400.00)	1.4
R-24	Development of road by CC from Sherpur – Jamalpur RHD, road at East Shari to Sherpur – Jamalpur RHD road at West Shari via h/o Eng: Ishak (Ch. 0+00 to 0+485.00)	0.485

Road ID No.	Name of Road	Length (km)
R-47	Development of road by CC from Sherpur Charsherpur BC road near Hazrot Sha kamal mazur road to h/o Samad (Ch. 0+00 to 0+670.00).	0.67
R-50	Road by BC from Sherpur Shribordi BC road near Akhermamud bazer to h/o Shafikul via Koinapara h/o mufazul (Ch. 0+00 to 0+1750.00).	1.75
R-55	Development of road by BC from Rice mill of Chiku mulla towards shop of Bahur mia at Dhukulhati (Ch. 0+00 to 0+1500.00)	1.5
Total		**28.915**

Source: PPTA Consultants

D. Implementation Schedule

30. Implementation of UGIIP-3is split up into 3 phases: (i) 1st phase = 18 months or 1.5 years; (ii) 2nd phase = 30 months or 2.5 years; and (iii) 3rd phase = 24 months or 2 years

31. Twenty five existing roads (total 28.915km) will be implemented under Phase 1, while the remaining 59 roads will be implemented in the succeeding phases. Preliminary design of Phase 1 roads has been done by the PPTA and will finalized during detailed design stage. It is estimated that construction period for Phase 1 implementation will cover 18 months.

32. The final detailed implementation schedule will be provided in the updated IEE once the detailed design phase is completed.

Figure 1: Location Map

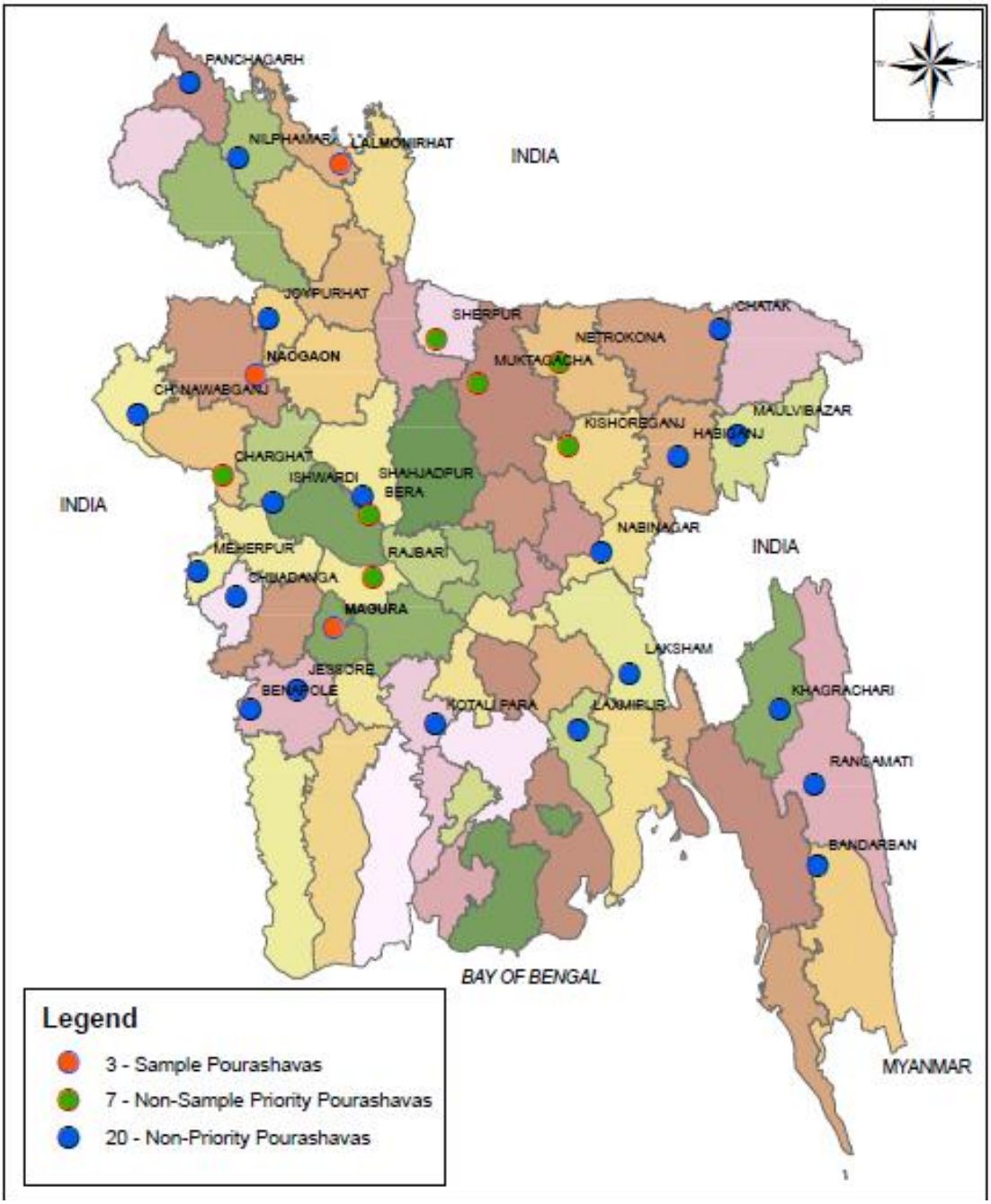


Figure 2: Proposed Road Works in Sherpur Pourashava

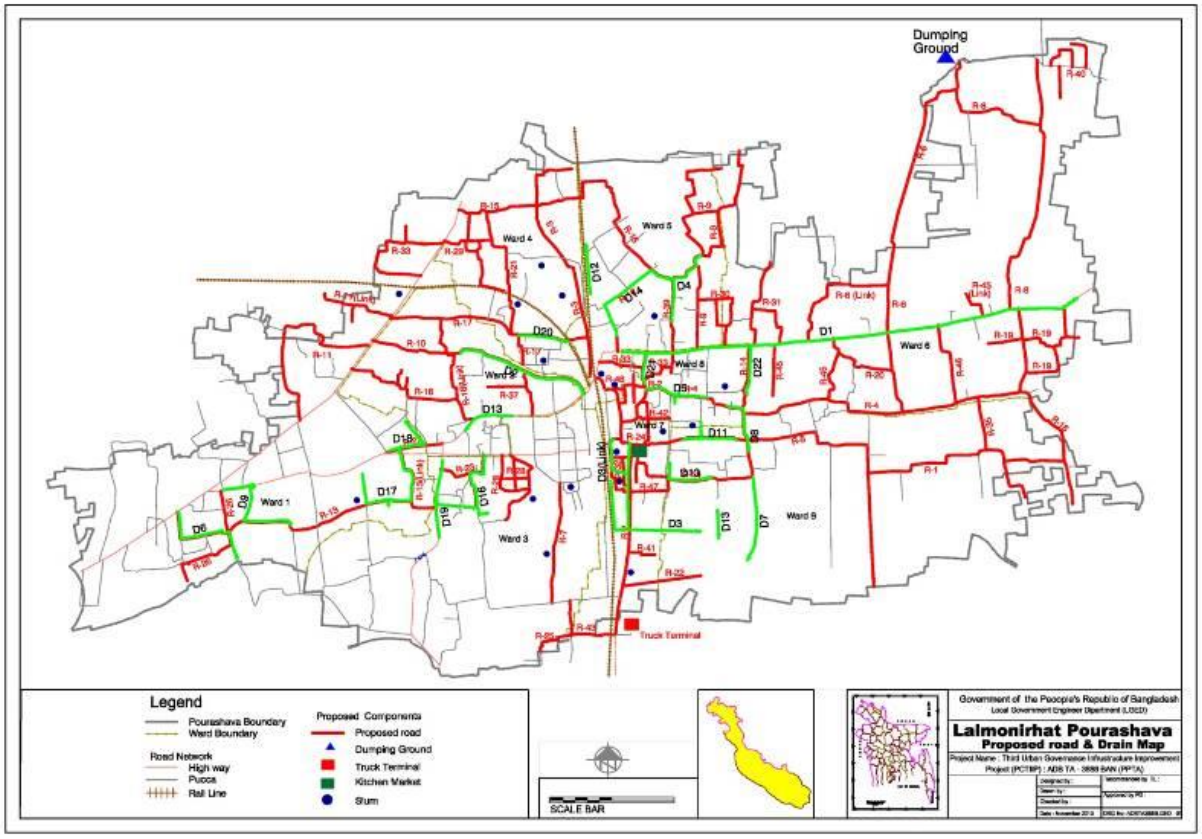


Figure 3: Cross-section of Bituminous Carpeting Road for Low Traffic Volume (Less than or Equal to 100 Commercial Vehicles per Day)

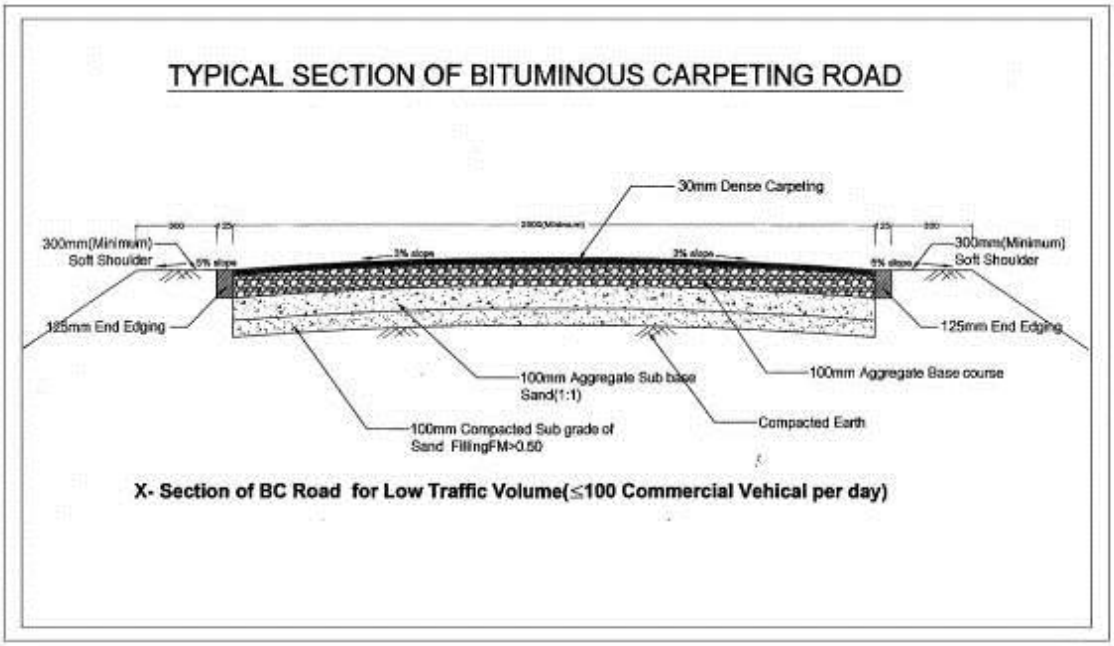


Figure 4: Cross-section of Bituminous Carpeting Road for Low Traffic Volume (More than 100 but less than 200 Commercial Vehicles per Day)

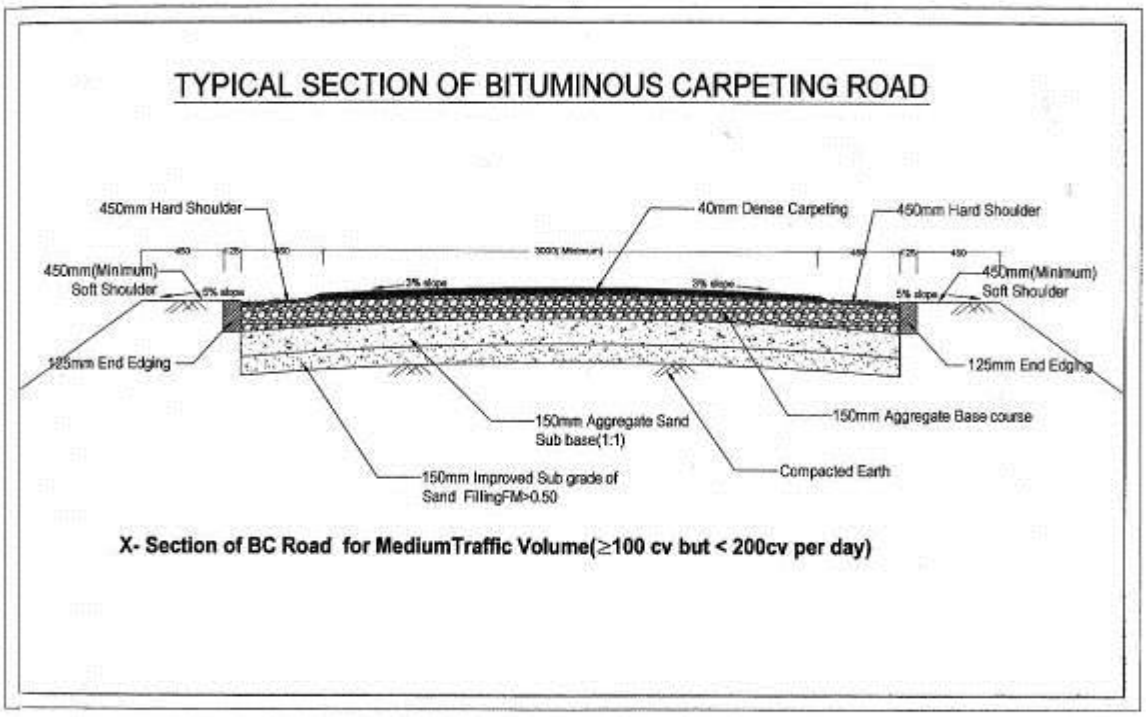
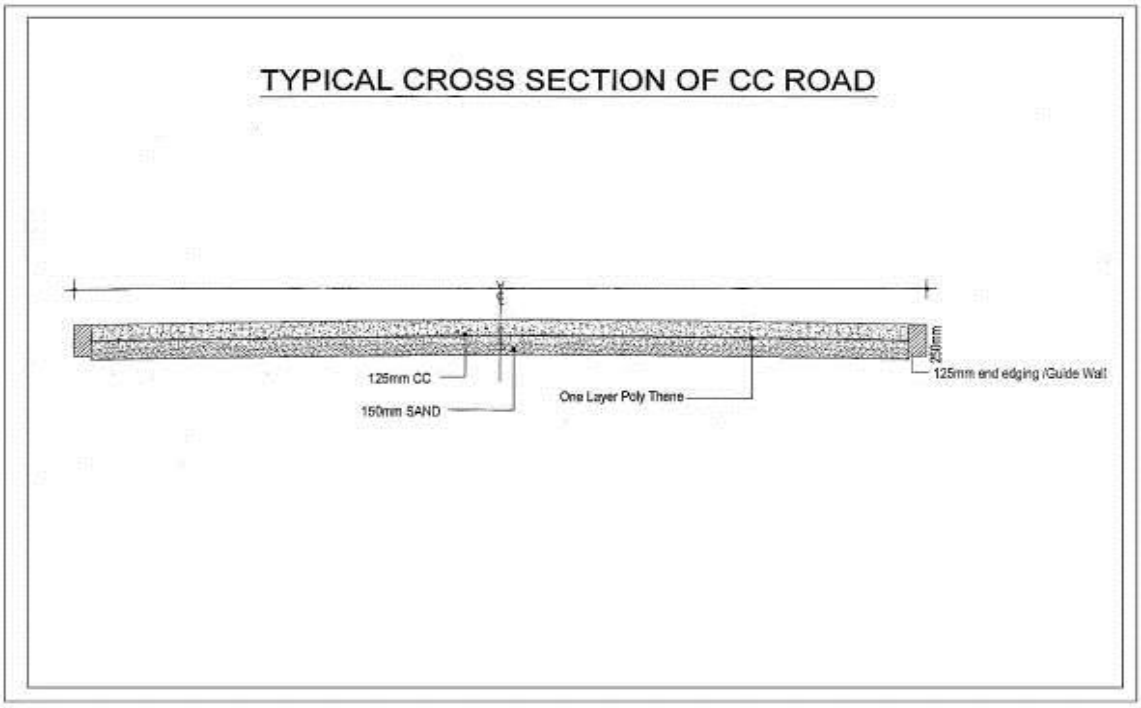


Figure 5: Typical Cross-section of Cement Concrete Road



IV. DESCRIPTION OF THE ENVIRONMENT

A. Methodology Used for the Baseline Study

33. **Data collection and stakeholder consultations.** Data for this study has been primarily collected through comprehensive literature survey, discussion with stakeholder agencies, and field visits to the proposed subproject sites. The literature survey broadly covered the following:

(i) subproject details, reports, maps, and other documents available with the ADB and PPTA consultants, LGED, and Sherpur *pourashava*;

(ii) relevant acts and extraordinary gazettes, and guidelines issued by Government of Bangladesh agencies; and

(iv) literature on land use, soil, geology, hydrology, climate, socioeconomic profiles, and environmental planning documents collected from Government of Bangladesh agencies and websites.

34. Several visits to the subproject sites were made during the PPTA stages to assess the existing environment (physical, biological, and socioeconomic) and gather information with regard to the proposed sites and scale of the proposed subproject. A separate socioeconomic study was conducted to determine the demographic information, archeological and religious places, densely populated pockets, and settlements.

35. **Data analysis and interpretation.** The data collected was analyzed and interpretations made to assess the physical, biological, and socioeconomic features of the project area. The relevant information is presented in the succeeding paragraphs.

36. **Updating during detailed design phase.** The IEE including specific description of the environment and corridor of impact will be updated as necessary based on the final roads design and alignments.

B. Physical Characteristics

37. **Topography.** Sherpur Pourashava is a land of mixed topography. It is located within the flood plain of the Jamuna and the Brahmaputra river. Due to its topography and the location of the nearby Jamuna and Brahmaputra river, built-up area of the town is very much prone to flooding. In 1998, flood level reached above average ground levels causing shallow flooding. In order to avoid regular flooding, urban development is generally concentrated in the core area of the town and on the higher grounds, north of Pourashava where the industrial area mainly the rice mills are located. The Mrigi river that flows along the western periphery of the Sherpur Pourashava from north-west to south-east (flow direction is north to south) serves as the outfall for most of the Pourashava drainage system.

38. Sherpur *pourashava* is not normally affected by annual floods in the core area by the overflow of the rivers the Jamuna and the Brahmaputra forming the floodplains of the district except the low lying fringe areas of the *pourashava*. But the total pourashava area is affected by water logging regularly due to drainage congestion of the present poor drainage system.

39. **Climatic conditions.** The climate of the *pourashava* area is moderate with the maximum and minimum mean monthly temperature being 32.04^{o}C and 24.60^{o}C, respectively observed in April and January. Mean annual rainfall is 2302 mm, with most of it occurring during

five months of monsoon, between May to September, which is around 81.40% of the aggregate precipitation. In the winter months of December-January, at times, temperature comes down substantially that at times adds to the woe of the dwellers.

40. **Surface water and other bodies of water.** There are large number of ponds, ditches, low lying agricultural lands as low pockets in Sherpur which act as retention basin to delay the maximum floods in the monsoon. However the PPTA study identified there are no existing natural or man-made bodies of water adjacent or within the corridors of impact of the subproject. Any water bodies to be identified during detailed design phase will be assessed and reported in the updated IEE.

41. **Air quality.** As there are no major industries in Sherpur the main sources of air pollution are vehicles and non-point sources such as open burning. There are currently no air quality monitoring stations are in operation within the *pourashava* limit. The baseline air quality will be measured by the subproject contractors prior to commencement of work. The results will be provided in the updated IEE and all other measurements during implementation will be reported as part of EMP implementation.

42. **Acoustic environment.** Subproject components are in the built-up part of Sherpur, with residential, commercial, and institutional establishments. The volume of traffic that passes through these sections is not significant and traffic jams are not frequent. However vehicular movement can be considered as major cause of noise pollution. The baseline noise level will be measured by the subproject contractors prior to commencement of work. The results will be provided in the updated IEE and all other measurements during implementation will be reported as part of EMP implementation.

43. **Water logged areas.** In Sherpur Pourashava there are no severe water logging areas. Inundation occurs due to localized storm rainfall and also due to lack of adequate number of drains. There are mainly ten (10) scattered low-lying areas in Sherpur Pourashava. A major issue, therefore, is the extent to which the town, both in its existing urban form and in future development can be kept flood free.

44. Inundation by water logging occurs due to localized storm rainfall associated with lack of adequate number of drains. There are mainly ten scattered low-lying water logged areas in Sherpur Pourashava. The water logging areas associated with drainage congestion are T&T office road side area, Front side area of new market, West side area of upazila office, Shingpara road side area, Bus stand area, Girls school road side area, Chakbazar road side area, WAPDA road side area, Shekhati road side area, Cosba Mollah para road. The total area of the water logged places is about 17 hacters. Depth of inundation ranges from 0.20 to 0.25 meter and duration from 4 to 6 hours varying from place to place. The main cause of water loggings is due to disposal of solid wastes which cause closure of the drains causing overflow which produce a suitable breading place of mosquitoes and consequent spreading of water borne diseases.

45. In 1998, flood level reached above average ground levels causing shallow flooding.

C. Biological Characteristics

46. **Flora and fauna.** Subproject components are located in Sherpur urban area or in its immediate surroundings which were converted into urban use for years ago, and there is no natural habitat left at these sites. Animals and plants in the subproject area are those commonly

found in urban and built-up areas. No endangered/protected species of either flora or fauna are found in the *pourashava* or its immediate surroundings.

47. **Protected areas.** There are no protected forests, wetlands, mangroves, or estuaries in or near the subproject area.

D. Socioeconomic Characteristics

48. **Area and population**. The *pourashava* with an area of 24.75km^2 lies within the center of Sherpur *upazilla*. Information about the total number of households, with average size, and population of Sherpur *pourashava* is presented in Table 6.

Table 6: Population of Sherpur Pourashava

Administrative Unit	Area (sq. km)	Households (nos.)	Total Population	Average Household Size	Density (per sq.km)
Sherpur Pourashava	**24.75**	**22,665**	**97,979**	**4.2**	**3,959**
Ward No - 01	2.67	2885	12426	4.3	4,654
Ward No - 02	1.15	1734	8826	4.7	7,675
Ward No - 03	2.61	2499	10311	4.1	3,951
Ward No - 04	2.96	2911	12413	4.3	4,194
Ward No - 05	1.81	2122	9301	4.3	5,139
Ward No - 06	3.92	2988	12940	4.3	3,301
Ward No - 07	1.54	2442	10622	4.2	6,897
Ward No - 08	5.32	2417	10307	4.3	1,937
Ward No - 09	2.77	2667	10833	4.1	3,911

(Source: BBS Community Report, Zilla: Sherpur, 2011)

49. **Land use.** According to existing land use pattern, it has been ascertained that the major land use of the Pourashava area goes to agricultural land and is about 55.91% of the total land. It shows the Pourashava is more rural than urban in nature at present. With the rapid growth of population, urbanization is increasing with the agricultural lands going out of cultivation due to its use for non-agricultural purposes like house building, development of different infrastructures, administration and institutional buildings etc., its nature will be changed in the coming years. The second major use is residential and homesteads and occupying about 27.80% of the total area. The other categories of land use pattern are not significant as the third major category is commercial which is 8.54%.

50. **Literacy.** Sherpur Sadar has an average literacy rate of 56.2% (7+ years), and the national average of 32.4% literate. (BBS, 2011) http://en.wikipedia.org/wiki/Lalmonirhat_Sadar_Upazila - cite_note-census-1.

51. **Water supply and water quality**. In Sherpur *pourashava*, main source of drinking water is by means of tubewells. Few amount of supply water from DTW is available. There are 8 pumphouses, 2 overhead tanks, 1 water treatment plant, water supply pipelines and a number of DTW in this *Pourashava* which cover about 80% of total household.

52. **Roads, existing provisions for pedestrians, and transport-related facilities.** Sherpur roads (total of 111.10 km) generally fall into two categories: *kutcha* (earthen) construction and *pukka* (formed) roads. Formed roads are mainly BT asphalt roads with CC roads in a few places for main roads, while minor roads may also be brick-on-edge soling, known locally as HBB.

Nearly all roads are built above the existing ground level, not only to avoid inundation during storms, but as the silty loam and alluvial soils typical of the area compact easily, roads need a supporting base layer that is often built up to around one meter above ground level**.** There are no provisions for pedestrians (e.g. footpaths) along the roads. There are no public or private bus services available. There is no designated authority for the management of traffic.

53. A bus terminal under UGIIP-I was taken and the construction of it is half done. There is no Bus Terminal owned by the Pourashava. There is one Bus Terminal on Private land where about 80 Buses can be accommodated in the Terminal. But the number of Buses using the Terminal daily is much higher. The completion of the remaining work of the incomplete work of central Bus Terminal will meet this requirement and also earn much revenue for the Pourashava.

54. **Drainage.** At present, the drainage system of Sherpur includes 59.59 km of *pucca* drains (9.80km primary drain, 46.39km secondary drains and 3.40 km tertiary drains). In addition, there are 8.87 km of *kutchakhal*. PPTA study shows that there is about 2km of *pucca* drain per sq km of the pourashava area which indicates a somewhat poor spectacle of the drainage system in Sherpur. Urban dwellers in most areas reported that the present drainage system is inadequate is inadequate.

55. **Sanitation.** The existing sanitary condition in Sherpur is relatively poor. As per Bangladesh Bureau of Statistics data for 2011, 17.3% of the pourashava population have water sealed latrines, 41.4% have latrines that are not water-sealed, 36.9% of the population have non-sanitary facilities while the remaining 4.4% have no toilets. Sherpur has no sewerage system and disposal/treatment facilities.

56. There are 4 nos. public toilets in Sherpur but these are in worse conditions as the pits, septic tanks and superstructures are mostly damaged. There is no arrangement for electricity and water supply. There is no separate provisions for women.

57. Sanitation facilities in schools (primary and secondary) are found not in bad conditions. There is no huge demand of toilets in schools contrary to the findings of the PPTA study which identified school toilets to be constructed in schools visited.

58. **Solid waste management.** Solid waste management in Sherpur consists of collection, transportation and dumping of wastes. There are 110 fixed dustbins located in different parts of the *pourashava*. Thereare 3 conservancy trucks, 15 rickshaw vans for soild waste collection and disposal. The *pourashava* currently does not have its own solid waste disposal site. Wastes are dumped in vacant low lands, commonly requested by private land owners to reclaim/increase the level of the land.

59. Sherpur generates about 29 metric tons per day computed based on 0.3 kilograms (kg) per capita per day. Segregation at source is not practiced resulting to mixed wastes from households, commercial establishments, hospitals, institutions and others. There is no regular public awareness and public relation activities in the pourashava. Community involvement is absent. Informal sector is prominent in recyclable collection and recycling.

60. **Other existing amenities for community welfare.** The pourashava has 3 kitchen markets. PPTA study estimated 5,000 people use to meet their daily needs. The kitchen markets lack in adequate number of waste bins and do not have arrangement for waste collection. Generally, there is no arrangement for drainage within the markets. The PPTA team

noted Sherpur has one well-designed and built kitchen market with 10 sheds along with a slaughterhouse however the *pourashava* sparsely use the facility. The *pourashava* could not provide plausible answer to their not being used.

61. There are 1 graveyard, 1 burning crematorium, 1 government hospital, 21 government primary schools, 9 high schools, 4 Colleges, and 1 polytechnic Institute. Apart from these, there are madrasas (community based religious institutes) established with private initiatives and operated and managed privately.

E. Historical, Cultural and Archaeological Characteristics

62. Sherpur Pourashava has a glorious background. During Moghul period the town was established as an administrative center. Later Sherpur was established as a 'thana' HQ of greater Mymensingh district and the Pourashava commenced on 1st April 1869 as class'C' Pourashava. Later the administrative area of Sherpur was promoted to a sub-division in 1979 and in 1984 to the district level.

63. **Archaeological Heritage and Relics**: Shribordi Sand Premise, Modhutila Eco Park, Shrine of Sher Ali Gazi (R), Baro Duari Mosque, Panihata Lake, Gojani Hill, Sutanali Lake, Shrine of Shah Kamal (R), Natmondir, Ghagra Loskor Khan Mosque, Barduary Mosque, Mai Shaheba Jame Mosque, Shrine of Jarip Shah (R), Annapurna Temple, Raghunath Temple etc.

64. **Historical Events**: During the War of Liberation the Sherpur Pourashava was under Sector 11. Sherpur was liberated on 10 December 1971.

65. **Marks of War of Liberation**: Mass grave 2, memorial 1, mass killing site 3.

66. It has been noted during the PPTA study road alignments and corridors of impact are not within nor adjacent to these sites.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Methodology

67. Issues for consideration have been raised by the following means: (i) input from interested and affected parties; (ii) desktop research of information relevant to the proposed subproject; (iii) site visits; and (iv) evaluation of proposed design scope as per PPTA study and potential impacts.

68. The corridors of impact considered include: (i) existing alignment and width of roads to be rehabilitated; and (ii) existing ROWs. No additional land is required beyond the ROWs. Categorization of the subproject and formulation of mitigation measures have been guided by ADB's REA Checklist for Roads (Appendix 1) and ADB SPS, 2009.

B. Screening out Areas of No Significant Impact

69. From the preliminary design and results of the rapid environmental assessment, it is clear that implementation of Sherpur roads subproject will not have major negative impacts because activities will be localized/site-specific and short in duration. Moreover, the corridors of impact of the subproject will be on existing public ROWs, and construction will be conducted within a relatively small area. Because of these there are several aspects of the environment

that are not expected to be affected by the subproject (Table 7) and thus can be screened out of the assessment at this stage but will be assessed again during detailed design stage and before implementation.

Table 7: Fields in Which the Subproject Is Not expected to have Significant Impacts

Field	Rationale
A. Physical Characteristics	
Topography, landforms, geology and soils	Required amount of materials will not cause alteration of topography, landforms, geology and soils. Erosion hazard is insignificant as trenching and excavation works will be conducted only during construction stage (short-term) and specific to sites along public ROWs.
Climatic conditions	Short-term production of dust is the only effect on atmosphere. However, impact is short-term, site-specific and within a relatively small area. There are well developed methods for mitigation.
B. Biological Characteristics	
Biodiversity	Activities being located in the built-up area of Sherpur *pourashava* will not cause direct impact on biodiversity values as identified flora and fauna are those commonly found in built up areas. The construction activities do not anticipate any cutting of trees.
C. Socioeconomic Characteristics	
Land use	No alteration on land use. Rehabilitation of existing roads and is prioritized over new construction, using vacant government land and ROWs.
Type of community spread	No alteration on type of community spread.
Socio-economic status	There is no requirement for land acquisition. Affected persons and structures will be addressed separately in the resettlement plan developed as per Government of Bangladesh laws and ADB SPS, 2009. Manpower will be required during the construction stage, this can result to generation of contractual employment and increase in local revenue.
D. Historical, Cultural, and Archaeological Characteristics	
Physical and cultural heritage	The subproject components are not located in or near and excavation works will not be conducted in the vicinities of identified historical sites.

C. Anticipated Impacts and Mitigation Measures – Planning and Design Phase

70. Subproject selection criteria. The project environmental assessment and review framework specifies environmental criteria to avoid or minimize adverse impacts during the identification and finalization of road subproject. Table 8 summarizes site and design considerations as per preliminary design.

Table 8: Site and Design Considerations to Meet EARF Environmental Criteria

	Components	Environmental Selection Guidelines	Remarks
1.	Overall selection guideline	i. Comply with all requirements of relevant national and local laws, rules, and guidelines.	- Requisite LCC and ECC to be obtained prior to commencement of works
		ii. Avoid/minimize where possible locations in protected areas, including notified reserved forests or biodiversity conservation hotspots (wetlands, national reserves, forest reserves, and sanctuaries).	- Not present in Sherpur *pourashava*
		iii. Avoid possible locations that will result in destruction/disturbance to historical and cultural places/values.	-- Use of “chance find” procedures in the EMP that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.
		iv. Avoid tree-cutting where possible. Retain mature roadside trees which are	- Permit for tree-cutting to be obtained by contractor/s prior to commencement of work

	Components	Environmental Selection Guidelines	Remarks
		important/valuable or historically significant. If any trees have to be removed, plant two new trees for every one that is lost.	- Compensatory plantation for trees lost at a rate of 2 trees for every tree cut, in addition to tree plantation as specified in the design, will be implemented by the contractor, who will also maintain the saplings for the duration of his contract.
		v. Ensure all planning and design interventions and decisions are made in consultation with local communities and include women. Reflect inputs from public consultation and disclosure for site selection.	- All consultations during project preparation are documented and concerns expressed by public addressed in the IEE.
		vi. Synchronize all road improvement and pipe laying works (to extent possible) to minimize disturbance and optimize use of resources (e.g., water pipes laid prior to road improvements).	- Considered in the preliminary design
2.	Roads improvement	i. Include the provision of new or improved storm water drainage to remove the increased runoff caused by increasing the road surface area	- Considered in the preliminary design
		ii. Include tree planting alongside roads to provide a natural barrier to noise and visual impacts, and include additional man-made barriers where suitable for public safety.	-included in the EMP

71. **Land acquisition and resettlement.** The proposed roads will be located in public ROWs. Involuntary resettlement impacts on encroachers along ROWs will be addressed by the resettlement plan prepared for the subproject as per ADB SPS, 2009 and applicable Bangladesh laws. Cutting of trees will not be required as per preliminary design. This will be reassessed during detailed design stage and if cutting of trees will be required, compensatory plantation for trees lost at a rate of 2 trees for every tree cut will be implemented by the contractor, who will also maintain the saplings for the duration of his contract.

72. Planning principles and design considerations have been reviewed and incorporated into the site planning process whenever possible. Locations and sitting of the proposed infrastructures were considered to further reduce impacts. The subproject will be in properties held by the *pourashava* and access to the subproject sites is through public ROW and existing roads hence, land acquisition and encroachment on private property will not occur.

73. The concepts considered in design of the Sherpur road subproject are: (i) locating components on public ROW to avoid the need for land acquisition and relocation of people; (ii) taking all possible measures in design and selection of site or alignment to avoid resettlement impacts; (iii) avoiding where possible locations that will result in destruction/disturbance to historical and cultural places/values; (iv) avoiding tree-cutting where possible; (v) ensuring all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultation and disclosure for site selection.

74. Preliminary designs integrate a number of measures (Table 9), both structural and non-structural, to mainstream climate resilience into the Sherpur roads subproject, including: (i) road level rise as required; (ii) increase of bitumen carpeting thickness; (iii) proper compaction; (iv) prefer cement concrete (CC) pavement where there are threats of inundation; (v) temperature reinforcement in CC pavement where there are threats of inundation; (vi) cross-drains as

required; (vii) for CC roads, guide wall to protect erosion and sliding; and (vii) turf and tree plantation along the roads. As a result, some measures have already been included in the subproject designs. This means that the impacts and their significance have already been reduced.

Table 9: Possible Actions to Mitigate against Projected Effects of Climate Change and Improve Climate Resilience for Roads

		Mitigation Measures
A.	**Climate Change Effect**	
1.	Increased rainfall quantity and runoff Increased frequency of storms	• Improve O&M, organizational capacity, resource allocation, etc. • Work with relevant stakeholders to manage water use and flood discharges more effectively • Improve collection and disposal of solid waste • Control encroachments • Improve public behavior through active and prolonged information, education and communication campaigns to reduce uncontrolled solid waste disposal, encroachments, damage to infrastructure, unregulated development in key areas, etc., supported by enforcement. • Guide wall to protect erosion and sliding for roads with adjacent water bodies/ponds
B.	**Impact Factor**	
1.	Construction materials' quality	• Choose most durable materials possible, even if higher cost, e.g. concrete, high quality bricks. • Monitor and control construction quality
2.	Rising temperatures	• Execute works during most favorable times of year and day. • Monitor and control preparing, placing and curing concrete and mortar, to ensure placement, etc., during most favorable times. • Use plain high-quality un-rendered brickwork and high quality cement mortar in preference to rendered low-grade bricks • Use sulphate resisting cement in vulnerable locations (higher heat gain during curing) or cement containing fly-ash (less heat gain, so preferred).
3.	Runoff	• Use trapezoidal section side drains with small low-flow section (cunette) for low flows • Line side drains to achieve higher discharge velocities without increasing risk of scour, etc.

Source: PPTA Consultant.

D. Anticipated Impacts and Mitigation Measures – Construction Phase

75. In the case of this subproject (i) most of the individual elements are relatively small and involve straightforward construction, so impacts will be mainly localized and not greatly significant; (ii) most of the predicted impacts are associated with the construction process, and are produced because that process is invasive, involving excavation and earth movements; and (iii) being located in the built-up area of the *pourashava*, will not cause direct impact on biodiversity values.

76. **Construction method.** Trenches will be dug by backhoe digger, supplemented by manual digging where necessary. Excavated soil will be placed nearby, and the materials (brought to site on trucks and stored on unused land nearby) will be placed in the trench by crane or using a small rig. The infrastructures will be constructed manually according to design specifications. Any excavated road will be reinstated.

77. There is sufficient space for a staging area, construction equipment, and stockpiling of materials. However, the contractor will need to remove all construction and demolition wastes on a daily basis.

78. Although construction of these project components involves quite simple techniques of civil work, the invasive nature of excavation and the project sites in built-up areas of Sherpur where there are a variety of human activities, will result to impacts to the environment and sensitive receptors such as residents, businesses, and the community in general. These anticipated impacts are short-term, site-specific and within a relatively small area. There are no impacts that are significant or complex in nature, or that need an in-depth study to assess the impact. Thus, Sherpur road subproject is unlikely to cause significant adverse impacts. The potential adverse impacts that are associated with construction activities can be mitigated to acceptable levels with the following mitigation measures (Table 10).

Table 10: Anticipated Impacts and Mitigation Measures–Construction Phase

Field	Impacts	Mitigation Measures
A. Physical Characteristics		
Topography, landforms, geology and soils	Significant amount of gravel, sand, asphalt and cement will be required for this subproject. Extraction of construction materials may cause localized changes in topography and landforms. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Utilize readily available sources of materials. If contractor procures materials from existing burrow pits and quarries, ensure these conform to all relevant regulatory requirements. • Borrow areas and quarries (If these are being opened up exclusively for the subproject) must comply with environmental requirements, as applicable. No activity will be allowed until formal agreement is signed between PIU, landowner and contractor.
Water quality	Trenching and excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall which may cause siltation and reduction in the quality of adjacent bodies of water. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Prepare and implement a spoil management plan (see Appendix 4 for outline). • Prioritize re-use of excess spoils and materials in construction activities. If spoils will be disposed, consult with Sherpur local authority on designated disposal areas. • All earthworks must be conducted during dry season to maximum extent possible to avoid the difficult working conditions that prevail during monsoon season such as problems from runoff. • Location for stockyards for construction materials shall be identified at least 300m away from watercourses. Place storage areas for fuels and lubricants away from any drainage leading to water bodies. • Take all precautions to minimize the wastage of water in the construction activities. • Take all precautions to prevent entering of wastewater into streams, watercourses, or irrigation system. Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies. • Ensure diverting storm water flow during construction shall not lead to inundation and other nuisances in low lying areas. • While working across or close to any water body, the flow of water must not be obstructed. Ensure no construction materials like earth, stone, or appendage are disposed of in a manner that may block the flow of water of any watercourse and cross drainage channels. • Monitor water quality according to the environmental management plan.
Air quality	Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of	• Damp down exposed soil and any sand stockpiled on site by spraying with water when necessary during dry weather; • Use tarpaulins to cover soils, sand and other loose

Field	Impacts	Mitigation Measures
	vehicle-related pollutants (such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	material when transported by trucks. • Unpaved surfaces used for haulage of materials within settlements shall be maintained dust-free. • Arrangements to control dust through provision of windscreens, water sprinklers, and dust extraction systems shall be provided at all hot-mix plants, batching plants and crushers (if these establishments are being set up exclusively for the subproject). • Monitor air quality.
Acoustic environment	Construction activities will be on settlements, along and near schools, and areas with small-scale businesses. Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment, materials, and people. However, the proposed subproject will follow existing ROW alignment and impact is short-term, site-specific and within a relatively small area. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Involve the community in planning the work program so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times. • Plan activities in consultation with Sherpur local authority so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. • Use of high noise generating equipment shall be stopped during night time. • Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach; • Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensure that these are maintained to manufacturers' specifications at all times. • All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent-type generators (if required). • Monitor noise levels. Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s. • If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection. • Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.
Aesthetics	The construction activities do not anticipate any cutting of trees but will produce excess excavated earth (spoils), excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Prepare the Debris Disposal Plan • Remove all construction and demolition wastes on a daily basis. • Coordinate with Sherpur local authority for beneficial uses of excess excavated soils or immediately dispose to designated areas Avoid stockpiling of any excess spoils • Suitably dispose of collected materials from drainages, unutilized materials and debris either through filling up of pits/wasteland or at pre-designated disposal locations. • All vehicles delivering fine materials to the site and carrying waste debris for disposal shall be covered to avoid spillage of materials. All existing roads used by vehicles of the contractor, shall be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. • Lighting on construction sites shall be pointed downwards and away from oncoming traffic and nearby houses. • In areas where the visual environment is particularly important or privacy concerns for surrounding buildings exist, the site may require screening. This could be in the form of shade cloth, temporary walls, or other suitable

Field	Impacts	Mitigation Measures
		materials prior to the beginning of construction. • The site must be kept clean to minimize the visual impact of the site. Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
B. Biological Characteristics		
Biodiversity	Activities being located in the built-up area of Sherpur pourashava. There are no protected areas in or around subproject sites, and no known areas of ecological interest. There are no trees along ROWs that need to be removed.	• Check if tree-cutting will be required during detailed design stage. No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior permission of project management office (PMO). • If during detailed design cutting of tress will be required, compensatory plantation for trees lost at a rate of 2 trees for every tree cut, in addition to tree plantation as specified in the design, will be implemented by the contractor, who will also maintain the saplings for the duration of his contract. • All efforts shall be made to preserve trees by evaluation of minor design adjustments/ alternatives (as applicable) to save trees. • Special attention shall be given for protecting giant trees and locally-important trees (with religious importance) during implementation. • Prevent workers or any other person from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body in the subproject vicinity. • Prohibit employees from poaching wildlife and cutting of trees for firewood.
C. Socioeconomic Characteristics		
Existing provisions for pedestrians and other forms of transport	Road closure is anticipated. Hauling of construction materials and operation of equipment on-site can cause traffic problems. However, the proposed subproject will follow existing ROW alignment. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Prepare and implement a Traffic Management Plan (see Appendix 5 for sample) • Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. • Maintain safe passage for vehicles and pedestrians throughout the construction period. • Schedule truck deliveries of construction materials during periods of low traffic volume. • Erect and maintain barricades, including signs, markings, flags and flagmen informing diversions and alternative routes when required. • Notify affected sensitive receptors by providing sign boards informing nature and duration of construction activities and contact numbers for concerns/complaints. • Leave spaces for access between mounds of soil. • Provide walkways and metal sheets where required to maintain access across for people and vehicles. • Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools. • Consult businesses and institutions regarding operating hours and factoring this in work schedules. Ensure there is provision of alternate access to businesses and institutions during construction activities, so that there is no closure of these shops or any loss of clientage. • Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.
Socio-economic status	Subproject components will be located in government land and existing ROWs thus there is no	• Employ at least 50% of labor force from communities in the vicinity of the site. This will have the added benefit of avoiding social problems that sometimes occur when

Field	Impacts	Mitigation Measures
	requirement for land acquisition or any resettlements. Manpower will be required during the 24-month construction stage. This can result in generation of contractual employment and increase in local revenue. Thus potential impact is positive and long-term.	workers are imported into host communities, and avoiding environmental and social problems from workers housed in poorly serviced camp accommodation. • Secure construction materials from local market.
Other existing amenities for community welfare	Although construction of subproject components involves quite simple techniques of civil work, the invasive nature of excavation and the subproject sites being in built-up areas of Sherpur pourashava where there are a variety of human activities, will result in impacts to the sensitive receptors such as residents, businesses, and the community in general. Excavation may also damage existing infrastructure (such as water distribution pipes, electricity pylons, etc) located alongside the roads. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Obtain details from pourashava nature and location of all existing infrastructure, and plan excavation carefully to avoid any such sites to maximum extent possible; • Integrate construction of the various infrastructure subprojects to be conducted in Sherpur (roads, water supply, etc.) so that different infrastructure is located on opposite sides of the road where feasible and roads and inhabitants are not subjected to repeated disturbance by construction in the same area at different times for different purposes. • Consult with local community to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed. • Existing infrastructure (such as water distribution pipes, electricity pylons, etc.) shall be relocated before construction starts at the subproject sites. • Prior permission shall be obtained from respective local authority for use of water for construction. Use of water for construction works shall not disturb local water users. • If construction work is expected to disrupt users of community water bodies, notice to the affected community shall be served 7 days in advance and again 1 day prior to start of construction. • Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.
Community health and safety	Construction works will impede the access of residents and businesses in limited cases. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures. Poor safety signage and lack of barriers at work site and trenches will create hazard to pedestrians and children.	• Provide safety signage at all sites visible to public • Provide safety barriers near any trenches, and cover trenches with planks during non work hours. • Contractor's activities and movement of staff will be restricted to designated construction areas. • Locations of hot-mix plants, batching plants and crushers (if these establishments are being set up exclusively for the subproject) shall be located at least 100 m away from the nearest dwelling preferably in the downwind direction. • Consult with Sherpur local authority on the designated areas for stockpiling of, soils, gravel, and other construction materials. • If the contractor chooses to locate the work camp/storage area on private land, he must get prior permission from the environment management specialist and landowner. • Use small mechanical excavators to attain faster trenching progress. For rock and concrete breaking, use non-explosive blasting chemicals, silent rock cracking chemicals, and concrete breaking chemicals.[6] • Under no circumstances may open areas or the surrounding bushes be used as a toilet facility.

[6] These products come in powder forms, and once mixed with water (being the catalyst) simply expand, and crack the rock from hole to hole. This product is environmentally friendly and can be washed away after it has been used.

Field	Impacts	Mitigation Measures
		• Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged. • A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: (i) no alcohol/drugs on site; (ii) prevent excessive noise; (iii) construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility); (iv) no fires permitted on site except if needed for the construction works; (v) trespassing on private/commercial properties adjoining the site is forbidden; (vi) other than pre-approved security staff, no workers shall be permitted to live on the construction site; and (vii) no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do. • Interested and affected parties need to be made aware of the existence of the complaints book and the methods of communication available to them. The contractor must address queries and complaints by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to the national/regional environmental specialist's attention immediately; and (iv) taking remedial action as per national/regional environment specialist's instruction. • The contractor shall immediately take the necessary remedial action on any complaint/grievance received by him and forward the details of the grievance along with the action taken to the national/regional environmental specialist within 48 hours of receipt of such complaint/grievance.
Workers health and safety	There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. Workers need to be mindful of the occupational hazards which can arise from working in height and excavation works. Potential impacts are negative and long-term but reversible by mitigation measures.	• Comply with requirements of Government of Bangladesh Labor Law of 2006 and all applicable laws and standards on workers health and safety (H&S). • Ensure that all site personnel have a basic level of environmental awareness training. If necessary, the national/regional environmental specialist and/or a translator shall be called to the sites to further explain aspects of environmental or social behavior that are unclear. • Produce and implement a site H&S plan which include measures as: (i) excluding the public from worksites; (ii) ensuring all workers are provided with and required to use personal protective equipment (reflectorized vests, footwear, gloves, goggles and masks) at all times; (iii) providing H&S training[7] for all site personnel; (iv) documenting procedures to be followed for all site activities; and (v) maintaining accident reports and

[7] Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

Field	Impacts	Mitigation Measures
		records. • Arrange for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances • Maintain necessary living accommodation and ancillary facilities in functional and hygienic manner in work camps. Ensure (i) uncontaminated water for drinking, cooking and washing, (ii) clean eating areas where workers are not exposed to hazardous or noxious substances; and (iii) sanitation facilities are available at all times. • Provide medical insurance coverage for workers; • Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; • Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted; • Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; • Ensure moving equipment is outfitted with audible back-up alarms; • 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. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and • Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.
D. Historical, Cultural, and Archaeological Characteristics		
Physical and cultural heritage	Construction works will be on existing roads and in built-up areas of Sherpur thus risk for chance finds is low.	• All fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest discovered on the site shall be the property of the government. • Prevent workers or any other persons from removing and damaging any fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest. • Stop work immediately to allow further investigation if any finds are suspected.

E. Anticipated Impacts and Mitigation Measures – Operations and Maintenance Phase

79. In the operations and maintenance (O&M) phase, the roads will operate with routine maintenance, which should not affect the environment. Routine repairs and unblocking of side drains will be very small in scale, to conducted manually by small teams of men with simple equipment (shovels, wheelbarrows, etc.) and works will be very short in duration, thus will not cause significant physical impacts. Traffic may be interrupted temporarily but this work will be very small in scale, infrequent, and short in duration, so there will be no economic or other implications. The infrastructures will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent,

affecting small areas only. O&M will be the responsibility of Sherpur local authority, which will be given training by this project.

80. To maintain the safety of workers and road-users, such work should be coordinated with the local police department so that adequate warning signs and traffic diversions can be set up when necessary. Debris/sediments from drainages need to be collected and disposed at a designated site such as the landfill. It is important that the designated disposal site's base is of a non-permeable membrane in order to prevent leachate that can contaminate the soil and groundwater. The potential adverse impacts that are associated with O&M activities can be mitigated to acceptable levels with the following mitigation measures (Table 11).

Table 11: Anticipated Impacts and Mitigation Measures–O&M Phase

Field	Impacts	Mitigation Measures
A. Physical Characteristics		
Water quality	Run-off from stockpiled debris/sediments from drainages which may cause siltation and reduction in the quality of adjacent bodies of water. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Take all precautions to prevent run-off into streams, watercourses, or irrigation system. Install temporary silt traps or sedimentation basins along drainage leading to the water bodies. • Remove all debris/sediments immediately. • Dispose debris/sediments at a designated site such as landfill.
Air quality	Moving debris/sediments may create dusts during dry season. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Use tarpaulins to cover soils, sand and other loose material.
Acoustic environment	Temporary increase in noise level and vibrations. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Plan activities in consultation with Sherpur local authority so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. • Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.
B. Biological Characteristics		
Biodiversity	Activities in the built-up area of Sherpur pourashava. There are no protected areas in or around subproject sites, and no known areas of ecological interest.	• No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior permission. • Prevent workers or any other person from removing and damaging any flora (plant/vegetation) and fauna (animal).
C. Socioeconomic Characteristics		
Existing provisions for pedestrians and other forms of transport	Road closure is not anticipated. Traffic may be interrupted temporarily. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Maintain safe passage for vehicles and pedestrians during maintenance activities. • Erect and maintain barricades, including signs, markings, flags and flagmen informing diversions and alternative routes when required. • Notify affected sensitive receptors by providing sign boards informing nature and duration of maintenance activities and contact numbers for concerns/complaints. • Leave spaces for access between mounds of soil. • Provide walkways and metal sheets where required to maintain access across for people and vehicles. • Increase workforce in front of critical areas such as institutions, place of worship, business establishment,

Field	Impacts	Mitigation Measures
		hospitals, and schools. • Consult businesses and institutions regarding operating hours and factoring this in work schedules. • Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.
Workers health and safety	Workers need to be mindful of the occupational hazards working in confined spaces such as closed drains. Potential impacts are negative and long-term but reversible by mitigation measures.	• Comply with requirements of Government of Bangladesh Labor Law of 2006 and all applicable laws and standards on workers H&S. • Ensure that all site personnel have a basic level of H&S training. • Produce and implement a O&M health and safety (H&S) plan which include measures as: (i) excluding the public from worksites; (ii) ensuring all workers are provided with and required to use personal protective equipment (reflectorized vests, footwear, gloves, goggles and masks) at all times; (iii) providing (H&S) training[8] for all site personnel; (iv) documenting procedures to be followed for all site activities; and (v) maintaining accident reports and records. • Arrange for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances • Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; • Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; • Mark and provide sign boards. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate. • Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.
D. Historical, Cultural, and Archaeological Characteristics		
Physical and cultural heritage	Construction works will be on existing drainages and built-up areas of Sherpur thus risk for chance finds is low.	• All fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest discovered on the site shall be the property of the government. • Prevent workers or any other persons from removing and damaging any fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest. • Stop work immediately to allow further investigation if any finds are suspected.

[8] Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

F. Cumulative Impact Assessment

81. The cumulative impact assessment examined the interaction between the subproject's residual effects (i.e., those effects that remain after mitigation measures have been applied) and those associated with other past, existing, and reasonably foreseeable future projects or activities. The interaction of residual effects associated with multiple projects and/or activities can result in cumulative impacts, both positive and negative. The project's potential cumulative effects were considered with respect to valued components in environmental and socioeconomic categories, in four areas:

(i) of any potential residual project effects that may occur incrementally over time;
(ii) consideration of other known relevant projects or activities within the specified study area boundaries, even if not directly related to the project;
(iii) potential overlapping impacts that may occur due to other developments, even if not directly related to the proposed subproject; and
(iv) future developments that are reasonably foreseeable and sufficiently certain to proceed.

82. The project has identified the valued components as air quality, acoustic environment, socioeconomic and socio-community components, and human health and safety. There are no foreseeable projects that will overlap with the subproject. The spatial boundary of the subproject is the area along the corridor of impact (alignment and width of the roads and ROWs) and the temporal boundary can be considered as the whole Sherpur *pourashava*.

83. It is recommended that infrastructures be (i) designed to the current best practice standard and notified Government of Bangladesh codes; (ii) built that the floods do not damage them; and (iii) side drains are to be kept free from wastes and siltation. Short-term negative impacts are the same with or without climate change measures except that with climate change measures there are increased demand for construction materials and more time to complete the works. No negative cumulative impact and the potential long-term environmental impacts are positive; including mainstreaming climate risk reduction into infrastructure development ensures subprojects infrastructure are less vulnerable to floods, storm surge, landslides and impacts of other extreme weather events.

84. **Air quality.** Emissions of common air contaminants and fugitive dust may be elevated in proximity to active work sites during construction and O&M phases, these impacts will be short-term and localized to the immediate vicinity of roads and . Greenhouse gas (GHG) emissions may increase as a result of the subproject activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land-filling of residual wastes). Given the subproject's relatively minor contribution to common air contaminants and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible.

85. **Acoustic environment.** Noise levels during construction and O&M activities in immediate proximity of work sites are expected to increase. The duration of exposure will be relatively brief and imperceptible. The exposure represents a temporary, localized, adverse residual effect of low significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction and O&M activities. The overall significance rating of potential residual effects is considered to be negligible.

86. **Socioeconomic and socio-community.** Concerns on existing provisions for pedestrians and other forms of transport will occur spatially during construction and O&M activities. Traffic movement along the roads will be improved once the activities are completed. Since the subproject will be improvement of existing infrastructures, it will not conflict with existing or planned land use. However, following improvement in infrastructures and services, added residential developments, commercial, and business facilities and increased densities are expected to develop and enhance Sherpur *pourashava*. This can be considered a long-term cumulative benefit of the subproject.

87. Given the scale of the project it is likely that local people will obtain at least temporary socio-economic benefits, by gaining employment in the construction workforce, and thus raising their levels of income. These benefits can bring wider social gains if they are directed at vulnerable[9] groups.

88. Upon completion of the project, the socio-community will be the major beneficiaries of this subproject. The citizens, businesses, and communities in Sherpur will be provided with reliable and climate-resilient roads resulting to enhanced safety, cost savings, and economic growth. Benefits for all Sherpur citizens include: safer travel, reduced congestion, reduced fuel usage, reduced vehicle maintenance costs, job creation and related positive economic impact, and improved quality of life. These are considered a long-term cumulative benefit.

89. **Community and workers health and safety.** No adverse residual effects to human health will occur as a result of construction or O&M activities, and mitigation measures are in place to ensure public and worker safety, and will be closely monitored. While exposure to elevated noise levels, fugitive dust and common air pollutants will occur in proximity to work sites, due to their short-term and localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health.

90. Therefore the project will benefit the general public by contributing to the long-term improvement of municipal services and community livability in Sherpur *pourashava*.

VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

A. Public Consultation Conducted

91. The public participation process included (i) identifying interested and affected parties (stakeholders); (ii) informing and providing the stakeholders with sufficient background and technical information regarding the proposed development; (iii) creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments, and concerns) with regard to the proposed development; (iv) giving the stakeholders feedback on process findings and recommendations; and (v) ensuring compliance to process requirements with regards to the environmental and related legislation.

92. Public consultations and focus group discussions (FGDs) were conducted by PPTA team on September 9, 2014. The objective of the meetings was to appraise the stakeholders about environmental and social impacts of the proposed subproject and safeguards to mitigate

[9] Vulnerable groups as those without legal title to land and other assets; households headed by single earner females, the elderly or disabled; indigenous peoples (based on ADB OM); and households with incomes that are below the poverty line.

the same. A questionnaire was designed and environmental information was collected. Key respondents included project-affected persons, who may suffer temporary access disruptions during construction activities, shopkeepers/businessmen from the subproject area, and daily commuters consulted randomly. Issues discussed and feedback received along with details of date, time, location, and list of participants are given in **Appendix 6**. The environmental concerns and suggestions made by the participants were listed, and discussed, and suggestions accordingly incorporated in the EMP. These include speedy construction works to ensure low impacts to community during road closures and local employment.

B. Future Consultation and Disclosure

93. This IEE and other relevant documents will be made available at public locations in the *pourashava* and posted on the websites of executing agencies and ADB. The consultation process will be continued and expanded during the project implementation to ensure stakeholders participate fully in project execution, as well as to implement comprehensive information, education, and communication plan.

94. The public consultation and disclosure program with all interested and affected partied will remain a continuous process throughout the project implementation, and shall include the following:

(i) **Consultations during construction phase:** (a) public meetings with affected communities to discuss and plan work programs and allow issues to be raised and addressed once construction has started; and (b) smaller-scale meetings to discuss and plan construction work with individual communities to reduce disturbance and other impacts, and to provide a mechanism through which stakeholders can participate in project monitoring and evaluation.

(ii) **Project disclosure:** (a) public information campaigns (via newspaper, flyers, and media) to explain the project to the wider city population and prepare them for disruptions they may experience once construction is underway; (b) public disclosure meetings at key project stages to inform the public of progress and future plans, and to provide copies of summary documents in local language; (c) formal disclosure of completed project reports by making copies available at convenient locations in the study areas, and informing the public of their availability; and (d) providing a mechanism through which comments can be made.

95. For the benefit of the community, relevant information from the IEE will be translated in the local language and made available at (i) offices of executing and implementing agencies, (ii) area offices, (iii) consultant teams' offices; and (iv) contractor's campsites. It will be ensured that the hard copies of IEE are kept at places which are conveniently accessible to people, as a means to disclose the document and at the same time creating wider public awareness. An electronic version of the IEE will be placed in the official website of executing and implementing agencies and the ADB website after approval of the IEE by ADB.

VII. GRIEVANCE REDRESS MECHANISM

96. A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate the resolution of AP's concerns, complaints, and grievances about the social and environmental performance at the level of the project. The GRM will aim to provide a

time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project.

97. **Common GRM.** A common GRM will be in place for social, environmental, or any other grievances related to the project; the resettlement plans (RPs) and IEEs will follow the GRM described below, which is developed in consultation with key stakeholders. The GRM will provide an accessible and trusted platform for receiving and facilitating resolution of affected persons' grievances related to the project. The multi-tier GRM for the project is outlined below, each tier having time-bound schedules and with responsible persons identified to address grievances and seek appropriate persons' advice at each stage, as required.

98. Pourashava-wide public awareness campaigns will ensure that awareness on grievance redress procedures is generated through the campaign. The project implementation unit (PIU) and governance improvement and capacity development consultants (GICDC) will conduct *pourashava*-wide awareness campaigns to ensure that poor and vulnerable households are made aware of grievance redress procedures and entitlements, and will work with the PMO and management, design and supervision consultants (MDSC) to help ensure that their grievances are addressed.

99. Affected persons (APs) will have the flexibility of conveying grievances/suggestions by dropping grievance redress/suggestion forms in complaints/suggestion boxes that have already been installed by project pourashavas or through telephone hotlines at accessible locations, by e-mail, by post, or by writing in a complaints register in pourashava offices. Appendix 7 has the sample grievance registration form. Careful documentation of the name of the complainant, date of receipt of the complaint, address/contact details of the person, location of the problem area, and how the problem was resolved will be undertaken. The project management office (PMO) safeguard officer will have the overall responsibility for timely grievance redressal on environmental and social safeguards issues and for registration of grievances, related disclosure, and communication with the aggrieved party through the PIU designated safeguard focal person.

100. **Grievance redress process**. In case of grievances that are immediate and urgent in the perception of the complainant, the contractor and MDSC on-site personnel will provide the most easily accessible or first level of contact for quick resolution of grievances. Contact phone numbers and names of the concerned PIU safeguard focal person and contractors, will be posted at all construction sites at visible locations.

(i) **1st Level Grievance.** The phone number of the PIU office should be made available at the construction site signboards. The contractors and PIU safeguard focal person can immediately resolve on-site in consultation with each other, and will be required to do so within 7 days of receipt of a complaint/grievance.

(ii) **2nd Level Grievance.** All grievances that cannot be redressed within 7 days at field/ward level will be reviewed by the grievance redress cell (GRC) headed by Panel Mayor of the pourashava with support from PIU designated safeguard focal person and MDSC regional environment and resettlement specialists. GRC will attempt to resolve them within 15 days.[10] The PIU designated safeguard focal

[10] Grievance redress cell (GRC) will have been formed at Pourashava-level. For example in Lalmonirhat pourashava, the GRC comprises Panel Mayor as Chairperson, and 1 councilor, the pourashava Executive Engineer, Secretary *pourashava* and *pourashava* administrative officer, as members. All *pourashava*-level GRCs shall have at least

person will be responsible to see through the process of redressal of each grievance.

(iii) **3rd Level Grievance.**The PIU designated safeguard focal person will refer any unresolved or major issues to the PMO safeguard officer and MDSC national environmental and resettlement specialists. The PMO in consultation with these officers/specialists will resolve them within 30 days.

101. Despite the project GRM, an aggrieved person shall have access to the country's legal system at any stage, and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

102. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use the ADB Accountability Mechanism (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB Bangladesh Resident Mission (BRM). The complaint can be submitted in any of the official languages of ADB's DMCs. The ADB Accountability Mechanism information will be included in the PID to be distributed to the affected communities, as part of the project GRM.

103. **Recordkeeping.** Records of all grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were effected and final outcome will be kept by PIU. The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the PMO office, *pourashava* office, and on the web, as well as reported in monitoring reports submitted to ADB on a semi-annual basis.

104. **Periodic review and documentation of lessons learned.** The PMO safeguard officer will periodically review the functioning of the GRM in each *pourashava* and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address grievances.

105. **Costs.** All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the concerned PIU at *pourashava*-level; while costs related to escalated grievances will be met by the PMO. Cost estimates for grievance redress are included in resettlement cost estimates.

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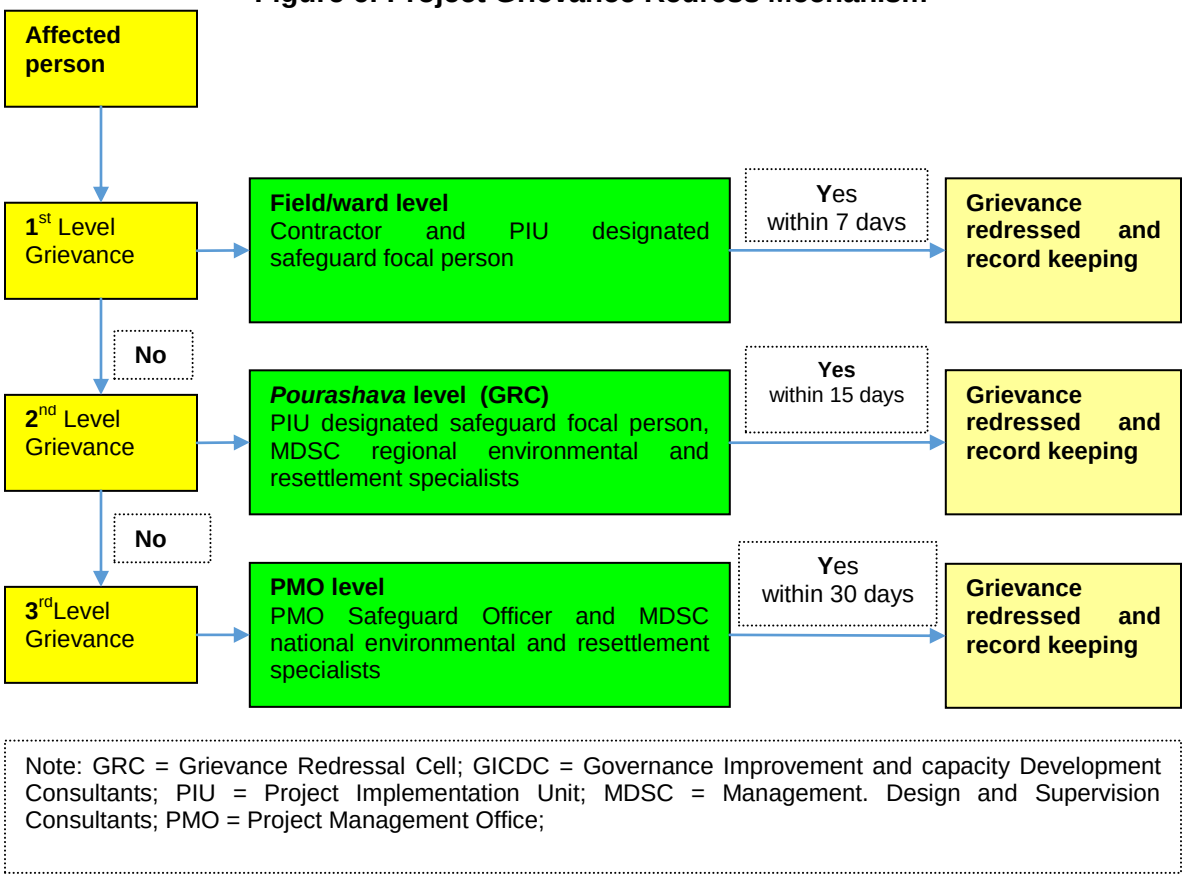
one-woman member/chairperson and AP representative or independent NGO as committee member. In addition, for project-related grievances, representatives of APs, community-based organizations (CBOs), and eminent citizens must be invited as observers in GRC meetings.

Figure 6: Project Grievance Redress Mechanism



Note: GRC = Grievance Redressal Cell; GICDC = Governance Improvement and capacity Development Consultants; PIU = Project Implementation Unit; MDSC = Management. Design and Supervision Consultants; PMO = Project Management Office;

VIII. ENVIRONMENTAL MANAGEMENT PLAN

106. The purpose of the environmental management plan (EMP) is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of: (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with.

107. A copy of the EMP must be kept on work sites at all times. This EMP will be included in the bid documents and will be further reviewed and updated during implementation. The EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

108. For civil works, the contractor will be required to (i) establish an operational system for managing environmental impacts (ii) carry out all of the monitoring and mitigation measures set forth in the EMP; and (iii) implement any corrective or preventative actions set out in safeguards monitoring reports that the employer will prepare from time to time to monitor implementation of this IEE and EMP. The contractor shall allocate a budget for compliance with these EMP measures, requirements and actions.

A. Institutional Arrangement

109. **Executing and implementing agencies.** The Local Government Engineering Department (LGED) and the Department of Public Health Engineering (DPHE), both under the Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives (MLGRD&C) and having extensive experience in managing urban and water supply projects financed by ADB, will be the executing agencies of the project. The participating *pourashavas* will be the implementing agencies.

B. Safeguard Implementation Arrangement

110. **Project management office.** A PMO will be established for the overall management of the project. The PMO will be headed by Project Director (PD) supported by officials including three project managers in charge of (i) municipal infrastructure (excluding water supply and sanitation), (ii) water supply and sanitation, and (iii) governance improvement and capacity development, respectively. the PMO will receive support from national environmental specialist and national resettlement specialist on the MDSC team. Key tasks and responsibilities of the PMO safeguard (environment)officer are as follows:

i. confirm existing IEEs/EMPs are updated based on detailed designs, and that new IEEs/EMPs are prepared in accordance with the EARF and subproject selection criteria related to safeguards;
ii. confirm whether IEEs/EMPs are included in bidding documents and civil works contracts;
iii. provide oversight on environmental management aspects of subprojects and ensure EMPs are implemented by project implementation unit (PIU) and contractors;
iv. establish a system to monitor environmental safeguards of the project, including monitoring the indicators set out in the monitoring plan of the EMP;
v. facilitate and confirm overall compliance with all government rules and regulations regarding site and environmental clearances, as well as any other environmental requirements (e.g., location clearance certificates, environmental clearance certificates, etc.), as relevant;
vi. supervise and provide guidance to the PIUs to properly carry out the environmental monitoring and assessments as per the EARF;
vii. review, monitor, and evaluate the effectiveness with which the EMPs are implemented, and recommend necessary corrective actions to be taken as necessary;
viii. consolidate monthly environmental monitoring reports from PIUs and submit semi-annual monitoring reports to ADB;
ix. ensure timely disclosure of final IEEs/EMPs in locations and form accessible to the public; and
x. address any grievances brought about through the grievance redress mechanism in a timely manner.

111. **Project implementation unit**. The participating *pourashavas* will establish a PIU within the *pourashava* structure.The PIUs will (i) be responsible for land acquisition; (ii) take necessary action for obtaining rights of way; (iii) plan, implement and monitor public relations activities, gender mainstreaming initiatives and community participation activities at *pourashava* level; (iv) disseminate information related to the project to the public and media; (v) ensure compliance

with loan covenants concerning safeguards measures; and (vi) facilitate implementation of safeguards plans. The PIUs will each designate a Safeguard Officer[11] and will receive assistance from the assigned MDSC regional environmental specialist to:

i. update IEEs/EMPs during detailed design stage and prepare new IEEs/EMPs in accordance with the EARF;
ii. conduct environmental compliance audit of existing facilities as per Item F, Appendix 6 of ADB SPS, 2009;
iii. include IEEs/EMPs in bidding documents and civil works contracts;
iv. comply with all government rules and regulations;
v. take necessary action for obtaining rights of way;
vi. oversee implementation of EMPs including environmental monitoring by contractors;
vii. take corrective actions when necessary to ensure no environmental impacts;
viii. submit monthly environmental monitoring reports to PMO,
ix. conduct continuous public consultation and awareness;
x. address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs; and
xi. organize an induction course for the training of contractors preparing them on EMP implementation, environmental monitoring requirements related to mitigation measures; and taking immediate actions to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation.

112. Project Management, Design and Supervision Consultants (MDSC). MDSC will be engaged to work closely with and advise the PMO, to be involved in project supervision including monitoring during construction phase. The MDSC will have one national environmental specialist and three regional environmental specialist as well as one national resettlement specialist and three regional resettlement specialist. The MDSC national environmental specialist will, but not limited to:

i. work under the general supervision of the team leader and the deputy team leader;
ii. review the environmental guidelines and requirement of the government of Bangladesh and ADB SPS, 2009, environmental subproject selection guidelines and EARF;
iii. Guide the implementation of future subprojects;
iv. provide technical support to the PMO and PIUs including review and update of EARF and guidelines for specific type of subprojects and assist in preparing terms of reference for environmental assessment;
v. assist and guide the MDSC regional environmental specialists to provide support to environmental management functions including updating subproject IEEs in respect to EMP;
vi. assist in preparing IEEs and in monitoring impact and mitigation measures associated with subprojects;

[11] It is recommended that existing *pourashava* health officer or executive engineer will also work as safeguard officer in addition to his/her regular responsibilities within the *pourashava*.

vii. assist PIUs and MDSC regional environmental specialists working in the steps for preparing the EIA/IEE, capacity building and training, preparation of guidelines and procedure and subproject specific guidance;
viii. provide support and guidance to PIUs in undertaking environmental monitoring
ix. support PMU in submitting semi-annual environmental monitoring reports to ADB;
x. facilitate in grievance redress and corrective actions;
xi. train PIU officials regarding environmental requirement and issues; and
xii. perform any other task assigned by the team leader, deputy team leader and the project director.

113. The MDSC regional environmental specialists will, but not limited to:

i. work under the supervision and guidance of the team leader, deputy team leader and MDSC national environmental specialist;
ii. assist PIUs in preparing and updating IEEs including EMPs in accordance with the EARF, and assist in monitoring impact and mitigation measures associated with subprojects including implementation of EMPs by contractors;
iii. assist in preparation of IEEs and in the environmental review of subproject consisting of screening at *pourashava* level by PIU through a committee formed with municipal mayor as chairman and representatives from DOE, LGED and other relevant district office as members;
iv. assist PIUs in the steps for preparing EIA/IEE, capacity building and training, preparation of guidelines and procedure and subproject specific guidance;
v. support PIU in environmental monitoring and submit monitoring reports to PMU as inputs into the semi-annual monitoring report submitted to ADB;
vi. undertake mitigation measures and other specific measures in the construction contract;
vii. facilitate in grievance redress and corrective actions;
viii. follow subproject selection guidelines and EARF to ensure compliance with the environmental guidelines and requirement of the Government of Bangladesh and ADB SPS, 2009;
ix. support PMO and MDSC national environment specialist by providing data, information and all other requested assistance;
x. train PIU officials regarding environmental issues
xi. perform any other task assigned by MDSC national environment specialist, team leader, deputy team leader and the project director.

114. **Civil works contracts and contractors**. EMPs are to be included in bidding and contract documents and verified by the PIUs and PMO. The contractor will be required to designate an environmental supervisor to (i) coordinate with MDSC on updating the IEE/EMP based on detailed designs, and (ii) ensure implementation of EMP during civil works. Contractors are to carry out all environmental mitigation and monitoring measures outlined in their contract.

115. Governance Improvement and Capacity Development Consultants (GICDC). The PMO and PIUs will require support on a range of activities related to governance improvement and capacity development of pourashavas. The GICDC will support PMO and PIUs in implementing urban government improvement action plan (UGIAP) by providing capacity development, community mobilization and other facilitation services. There will be 4 GICDC regional offices

consisting of 4 regional coordinators at each regional office. There will be 2community mobilizers in each project pourashava. The regional coordinators will assist pourashavas and the community mobilizers in the activities related to community participation and inclusive development. The community mobilizers will be posted at the pourashava and will (i) have to work maintaining close liaison with the mayor, councilors, pourashava staffs and communities, (ii) provide assistance and support to PIU regarding planning and implementation of citizen awareness and participation activities, urban planning, equity and inclusiveness of women and urban poor. The GICDC will also have a training specialist who will be responsible for identifying and coordinating capacity building activities at pourashava level.

Figure 7: Safeguards Implementation Arrangement

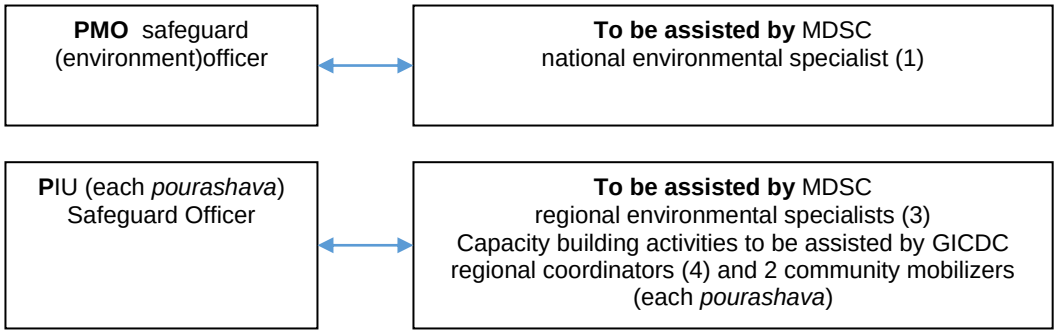


Table 12: Environmental Management and Monitoring Plan – Prior, During, and Post Construction Phase

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	1. Prior to Construction Activities					
Consents, permits, clearances, no objection certificate (NOC), etc.	Failure to obtain necessary consents, permits, NOCs, etc can result to design revisions and/or stoppage of works	• Obtain all necessary consents, permits, clearance, NOCs, etc. prior to start of civil works. • Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. • Include in detailed design drawings and documents all conditions and provisions if necessary	Project management unit (PMO), project implementing unit (PIU), Management Design Supervision Consultants (MDSC)	• Incorporated in final design and communicated to contractors.	• Prior to award of contract	• No cost required. Cost of obtaining all consents, permits, clearance, NOCs, etc. prior to start of civil works responsibility of PMO and PIU. • Mitigation measures are included as part of TOR of PMO, PIU, MDSC
Updating of IEE based on detailed design	Site-specific impacts not identified, mitigation measures not appropriate and sufficient to address impacts	• Update IEE and EMP based on detailed design • Ensure updated EMP is provided to contractors • Relevant information disclosed	PMO	• Updated IEE and EMP reviewed, approved and disclosed	• Upon completion of detailed design	• No additional cost required
Existing utilities	Disruption of services.	• Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction activities • Require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. • Require contractors to prepare spoils management	PMO, PIU, MDSC	• List of affected utilities and operators; • Bid document to include requirement for a contingency plan for service interruptions (example provision of water if disruption is more than 24 hours), spoil management plan (see Appendix 4 for outline), and traffic	• During detailed design phase • Review of spoils management plan: Twice (once after first draft and once before final approval)	• No cost required. • Mitigation measures are included as part of TOR of PMO, PIU, MDSC.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		plan (see Appendix 4 for outline) and traffic management plan (see Appendix 5 for sample)		management plan (see Appendix 5 for sample)		
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	Disruption to traffic flow and sensitive receptors	• Determine locations prior to award of construction contracts.	PMO, PIU, and MDSC	• List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas. • Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land	• During detailed design phase	• No cost required. • Mitigation measures are included as part of TOR of PMO, PIU, and MDSC.
Sources of Materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.	• Prepare list of approved quarry sites and sources of materials	PMO, PIU, and MDSC	• List of approved quarry sites and sources of materials; • Bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary.	• During detailed design phase, as necessary with discussion with detailed design engineers and PIUs	• No cost required. • Mitigation measures are included as part of TOR of PMO, PIU, and MDSC.
EMP Implementation Training	Irreversible impact to the environment, workers, and community	• Project manager and all key workers will be required to undergo EMP implementation including spoils management, Standard operating procedures (SOP) for construction works; health and safety (H&S), core labor laws, applicable	Construction Contractor	• Proof of completion (Safeguards Compliance Orientation) • Posting of proof of completion at worksites	• During detailed design phase prior to mobilization of workers to site	• Cost of EMP Implementation Orientation Training to contractor is responsibility of PMO and PIU.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		environmental laws, etc		• Posting of EMP at worksites		• Other costs responsibility of contractor.
2. During Construction Activities						
A. Physical Characteristics						
Topography, landforms, geology and soils	Significant amount of gravel, sand, and cement will be required for this subproject. Extraction of construction materials may cause localized changes in topography and landforms. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Utilize readily available sources of materials. If contractor procures materials from existing burrow pits and quarries, ensure these conform to all relevant regulatory requirements. • Borrow areas and quarries (If these are being opened up exclusively for the subproject) must comply with environmental requirements, as applicable. No activity will be allowed until formal agreement is signed between PIU, landowner and contractor.	Construction Contractor	• Records of sources of materials	• Monthly by PIU	• Cost for implementation of mitigation measures responsibility of contractor.
Water quality	Trenching and excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall which may cause siltation and reduction	• Prepare and implement a spoils management plan (see Appendix 4 for outline). • Prioritize re-use of excess spoils and materials in construction activities. If spoils will be disposed, consult with Sherpur local authority on designated disposal areas. • All earthworks must to be conducted during dry season to maximum extent possible to avoid the difficult working conditions that prevail during	Construction Contractor	• Areas for stockpiles, storage of fuels and lubricants and waste materials; • Number of silt traps installed along trenches leading to water bodies; • Records of surface water quality inspection; • Effectiveness of water	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	in the quality of adjacent bodies of water. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	monsoon season such as problems from runoff. • Location for stockyards for construction materials shall be identified at least 300m away from watercourses. Place storage areas for fuels and lubricants away from any drainage leading to water bodies. • Take all precautions to minimize the wastage of water in the construction activities. • Take all precautions to prevent entering of wastewater into streams, watercourses, or irrigation system. Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies. • Ensure diverting storm water flow during construction shall not lead to inundation and other nuisances in low lying areas. • While working across or close to any water body, the flow of water must not be obstructed. Ensure no construction materials like earth, stone, or appendage are disposed of in a manner that may block the flow of water of any watercourse and cross drainage channels. • Monitor water quality according to the environmental management plan.		management measures; • No visible degradation to nearby drainages, *khals* or water bodies due to construction activities		
Air quality	Conducting works at dry season and	• Damp down exposed soil and any sand stockpiled on site by spraying with water	Construction Contractor	• Location of stockpiles; • Number of	• Visual inspection by PIU and supervision	• Cost for implementation of mitigation measures

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	when necessary during dry weather; • Use tarpaulins to cover soils, sand and other loose material when transported by trucks. • Unpaved surfaces used for haulage of materials within settlements shall be maintained dust-free. • Arrangements to control dust through provision of windscreens, water sprinklers, and dust extraction systems shall be provided at all hot-mix plants, batching plants and crushers (if these establishments are being set up exclusively for the subproject). • Monitor air quality.		complaints from sensitive receptors; • Heavy equipment and machinery with air pollution control devices; • Certification that vehicles are compliant with air quality standards.	consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components	responsibility of contractor.
Acoustic environment	Construction activities will be on settlements, along and near schools, and areas with small-scale businesses. Temporary increase in noise level and vibrations may be caused by excavation	• Involve the community in planning the work program so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times. • Plan activities in consultation with Sherpur local authority so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance.	Construction Contractor	• Number of complaints from sensitive receptors; • Use of silencers in noise-producing equipment and sound barriers; • Equivalent day and night time noise levels	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of subproject	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	equipment, and the transportation of equipment, materials, and people. However, the proposed subproject will follow existing ROW alignment and impact is short-term, site-specific and within a relatively small area. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Use of high noise generating equipment shall be stopped during night time. • Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach; • Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensure that these are maintained to manufacturers' specifications at all times. • All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent-type generators (if required). • Monitor noise levels. Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s. • If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection. • Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.			components	
Aesthetics	The	• Prepare the Debris	Construction	• Number of	• Visual	• Cost for

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	construction activities do not anticipate any cutting of trees but will produce excess excavated earth (spoils), excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	Disposal Plan • Remove all construction and demolition wastes on a daily basis. • Coordinate with Sherpur local authority for beneficial uses of excess excavated soils or immediately dispose to designated areas Avoid stockpiling of any excess spoils • Suitably dispose of collected materials from drainages, unutilized materials and debris either through filling up of pits/wasteland or at pre-designated disposal locations. • All vehicles delivering fine materials to the site and carrying waste debris for disposal shall be covered to avoid spillage of materials. All existing roads used by vehicles of the contractor, shall be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. • Lighting on construction sites shall be pointed downwards and away from oncoming traffic and nearby houses. • In areas where the visual environment is particularly important or privacy concerns for surrounding buildings exist, the site may require screening. This could be in the form of shade cloth, temporary walls, or other suitable materials prior to the beginning of construction.	Contractor	complaints from sensitive receptors; • Worksite clear of hazardous wastes such as oil/fuel • Worksite clear of any wastes, collected materials from drainages, unutilized materials and debris • Transport route and worksite cleared of any dust/mud	inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		• The site must be kept clean to minimize the visual impact of the site. Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;				
B. Biological Characteristics						
Biodiversity	Activities being located in the built-up area of Sherpur pourashava. There are no protected areas in or around subproject sites, and no known areas of ecological interest. There are no trees at the site that need to be removed.	• Check if tree-cutting will be required during detailed design stage. No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior permission of the environment management specialist. • If during detailed design cutting of tress will be required, compensatory plantation for trees lost at a rate of 2 trees for every tree cut, in addition to tree plantation as specified in the design, will be implemented by the contractor, who will also maintain the saplings for the duration of his contract. • All efforts shall be made to preserve trees by evaluation of minor design adjustments/ alternatives (as applicable) to save trees. • Special attention shall be given for protecting giant trees and locally-important trees (with religious importance) during implementation. • Prevent workers or any other person from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any	Construction Contractor	• PMO and PIU to report in writing the number of trees cut and planted if tree-cutting will be required (to be determined during detailed design stage) • Number of complaints from sensitive receptors on disturbance of vegetation, poaching, fishing, etc.	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		water body in the subproject vicinity. • Prohibit employees from poaching wildlife and cutting of trees for firewood.				
C. Socioeconomic Characteristics						
Existing provisions for pedestrians and other forms of transport	Road closure is not anticipated. Hauling of construction materials and operation of equipment on-site can cause traffic problems. However, the proposed subproject will follow existing ROW alignment. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Prepare and implement a Traffic Management Plan (see Appendix 5 for sample) • Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. • Maintain safe passage for vehicles and pedestrians throughout the construction period. • Schedule truck deliveries of construction materials during periods of low traffic volume. • Erect and maintain barricades, including signs, markings, flags and flagmen informing diversions and alternative routes when required. • Notify affected sensitive receptors by providing sign boards informing nature and duration of construction activities and contact numbers for concerns/complaints. • Leave spaces for access between mounds of soil. • Provide walkways and metal sheets where required to maintain access across for people and vehicles. • Increase workforce in	Construction Contractor	• Traffic route during construction works including number of permanent signages, barricades and flagmen on worksite as per Traffic Management Plan (see Appendix 5 for sample); • Number of complaints from sensitive receptors; • Number of signages placed at project location • Number of walkways, signages, and metal sheets placed at project location	• Visual inspection by PIU and supervision consultants on monthly basis • Frequenc y and sampling sites to be finalized during detailed design stage and final location of) subproject components	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools. • Consult businesses and institutions regarding operating hours and factoring this in work schedules. Ensure there is provision of alternate access to businesses and institutions during construction activities, so that there is no closure of these shops or any loss of clientage. • Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.				
Socio-economic status	Subproject components will be located in government land and existing ROWs thus there is no requirement for land acquisition or any resettlements. Manpower will be required during the XXX-months construction stage. This can result to generation of contractual employment and increase in local revenue. Thus potential	• Employ at least 50% of labor force from communities in the vicinity of the site. This will have the added benefit of avoiding social problems that sometimes occur when workers are imported into host communities, and avoiding environmental and social problems from workers housed in poorly serviced camp accommodation. • Secure construction materials from local market.	Construction Contractor	• Employment records; • Records of sources of materials • Records of compliance to Bangladesh Labor Law of 2006 and other applicable standards	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	impact is positive and long-term.					
Other existing amenities for community welfare	Although construction of subproject components involves quite simple techniques of civil work, the invasive nature of excavation and the subproject sites being in built-up areas of Sherpur pourashava where there are a variety of human activities, will result to impacts to the sensitive receptors such as residents, businesses, and the community in general. Excavation may also damage existing infrastructure (such as water distribution pipes, electricity pylons, etc) located alongside the	• Provide safety signage at all sites visible to public • Provide safety barriers near any trenches, and cover trenches with planks during non work hours. • Obtain details from pourashava nature and location of all existing infrastructure, and plan excavation carefully to avoid any such sites to maximum extent possible; • Integrate construction of the various infrastructure subprojects to be conducted in Sherpur (roads, water supply, etc.) so that different infrastructure is located on opposite sides of the road where feasible and roads and inhabitants are not subjected to repeated disturbance by construction in the same area at different times for different purposes. • Consult with local community to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed. • Existing infrastructure (such as water distribution pipes, electricity pylons, etc.) shall be relocated before construction starts at the subproject sites. • Prior permission shall	Construction Contractor	• Utilities Contingency Plan Number of complaints from sensitive receptors	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	roads. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	be obtained from respective local authority for use of water for construction. Use of water for construction works shall not disturb local water users. • If construction work is expected to disrupt users of community water bodies, notice to the affected community shall be served 7 days in advance and again 1 day prior to start of construction. • Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.				
Community health and safety	Construction works will impede the access of residents and businesses in limited cases. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures. Poor safety signage and lack of barriers at work site and trenches will create hazard to pedestrians and children.	• Provide safety signage at all sites visible to public • Provide safety barriers near any trenches, and cover trenches with planks during non work hours. • Contractor's activities and movement of staff will be restricted to designated construction areas. • Locations of hot-mix plants, batching plants and crushers (if these establishments are being set up exclusively for the subproject) shall be located at least 100 m away from the nearest dwelling preferably in the downwind direction. • Consult with Sherpur local authority on the designated areas for stockpiling of, soils, gravel, and other construction materials. • If the contractor chooses to locate the work	Construction Contractor	• Number of permanent signages, barricades and flagmen on worksite as per Traffic Management Plan (see Appendix 5 for sample); • Number of complaints from sensitive receptors; • Number of walkways, signages, and metal sheets placed at project location • Agreement between landowner and contractors in case of using private lands as work camps, storage areas, etc.	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		camp/storage area on private land, he must get prior permission from the environment management specialist and landowner. • Use small mechanical excavators to attain faster trenching progress. For rock and concrete breaking, use non-explosive blasting chemicals, silent rock cracking chemicals, and concrete breaking chemicals.[12] • Under no circumstances may open areas or the surrounding bushes be used as a toilet facility. • Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged. • A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: (i) no alcohol/drugs on site; (ii) prevent excessive noise; (iii) construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility); (iv) no fires permitted on site except if needed for the construction works; (v)				

[12]These products come in powder forms, and once mixed with water (being the catalyst) simply expand, and crack the rock from hole to hole. This product is environmentally friendly and can be washed away after it has been used.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		trespassing on private/commercial properties adjoining the site is forbidden; (vi) other than pre-approved security staff, no workers shall be permitted to live on the construction site; and (vii) no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do. • Interested and affected parties need to be made aware of the existence of the complaints book and the methods of communication available to them. The contractor must address queries and complaints by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to the national/regional environmental specialist's attention immediately; and (iv) taking remedial action as per national/regional environment specialist's instruction. • The contractor shall immediately take the necessary remedial action on any complaint/grievance received by him and forward the details of the grievance along with the action taken to the national/regional environmental specialist within 48 hours of receipt of such complaint/grievance.				
Workers health and safety	There is invariably a	• Comply with requirements of Government of	Construction Contractor	• Site-specific H&S Plan	• Visual inspection by PIU	• Cost for implementation of

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	safety risk when construction works such as excavation and earthmoving are conducted in urban areas. Workers need to be mindful of the occupational hazards which can arise from working in height and excavation works. Potential impacts are negative and long-term but reversible by mitigation measures.	Bangladesh Labor Law of 2006 and all applicable laws and standards on workers H&S. • 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. • Produce and implement a site health and safety (H&S) plan which include measures as: (i) excluding the public from worksites; (ii) ensuring all workers are provided with and required to use personal protective equipment (reflectorized vests, footwear, gloves, goggles and masks) at all times; (iii) providing (H&S) training[13] for all site personnel; (iv) documenting procedures to be followed for all site activities; and (v) maintaining accident reports and records. • Arrange for readily available first aid unit including an adequate supply of sterilized dressing materials and		• Equipped first-aid stations • Medical insurance coverage for workers • Number of accidents • Records of supply of uncontaminated water • Condition of eating areas of workers • Record of H&S orientation trainings • Use of personal protective equipment • % of moving equipment outfitted with audible back-up alarms • Permanent sign boards for hazardous areas • Signages for storage and disposal areas • Condition of sanitation facilities for workers	and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	mitigation measures responsibility of contractor.

[13] Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		appliances • Maintain necessary living accommodation and ancillary facilities in functional and hygienic manner in work camps. Ensure (i) uncontaminated water for drinking, cooking and washing, (ii) clean eating areas where workers are not exposed to hazardous or noxious substances; and (iii) sanitation facilities are available at all times. • Provide medical insurance coverage for workers; • Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; • Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted; • Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; • Ensure moving equipment is outfitted with audible back-up alarms; • Mark and provide sign boards for hazardous areas				

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and • Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.				
D. Historical, Cultural, and Archaeological Characteristics						
Physical and cultural heritage	Construction works will be on existing roads and in built-up areas of Sherpur thus risk for chance finds is low.	• All fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest discovered on the site shall be the property of the government. • Prevent workers or any other persons from removing and damaging any fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest. • Stop work immediately to allow further investigation if any finds are suspected.	Construction Contractor	• Records of chance finds	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• Cost for implementation of mitigation measures responsibility of contractor.
E. Others						
Submission of EMP implementation report	Unsatisfactory compliance to EMP	• Appointment of supervisor to ensure EMP implementation • Timely submission of monitoring reports including pictures	Construction contractor	• Availability and competency of appointed supervisor • Monthly report	• Monthly monitoring report to be submitted by PIU to PMO • PMO to submit semi-	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
					annual monitoring report to ADB	
3. Post-construction Activities						
Post-construction clean-up	Damage due to debris, spoils, excess construction materials	• Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and • All excavated roads shall be reinstated to original condition. • All disrupted utilities restored • All affected structures rehabilitated/compensated • The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. • All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be topsoiled and regrassed using the guidelines set out in the revegetation specification that forms part of this document. • The contractor must arrange the cancellation of all temporary services. • Request PMO/CSS to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.	Construction Contractor	• PMO/CSS report in writing that (i) worksite is restored to original conditions; (ii) camp has been vacated and restored to pre-project conditions; (iii) all construction related structures not relevant to O&M are removed; and (iv) worksite clean-up is satisfactory.	• Prior to turn-over of completed works to pourashava	• Cost for implementation of mitigation measures responsibility of contractor.

Table 13: Environmental Management and Monitoring Plan – O&M Phase

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
A. Physical Characteristics						
Water quality	Run-off from debris/sediments from repair and maintenance of road and bridge which may cause siltation and reduction in the quality of adjacent bodies of water. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Take all precautions to prevent run-off into streams, watercourses, or irrigation system. Install temporary silt traps or sedimentation basins along drainage leading to the water bodies. • Remove all debris/sediments immediately. • Dispose debris/sediments at a designated site such as landfill.	Sherpur pourashava	• No visible degradation to nearby drainages, *khal*s or water bodies due to construction activities	Duration of repair works	• Included in O&M cost
Air quality	Moving debris/sediments may create dusts during dry season. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Use tarpaulins to cover soils, sand and other loose material.	Sherpur pourashava	• No complaints from sensitive receptors	Duration of repair works	• Included in O&M cost
Acoustic environment	Temporary increase in noise level and vibrations. The impacts are negative but short-term, site-	• Plan activities in consultation with Sherpur local authority so that activities with the greatest potential to generate noise are conducted during periods of the day	Sherpur pourashava	• No complaints from sensitive receptors	Duration of repair works	• Included in O&M cost

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	specific within a relatively small area and reversible by mitigation measures.	which will result in least disturbance. • Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.				
B. Biological Characteristics						
Biodiversity	Activities in the built-up area of Sherpur pourashava. There are no protected areas in or around subproject sites, and no known areas of ecological interest.	• No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior permission. • Prevent workers or any other person from removing and damaging any flora (plant/vegetation) and fauna (animal).	Sherpur pourashava	• No complaints from sensitive receptors	Duration of repair works	• Included in O&M cost
C. Socioeconomic Characteristics						
Existing provisions for pedestrians and other forms of transport	Road closure is not anticipated. Traffic may be interrupted temporarily. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Maintain safe passage for vehicles and pedestrians during maintenance activities. • Erect and maintain barricades, including signs, markings, flags and flagmen informing diversions and alternative routes when required. • Notify affected sensitive receptors by providing sign boards informing nature and duration of maintenance activities and contact numbers for	Sherpur pourashava	• No complaints from sensitive receptors	Duration of repair works	• Included in O&M cost

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		concerns/complaints. • Leave spaces for access between mounds of soil. • Provide walkways and metal sheets where required to maintain access across for people and vehicles. • Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools. • Consult businesses and institutions regarding operating hours and factoring this in work schedules. • Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.				
Workers health and safety	Workers need to be mindful of the occupational hazards working in confined spaces such as closed drains. Potential impacts are negative and long-term but reversible by mitigation measures.	• Comply with requirements of Government of Bangladesh Labor Law of 2006 and all applicable laws and standards on workers H&S. • Ensure that all site personnel have a basic level of H&S training. • Produce and implement a O&M H&S plan which include measures as: (i)	Sherpur pourashava	• No complaints from sensitive receptors • No complaints from workers related to O&M activities • Zero accident	Duration of repair works	• Included in O&M cost

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		excluding the public from worksites; (ii) ensuring all workers are provided with and required to use personal protective equipment (reflectorized vests, footwear, gloves, goggles and masks) at all times; (iii) providing H&S training for all site personnel; (iv) documenting procedures to be followed for all site activities; and (v) maintaining accident reports and records. • Arrange for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances • Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; • Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; • Mark and provide sign boards. Signage shall be in accordance with				

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate. • Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.				
D. Historical, Cultural, and Archaeological Characteristics						
Physical and cultural heritage	Sherpur pourashava was established in 1972. However, construction works will be on existing roads and in built-up areas of Sherpur thus risk for chance finds is low.	• All fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest discovered on the site shall be the property of the government. • Prevent workers or any other persons from removing and damaging any fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest. • Stop work immediately to allow further investigation if any finds are suspected.	Sherpur pourashava	• Records of chance finds	Duration of repair works	• Included in O&M cost

C. Institutional Capacity Development Program

116. The MDSC national and regional environmental specialists will be responsible for trainings on environmental awareness and management in accordance with both ADB and government requirements. Specific modules customized for the available skill set will be devised after assessing the capabilities of the target participants and the requirements of the project. Typical modules would be as follows: (i) sensitization; (ii) introduction to environment and environmental considerations in water supply and wastewater projects; (iii) review of IEEs and integration into the project detailed design; (iv) improved coordination within nodal departments; and (v) monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites. The proposed training project along with the frequency of sessions is presented in Table 14.

Table 14: Training Program for Environmental Management

Items	Pre-construction/prior to construction	Construction	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staffs	Experiences and best practices sharing
Purpose	To aware the participants of the environmental safeguard requirements of ADB and GOB and how the project will meet these requirements	To build the capacity of the staffs for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and GOB	To share the experiences and best practices aimed at learning lessons and improving implementation of EMP
Contents	**Module 1: Orientation** • ADB Safeguards Policy Statement • Government of Bangladesh Environmental Laws and Regulations **Module 2: Environmental Assessment Process** • ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements • Review of environmental assessment report to comply with ADB requirements • Incorporation of EMP into the project design and contracts	• Roles and responsibilities of officials/contractors/consultants towards protection of environment • Environmental issues during construction • Implementation of EMP • Monitoring of EMP implementation • Reporting requirements	Experiences on EMP implementation – issues and challenges Best practices followed
Duration	1 day	1 day	1 day on a regular period to be determined by PMO, PIUs, and PMSC
Participants	LGED, DPHE, PMO, and PMO staffs (technical and environmental) involved in the project implementation	PMO PIUs Contractors	PMO PIUs Contractors

D. Staffing Requirement and Budget

117. Costs required for implementing the EMP will cover the following activities:

(i) Updating IEE, preparing and submitting reports and public consultation and disclosure;
(ii) Application for environmental clearances; and
(iii) Implementation of EMP, environmental monitoring program and long-term surveys.

118. The infrastructure involved in each scheme is generally straightforward and will take between three and nine months to build. Environmental monitoring during construction will also be straightforward and will involve periodic site observations and interviews with workers and others, plus checks of reports and other documents. This will be conducted by MDSC environmental management specialist assisted by the PMO environment officer. The environmental management specialist will use the IEE as necessary and perform tasks as specified in the TOR. Therefore no separate budget required for MDSC environment management specialist.

119. The cost of mitigation measures and surveys during construction stage will be incorporated into the contractor's costs, which will be binding on him for implementation. The surveys will be conducted by the contractors.

120. The operation phase mitigation measures are again of good operating practices, which will be the responsibility of Sherpur *pourashava*. All monitoring during the operation and maintenance phase will be conducted by LGED and DPHE, therefore, there are no additional costs.

121. The indicative costs of EMP implementation are shown in Tables 15 and 16 (by source of funds).

Table 15: Indicative Cost of EMP Implementation

	Particulars	Stages	Unit	Total Number	Rate (Taka)	Cost (Taka)	Cost covered by
A.	**Mitigation Measures**						
1.	Compensatory plantation measures	Construction	Per tree	50	1,500	75,000	Civil works contract
B.	**Monitoring Measures**						
1.	Air quality monitoring	- Pre-construction - Construction	Per location	20	30,000	60,000	Civil works contract
2.	Noise levels monitoring	- Pre-construction - Construction	Per location	20	10,000	200,000	Civil works contract
C	**Capacity Building**						
1.	(i) Orientation workshop for officials involved in the project implementation on ADB Safeguards Policy Statement, Government of Bangladesh environmental laws and regulations, and environmental assessment process; (ii) induction course	Module 1 – immediately upon engagement of the MDSC environmental specialists Module 2 – prior to award of civil works contracts (twice a year for 4 years)	lump sum		Module 1 – 30,000 Module 2 – 30,000 Module 3 – 30,000	90,000	Covered under MDSC contract

	Particulars	Stages	Unit	Total Number	Rate (Taka)	Cost (Taka)	Cost covered by
	contractors, preparing them on EMP implementation and environmental monitoring requirements related to mitigation measures; and taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation; and (iii) lessons learned information sharing	Module 3 – prior to start of Phase 2 and upon completion of the project					
D.	**Consultants Costs**						
1.	MDSC national environmental specialist (1 person)	Responsible for environmental safeguards of the project	person months (spread over entire project implementation period)	60 person months	320,000 per person month	1,280,000	Remuneration and budget for travel covered in the MDSC contract
2.	MDSC regional environmental specialists (3 persons)	Responsible for environmental safeguards of the project	person months (spread over entire project implementation period)	60 each = 180 person-months	320,000 per person-month	57,600,000	Remuneration and budget for travel covered in the MDSC contract
E.	**Administrative Costs**						
1.	Legislation, permits, and agreements	Permit for excavation, tree-cutting permits, etc	Lump sum		50,000	50,000	These consents are to be obtained by contractor at his own expense.
		Environmental assessment and environmental clearances as per ECA and ECR requirements Obtaining right of way clearances with related national agencies.	Lump sum		100,000	100,000	LGED DPD cost for municipal infrastructures
F.	**Other Costs**						
1.	Public consultations and information	Information disclosure and	As per requireme	Lump sum		1,000,000	Covered under MDSC

	Particulars	Stages	Unit	Total Number	Rate (Taka)	Cost (Taka)	Cost covered by
	disclosure	consultations during preconstruction and construction phase, including public awareness campaign through media	nt				contract
2.	GRM implementation	Costs involved in resolving complaints (meetings, consultations, communication, and reporting/information dissemination)		Lump sum		1,000,000	PMO cost
3.	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction phase and defect liability period		Lump sum	Contractor's liability	As per insurance requirement	Civil works contract – contractor's insurance

Table 16: Indicative Cost of EMP Implementation – Per Source of Funding

	Particulars	Stages	Unit	Total Number	Rate (Taka)	Cost (Taka)	Cost covered by
A. Contractors							
1.	Compensatory plantation measures	Construction	Per tree	50	1,500	75,000	Civil works contract
2.	Air quality monitoring	- Pre-construction - Construction	Per location	20	30,000	60,000	Civil works contract
3.	Noise levels monitoring	- Pre-construction - Construction	Per location	20	10,000	200,000	Civil works contract
4.	Legislation, permits, and agreements	Permit for excavation, tree-cutting permits, etc	Lump sum		50,000	50,000	These consents are to be obtained by contractor at his own expense.
5.	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction phase and defect liability period		Lump sum	Contractor's liability	As per insurance requirement	Civil works contract – contractor's insurance
	Subtotal					**720,000**	
B. MDSC							
1.	Public consultations	Information	As per	Lump sum		1,000,000	Covered

	Particulars	Stages	Unit	Total Number	Rate (Taka)	Cost (Taka)	Cost covered by
	and information disclosure	disclosure and consultations during preconstruction and construction phase, including public awareness campaign through media	requirement				under MDSC contract
2.	(i) Orientation workshop for officials involved in the project implementation on ADB Safeguards Policy Statement, Government of Bangladesh environmental laws and regulations, and environmental assessment process; (ii) induction course contractors, preparing them on EMP implementation and environmental monitoring requirements related to mitigation measures; and taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation; and (iii) lessons learned information sharing	Module 1 – immediately upon engagement of the MDSC environmental specialists Module 2 – prior to award of civil works contracts (twice a year for 4 years) Module 3 – prior to start of Phase 2 and upon completion of the project	lump sum		Module 1 – 30,000 Module 2 – 30,000 Module 3 – 30,000	90,000	Covered under MDSC contract
3.	MDSC national environmental specialist (1 person)	Responsible for environmental safeguards of the project	person months (spread over entire project implementation period)	60 person months	320,000 per person month	1,280,000	Remuneration and budget for travel covered in the MDSC contract
4.	MDSC regional environmental specialists (3 persons)	Responsible for environmental safeguards of the project	person months (spread over entire project implementation period)	60 each = 180 person-months	320,000 per person-month	57,600,000	Remuneration and budget for travel covered in the MDSC contract
	Subtotal					**59,970,00**	

	Particulars	Stages	Unit	Total Number	Rate (Taka)	Cost (Taka)	Cost covered by
						0	
C. Administrative Cost (Recurring) – PMO							
1.	Legislation, permits, and agreements	Environmental assessment and environmental clearances as per ECA and ECR requirements Obtaining right of way clearances with related national agencies.	Lump sum		100,000	100,000	LGED DPD cost for municipal infrastructures
2.	GRM implementation	Costs involved in resolving complaints (meetings, consultations, communication, and reporting/information dissemination)		Lump sum		1,000,000	PMO cost
	Subtotal					**1,100,000**	

IX. MONITORING AND REPORTING

122. PMO will monitor and measure the progress of EMP implementation. The monitoring activities will correspond with the project's risks and impacts, and will be identified in the EIAs/IEEs for the projects. In addition to recording information on the work and deviation of work components from original scope PMO, PIUs, and MDSC will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome. Corrective actions to be taken quickly and reported in monitoring reports.

123. MDSC will submit monthly monitoring and implementation reports to PMO, who will take follow-up actions, if necessary. PMO will submit semi-annual monitoring reports to ADB. The suggested monitoring report format is in Appendix 9. Subproject budgets will reflect the costs of monitoring and reporting requirements. For projects likely to have significant adverse environmental impacts during operation, reporting will continue at the minimum on an annual basis. Monitoring reports will be posted in a location accessible to the public.

124. LGED and DPHE will document monitoring results, identify the necessary corrective actions, reflect them in a corrective action plan, and for each quarter, will study the compliance with the action plan developed in the previous quarter. Compliance with loan covenants will be screened by ADB.

125. ADB will review project performance against the commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the project's risks and impacts. Monitoring and supervising of social and environmental safeguards will be integrated into the project performance management system. ADB will monitor projects on an ongoing basis until a project completion report is issued. ADB will carry out the following monitoring actions to supervise project implementation:

(i) conduct periodic site visits for projects with adverse environmental or social impacts;
(ii) conduct supervision missions with detailed review by ADB's safeguard specialists/officers or consultants for projects with significant adverse social or environmental impacts;
(iii) review the periodic monitoring reports submitted by EAs to ensure that adverse impacts and risks are mitigated, as planned and as agreed with ADB;
(iv) work with EAs to rectify to the extent possible any failures to comply with their safeguard commitments, as covenanted in the legal agreements, and exercise remedies to re-establish compliance as appropriate; and
(v) prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

X. CONCLUSION AND RECOMMENDATIONS

126. The process described in this document has assessed the environmental impacts of all elements of Sherpur roads subproject. All potential impacts were identified in relation to design and location, construction, and operation phases.

127. Planning principles and design considerations have been reviewed and incorporated into the site planning process whenever possible; thus, environmental impacts as being due to the project design or location were not significant.

128. Most of the individual elements of the subproject are relatively small and involve straightforward construction and operation, so impacts will be mainly localized and not greatly significant. Most of the predicted impacts are associated with the construction process, and are produced because that process is invasive, involving trenching and other excavation. However, the routine nature of the impacts means that most can be easily mitigated. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. Mitigation will be assured by a program of environmental monitoring to ensure that all measures are implemented, and will determine whether the environment is protected as intended. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. Any requirements for corrective action will be reported to the ADB.

129. The stakeholders were involved in developing the IEE through discussions on-site and public consultation, after which views expressed were incorporated into the IEE and in the planning and development of the subproject. The IEE will be made available at public locations in the city and will be disclosed to a wider audience via the ADB and LGED project websites. The consultation process will be continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation. A grievance redress mechanism is described within the IEE to ensure any public grievances are addressed quickly.

130. The PMO and MDSC will be responsible for monitoring. The MDSC will submit monthly monitoring reports to PMO, and the PMO will send semi-annual monitoring reports to ADB. ADB will post the environmental monitoring reports on its website.

131. The EMP will assist the PMO, MDSC, and contractors in mitigating the environmental impacts, and guide them in the environmentally sound execution of the proposed project. The EMP will also ensure efficient lines of communication between the implementing agency, project management unit, and contractors. A copy of the EMP shall be kept on-site during the construction period at all times. The EMP shall be made binding on all contractors operating on the site, and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document shall constitute a failure in compliance.

132. Therefore the proposed subproject is unlikely to cause significant adverse impacts and net environmental benefits to citizens of Sherpur will be positive. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures.

133. As per Government of Bangladesh Environment Conservation Act, 1995 (ECA, 1995) and Environment Conservation Rules (ECR, 1997), the subproject is categorized as “Orange-B” and Location Clearance Certificate (LCC) and Environmental Clearance Certificate (ECC) must be obtained from the DoE.

134. Based on the findings of the IEE, there are no significant impacts and the classification of the subproject as Category “B” is confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS (2009).

Appendix 1: Rapid Environmental Assessment Checklist

Screening questions	Yes	No	Remarks
A. Project siting Is the project area adjacent to or within any of the following environmentally sensitive areas?	✓		Sherpur *pourashava* covers an area of 24.75 km^2 with population density of 3959 persons per km^2.The area is predominantly residential.
Cultural heritage site		✓	The subproject components are not within locations in or near sensitive and valuable ecosystems, including protected areas and forests. Not applicable
Protected area		✓	Not applicable
Wetland		✓	Not applicable
Mangrove		✓	Not applicable
Estuarine		✓	Not applicable
Buffer zone of protected area		✓	Not applicable
Special area for protecting biodiversity		✓	Not applicable
B. Potential environmental impacts Will the project cause…		✓	Not applicable
Encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?		✓	Not applicable. Construction works will be on existing roads and mostly in built-up areas of Sherpur.
Encroachment on precious ecology (e.g. sensitive or protected areas)?		✓	Not applicable. There are no protected areas in or around subproject sites, and no known areas of ecological interest in Sherpur.
Alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?	✓		Excavations may result to silt-laden runoff during rainfall which may cause siltation and reduction in the quality of adjacent bodies of water. The impacts are negative but short-term, site-specific within a relatively small area and reversible through mitigation measures.
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?	✓		Due to excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants. The impacts are negative but short-term, site-specific within a relatively small area and reversible through mitigation measures.
Increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?	✓		Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants. The impacts are negative but short-term, site-specific within a relatively small area and reversible through mitigation measures.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?		✓	Not applicable. Construction will not involve use explosives and chemicals. Excavation will be done manually. Construction contractors will be required to implement health and safety (H&S) plan.
Noise and vibration due to blasting and other civil works?	✓		Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment, materials, and people. The impacts are negative but short-term, site-specific within a relatively small area and reversible through mitigation measures.
Dislocation or involuntary resettlement of people?		✓	Not applicable. Land acquisition not required for the subproject. RF to guide any resettlement related issues.
Dislocation and compulsory resettlement of people		✓	RP prepared as per ADB SPS and

Screening questions	Yes	No	Remarks
living in right-of-way?			Government of Bangladesh laws.
Disproportionate impacts on the poor, women and children, indigenous peoples or other vulnerable groups?		✓	Not applicable.
Other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?		✓	Not applicable.
Hazardous driving conditions where construction interferes with pre-existing roads?	✓		Road closures are not required. Construction contractors will be required to implement traffic management plan and coordinate with Sherpur local authority.
Poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI and HIV/AIDS) from workers to local populations?		✓	Construction contractors will be required to provide sanitation facilities and ensure proper waste management at all times. Contracts will include provisions on STI and HIV/AIDS.
Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		✓	Construction contractors will be required to ensure cleanliness at all times to prevent breeding of mosquitoes and rodents.
Accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?		✓	Not applicable.
Increased noise and air pollution resulting from traffic volume?		✓	Not anticipated.
Increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?		✓	Not anticipated.
Social conflicts if workers from other regions or countries are hired?		✓	Priority in employment will be given to local residents.
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Improved management systems through capacity building and institutional development will ensure reduced burden on services and infrastructure.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		✓	Not applicable. Construction will not involve use of explosives and chemicals.
Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.		✓	Work areas will be clearly demarcated with signage and safety barriers, and access will be controlled. Only workers and project concerned members will be allowed to visit the operational sites.

Appendix 2: Environmental Standards and Application Fees

1. The standards for air, water, sound, odor and other components of the environment applicable to the project shall be determined in accordance with the standards specified in Schedules 2, 3, 4, 5, 6, and 8 of ECR, 1997.

	Standards	**ECR, 1997 (Rule 12) http://www.moef.gov.bd/html/laws/env_law/178-189.pdf**
1.	Air	Schedule 2
2.	Inland surface water	Schedule 3
	Drinking water	
3.	Sound	Schedule 4
4.	Sound Originating from Motor Vehicles or Mechanized Vessels	Schedule 5
5.	Emission from Motor Vehicles	Schedule 6
7.	Odor	Schedule 8

2. The standard limits of discharge of liquid waste and gaseous emissions applicable to the project shall be determined in accordance with the standards specified in Schedule 9 and 10

	Environmental Component	**ECR, 1997 (Rule 13) http://www.moef.gov.bd/html/laws/env_law/178-189.pdf**
1.	Sewage Discharge	Schedule 9
2.	Waste from Industrial Units or Projects Waste (see discharge to inland surface water and irrigated land)	Schedule 10

3. The fees for issuance of environmental clearance certificate and its renewal shall be payable in accordance with Schedule 13. The fees for analysis of samples of water, liquid waste, air and sound and also the information or data derived from such analysis are described in Schedule 14.

	Fees	**ECR, 1997 (Rule 14 and 15) http://www.moef.gov.bd/html/laws/env_law/178-189.pdf**
1.	Environmental clearance certificate or renewal	Schedule 13
2.	Supplying various analytical information or data or test results of samples of water, effluent, air and sound	Schedule 14

[1]"SCHEDULE – 13

Fees for Environmental Clearance Certificate or Renewal
[See Rules 7(5), 8(2) and 14]

1. Industrial unit or project

Investment (in Taka)	Fees for Environmental Clearance Certificate (in Taka)	Certificate Renewal Fee
(1)	(2)	(3)
(a) Between Tk. 100,000 and 5,00,000	Tk. 1,500	One-fourth of the fees in Column (2).
(b) Between Tk. 5,00,000 and 10,00,000	Tk. 3,000	-Do-
(c) Between Tk. 10,00,000 and 50,00,000	Tk. 5,000	-Do-
(d) Between Tk. 50,00,000 and 10,000,000	Tk. 10,000	-Do-

[1] *Schedule-13 was substituted by Notification S.R.O. No. 234-Law/2002 dated 24/08/2002 and came into force on 26/08/2002 being the date of publication in Bangladesh Gazette extraordinary issue.*

(1)	(2)	(3)
(e) Between Tk. 10,000,000 and 2,00,000,000	Tk. 25,000	One-fourth of the fees in Column (2).
(f) Between Tk. 2,00,000,000 and 5,00,000,000	Tk. 50,000	-Do-
(g) Above Tk. 5,00,000,000	Tk. 1,00,000	-Do-

Appendix 3: Levels of Service for Proposed Interventions – Roads

Road Part	Existing Standard	Proposed Standard	Additional Climate Change forUGIIP-3
Design Life	20 years		20 years with consideration for 50 years flood frequency for rights of way (RoW)
Minimum width	Minor roads 1.0-3.0 m Town Roads 3.0-5.0 m	3.0 m for minor access roads with 1.0 shoulder only if RoW permits. 5.0 m with 2 x 1.15 meter shoulders where RoW exists	
Crest level	600 mm above normal flood level	600 mm above normal flood level	200 mm above A1B[14] scenario sea levels in 2034
Surface material	BT, CC or HBB depending on width		All CC with minimum thickness of 150 mm with adequate reinforcement and 150 mm plastic pipes to be placed at 50 meter intervals under roads for services
Pavements	Thickened sand cushion or sometimes sand aggregate. (7 to 11 meters wide)		All thickened sand aggregate. Sub-base to be 0.25 meters wider than overlying layer.
Earthworks	Compacted where necessary either by hand or machine.	Machine compacted in layers and tested.	
Embankments	Slope 1:1.5	Embankments strengthened with edge protection. Where possible, trees or bushes should be planted on earth embankments	Additional strengthening on roads in flood areas, either concrete brick work.
Run-off / drainage	Culverts provided as necessary	Ensure side drains are integrated into town's drainage system	Increase cross drainage structures as necessary. Full width drainage layer in sub-base Assess need for larger culverts
			Strengthen abutments and approaches

Source: PPTA Consultant.

[14] A1B represents a mid-range emission scenario for the future global emission of Greenhouse gases. A1B makes assumptions about future growth and development of human activities during the next century. It was used for the IPCC climate change assessments in 2007.

Appendix 4: Sample Outline Spoils Management Plan

I. Spoils information

- A. Materials type
- B. Potential contamination
- C. Expected volume and sources
- D. Spoil classification

II. Spoils management

- A. Transportation of spoil
- B. Storage of spoil
- C. Contaminated spoil
- D. Approved reuse and/or disposal sites

III. Records of reuse and/or disposal

Appendix 5: Sample Outline Traffic Management Plan

A. Principles

1. One of the prime objectives of this TMP is to ensure the safety of all the road users along the work zone, and to address the following issues:

(i) the safety of pedestrians, bicyclists, and motorists traveling through the construction zone;
(ii) protection of work crews from hazards associated with moving traffic;
(iii) mitigation of the adverse impact on road capacity and delays to the road users;
(iv) maintenance of access to adjoining properties; and
(v) addressing issues that may delay the project.

B. Operating Policies for TMP

2. The following principles will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around work zones while reasonably protecting workers and equipment.

(i) Make traffic safety and temporary traffic control an integral and high-priority element of every project from planning through design, construction, and maintenance.
(ii) Inhibit traffic movement as little as possible.
(iii) Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic control zone.
(iv) Inspect traffic control elements routinely, both day and night, and make modifications when necessary.
(v) Pay increased attention to roadside safety in the vicinity of temporary traffic control zones.
(vi) Train all persons that select, place, and maintain temporary traffic control devices.
(vii) Keep the public well informed.
(viii) Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

3**. Figure A2 to Figure A12**illustrates the operating policy for TMP for the construction of water pipes and the sewers along various types of roads.

C. Analyze the impact due to street closure

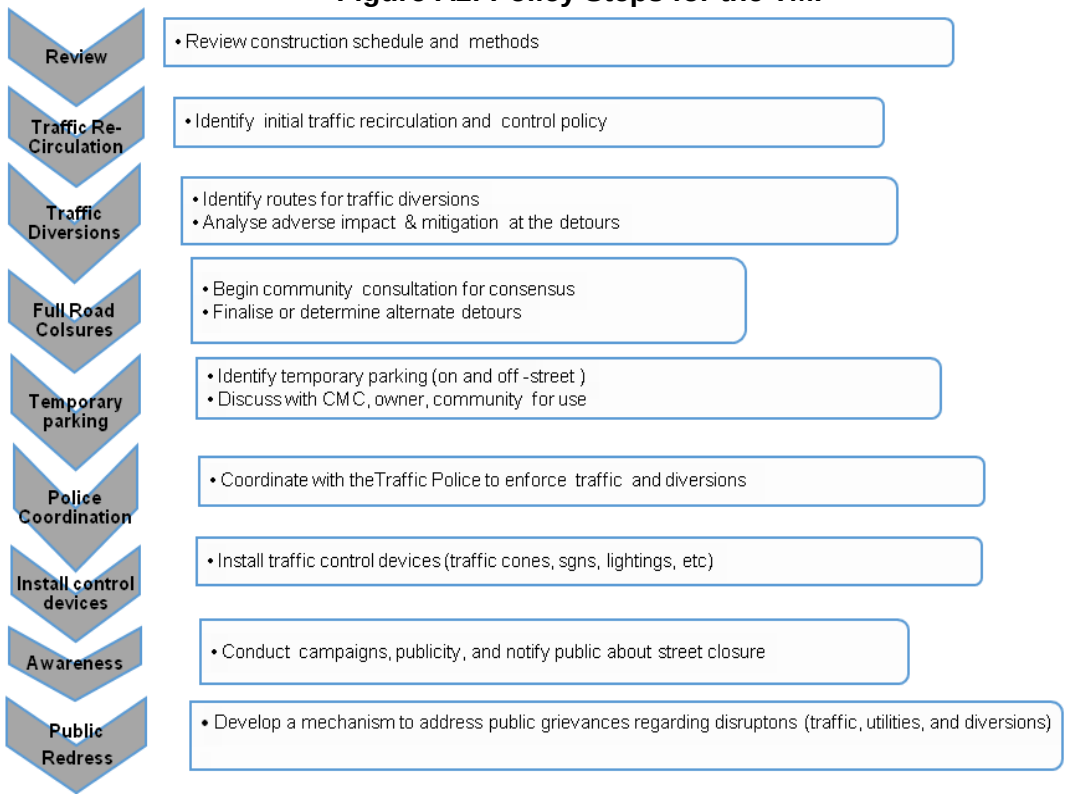
4. Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

(i) approval from the ULB/CMC/Public Works Department (PWD) to use the local streets as detours;
(ii) consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;

(iii) determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
(iv) determining if additional traffic control or temporary improvements are needed along the detour route;
(v) considering how access will be provided to the worksite;
(vi) contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
(vii) developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

5. If full road-closure of certain streets within the area is not feasible due to inadequate capacity of the detour street or public opposition, the full closure can be restricted to weekends with the construction commencing on Saturday night and ending on Monday morning prior to the morning peak period.

Figure A1: Policy Steps for the TMP



D. Public awareness and notifications

6. As per discussions in the previous sections, there will be travel delays during the constructions, as is the case with most construction projects, albeit on a reduced scale if utilities and traffic management are properly coordinated. There are additional grounds for travel delays in the area, as most of the streets lack sufficient capacity to accommodate additional traffic from diverted traffic as a result of street closures to accommodate the works.

7. The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

8. The PIU will also conduct an awareness campaign to educate the public about the following issues:

(i) traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
(ii) defensive driving behaviour along the work zones; and
(iii) reduced speeds enforced at the work zones and traffic diversions.

9. It may be necessary to conduct the awareness programs/campaigns on road safety during construction.

10. The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centers. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around the area and will also be available at the PIU, and the contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

(i) explain why the brochure was prepared, along with a brief description of the project;
(ii) advise the public to expect the unexpected;
(iii) educate the public about the various traffic control devices and safety measures adopted at the work zones;
(iv) educate the public about the safe road user behaviour to emulate at the work zones;
(v) tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and
(vi) indicate the office hours of relevant offices.

E. Install traffic control devices at the work zones and traffic diversion routes

11. The purpose of installing traffic control devices at the work zones is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic signs at the work zones. The following traffic control devices are used in work zones:

- Signs
- Pavement Markings
- Channelizing Devices
- Arrow Panels
- Warning Lights

12. Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary “STOP” and “GO”).

13**.** **Figure A2 to Figure A12** illustrates a typical set-up for installing traffic control devices at the work zone of the area, depending on the location of work on the road way, and road geometrics:

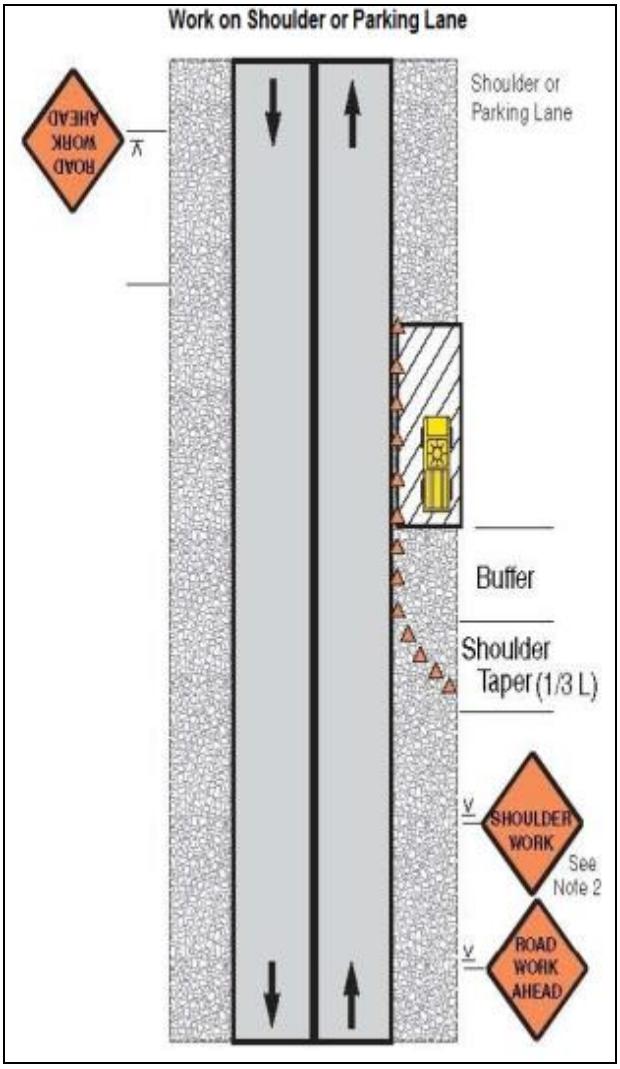
- Work on shoulder or parking lane
- Shoulder or parking lane closed on divided road
- Work in Travel lane
- Lane closure on road with low volume
- Lane closure on a two-line road with low volume (with yield sign)
- Lane closure on a two-line road with low volume (one flagger operation)
- Lane closure on a two lane road (two flagger operation)
- Lane closure on a four lane undivided Road
- Lane closure on divided roadway
- Half road closure on multi-lane roadway
- Street closure with detour

14. The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.

15. Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

16. In addition to the delineation devices, all the construction workers should wear fluorescent safety vests and helmets in order to be visible to the motorists at all times. There should be provision for lighting beacons and illumination for night constructions.

Figure A2 & A3: Work on shoulder or parking lane and shoulder or parking lane closed on divided road



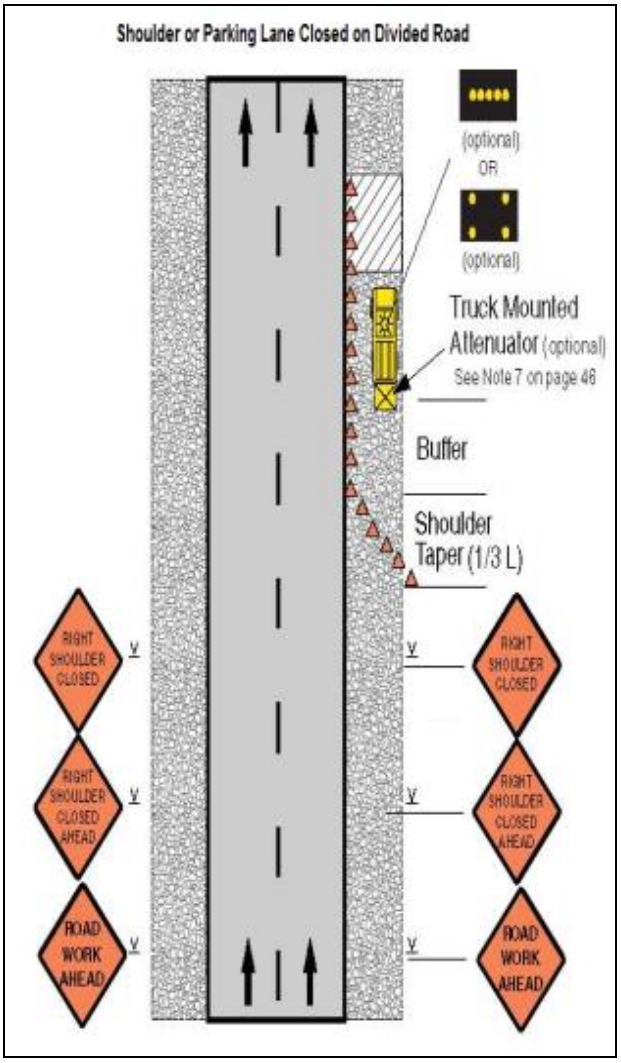
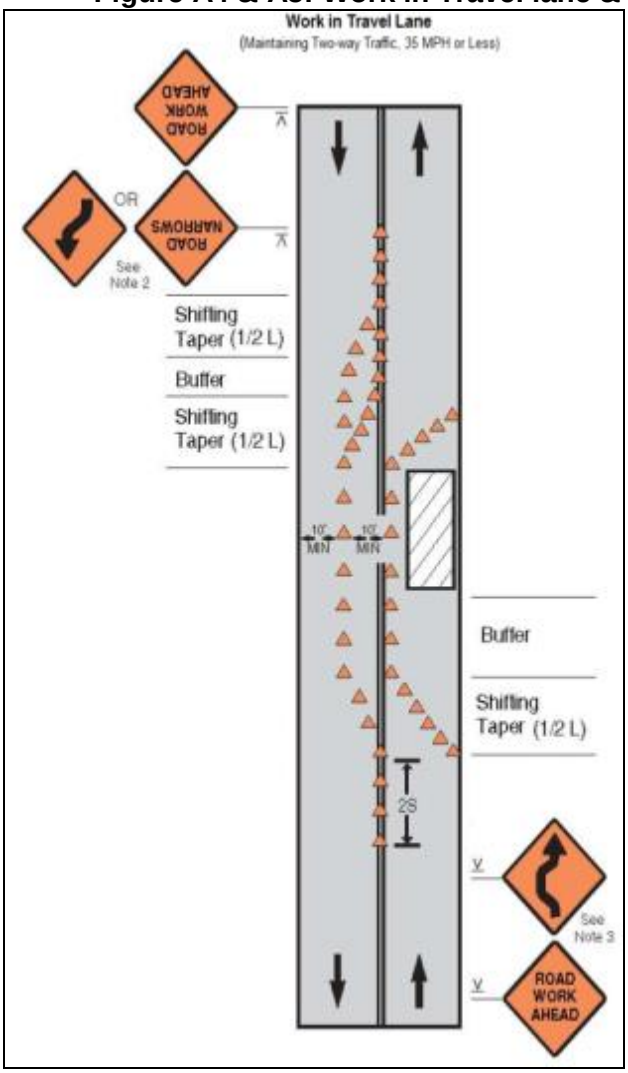


Figure A4 & A5: Work in Travel lane & Lane closure on road with low volume



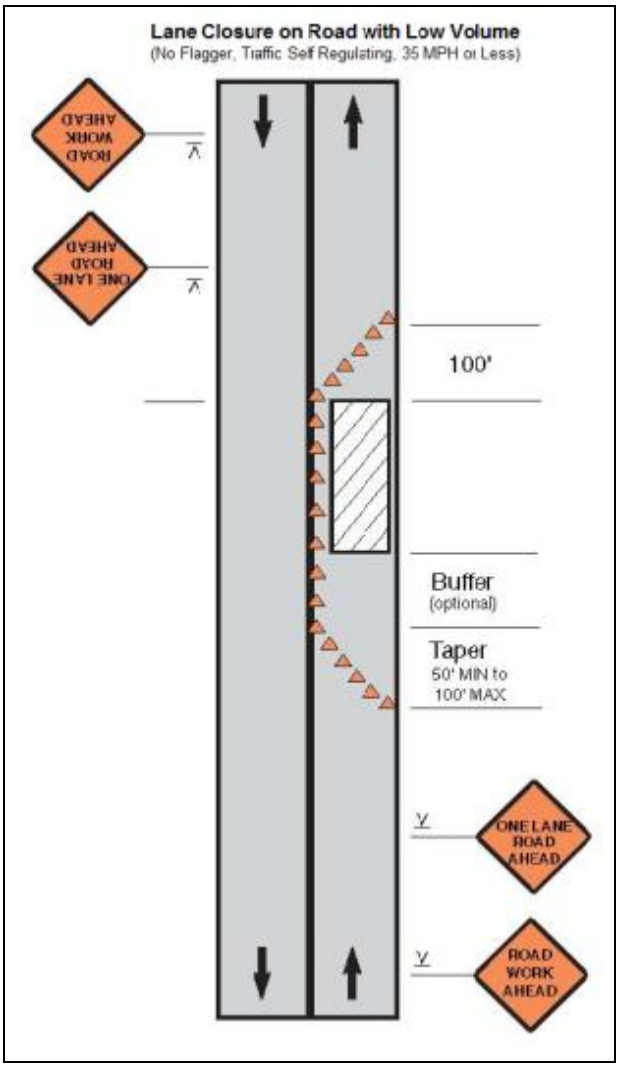
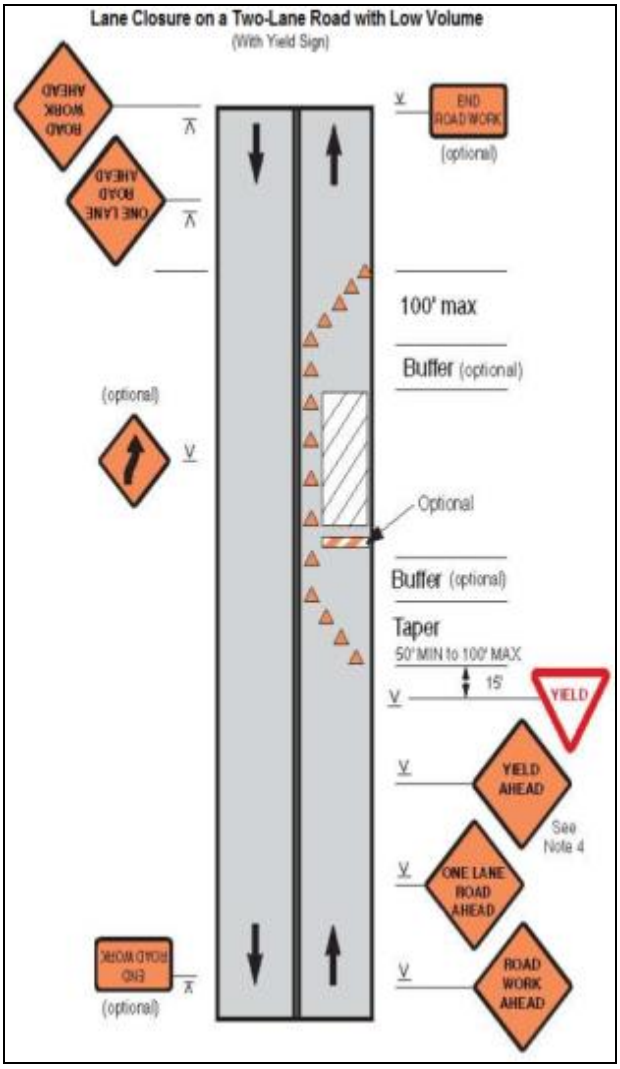


Figure A6 & A7: Lane closure on a two-line road with low volume (with yield sign) & Lane closure on a two-line road with low volume (one flagger operation)



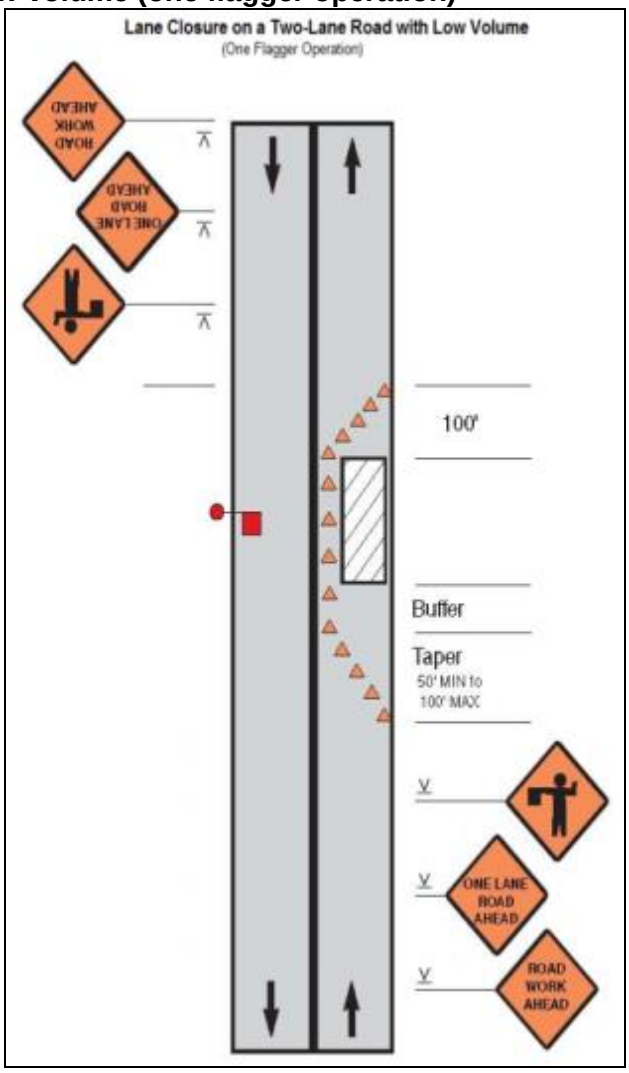
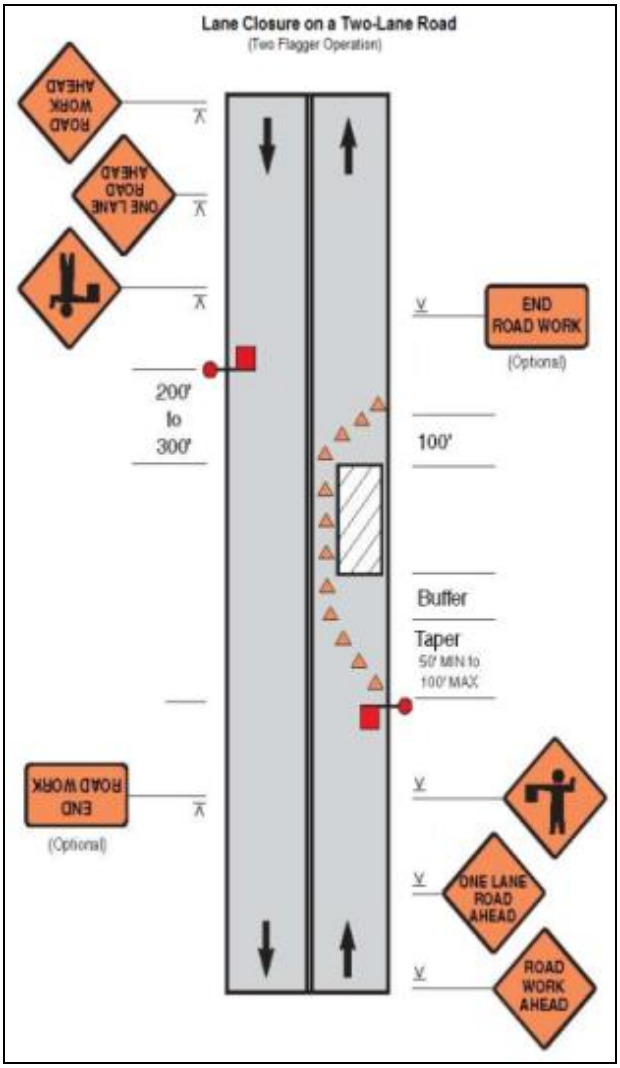


Figure A8 & A9: Lane Closure on a Two-Lane Road (Two Flagger Operation) & Lane Closure on a Four-Lane Undivided Road



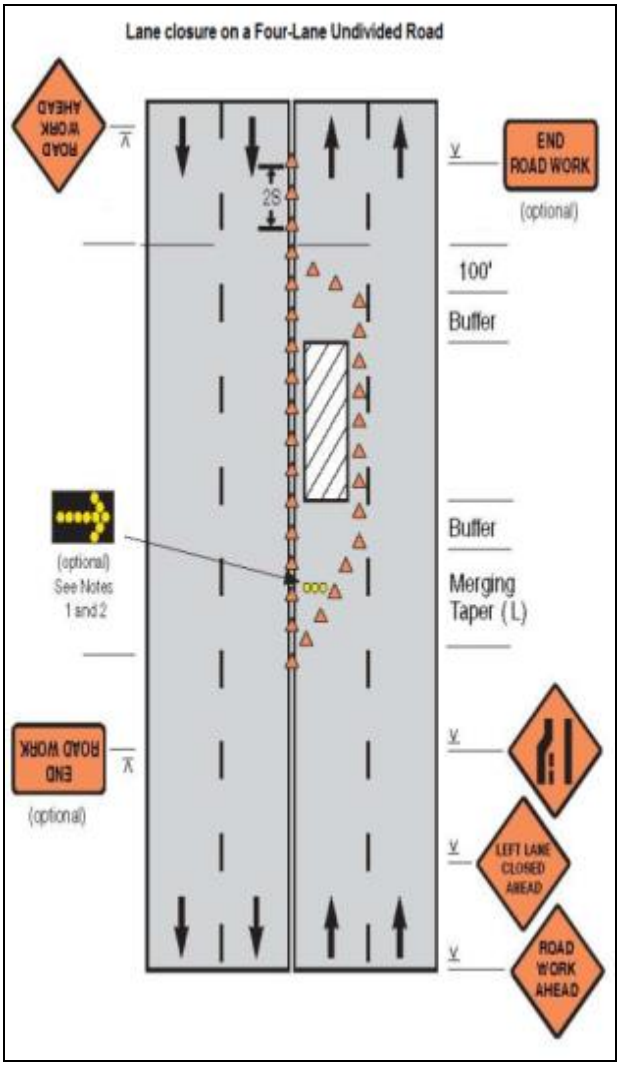
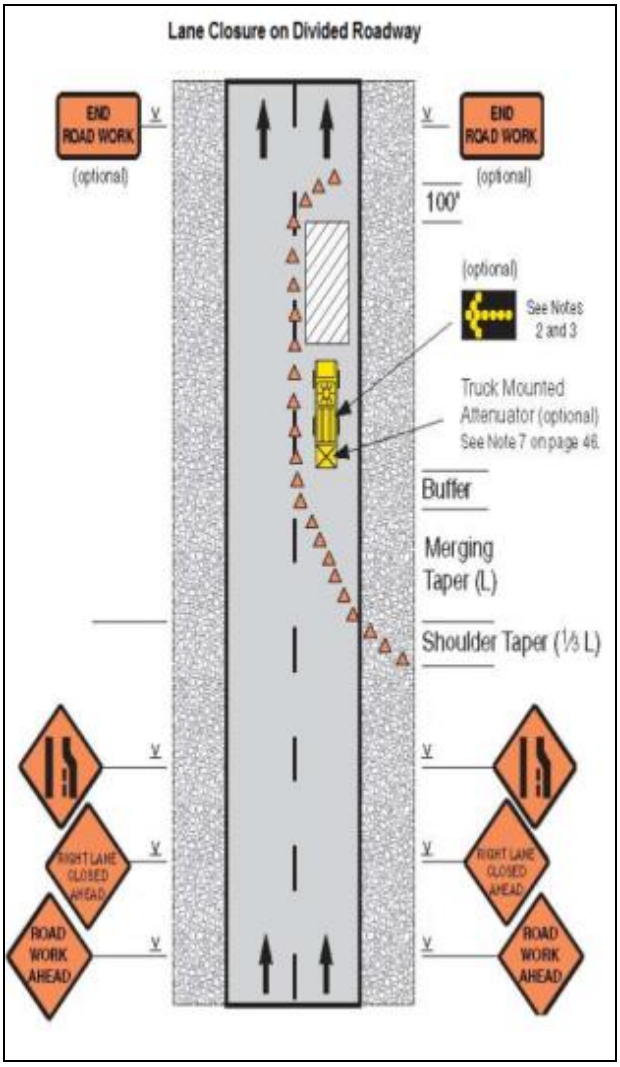


Figure A10 & A11: Lane Closure nn Divided Roadway & Half Road Closure On Multi-Lane Roadway



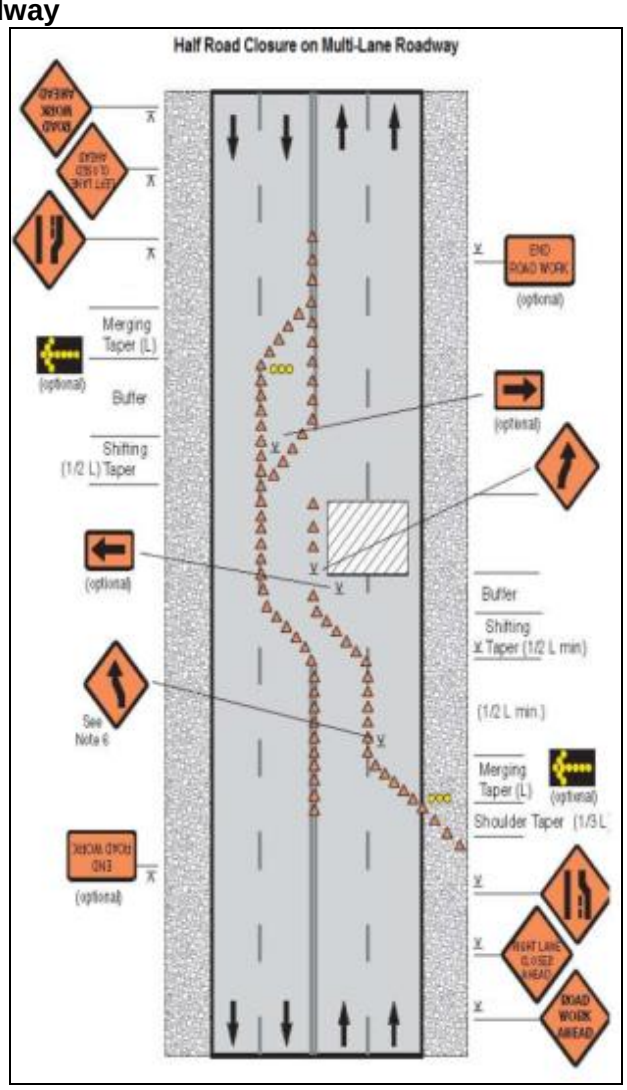
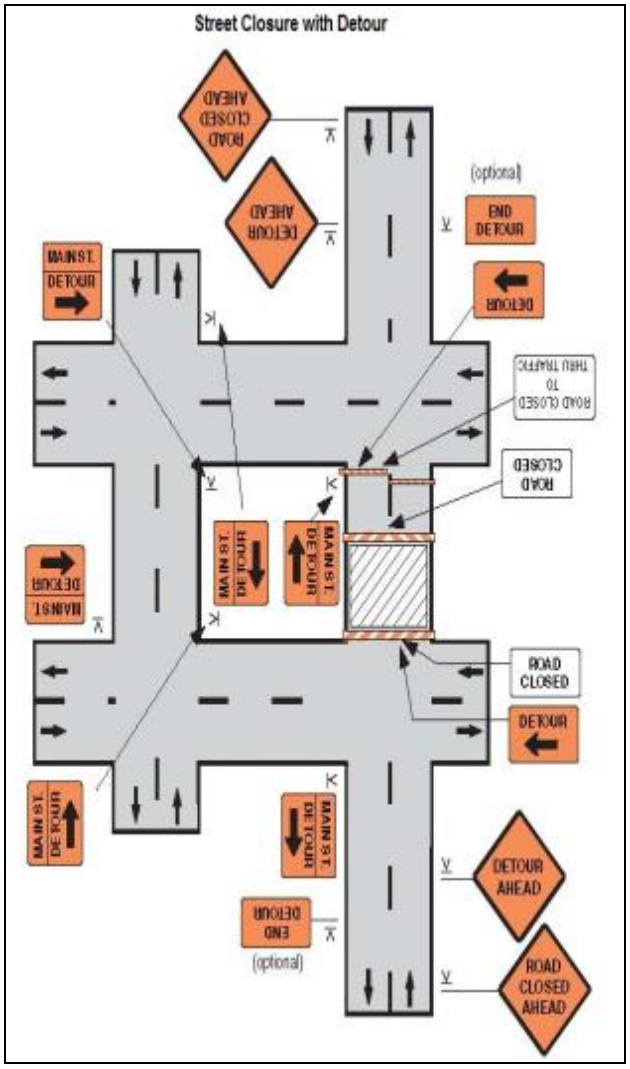


Figure A12: Street closure with detour



Appendix 6: RECORDS OF PUBLIC CONSULTATIONS AND FGDS

FGD Summaries-Roads and Drain Sherpur Pourashava

SL No.	Proposed Project Facility/Alignment Related to Which Discussion Held	Date	Venue	No. of Participants & gender	Key Safeguard Issues Discussed	Overall Concerns Expressed Related to Project	Suggestions From People	Willingness to Participate in Project
1.	R-1, R-12: Road Improvement D-11, D-12, D-14: Drain	Sep 09, 2014	Shahid Bulbul Road, Ward-02	M= 08 F= 03 T= 11	Road damage & ineffective drain	Road damaged, water logging; Communication disrupted	Repair & rehabilitation of road with placiding needed	Will extend their co-operation as & when required
2.	R-11, R-24: Road Improvement	Sep 09, 2014	West Sheri para, Ward: 04	M= 09 F= 02 T= 11	Damaged road and communication disruption	Road badly damaged Rushness/ traffic jam of heavy vehicles	Proper improvement (re-constn.) by genuine contractors	Ready to co-operate; Will accept disturbance during erection;
3.	R:16, R-17: Road Improvement	Sep 09, 2014	Kasba Kacharipara, Ward:06	M= 07 F= 04 T= 11	Broken road and water congestion	No major concerns; people are happy of their road improvement as it will benefit them immensely	Widening, drain construction, speedy construction	Will cooperate and accept disturbance during construction
4.	R:17: Road Improvement	Sep 09, 2014	Kashba Kathgar, Ward: 06 (Near Tribal Pally)	M= 07 F= 05 T= 12	Road damage construction related impacts	No major concerns; people are happy of their road improvement as it will benefit them immensely	Speedy construction works to ensure low impacts; local employment; Post-project maintenance to be ensured	They will extend their cooperation in the implementation as the road will benefit them.
5.	R-5, R-19, R-47: Road Improvement, D-1, D-2: Drain	Sep 09, 2014	Kashba Kacharipara Ward: 06	M= 14 F= 03 T= 17	Road damage; ;water logging; construction related impacts	No major concern; Road & side slopes damagd for long time; Traffic jam	Road widening & slope correction	Demand for early start-up of dev. works; They will co-operate in execution works as the road will benefit them.
6.	R-3, R-4, R-6, R-9, R-13, R-14: Road Improvement D-5: Drain	Sep 09, 2014	Chapatali Ward: 05	M= 12 F= 0 T= 12	Road improvement and possible environmental impacts	Road damage hampers people for easy access; Water logging at major parts.	Road widening at right direction to avoid PAPs; Speedy construction desired	They are ready to co-operate as road improvement urgently needed.
7.	R-2, R-8, R-10, R-15, R-18, R-50, R-55: Road Improvement D-9: Drain	Sep 09, 2014	Mubarakpur Ward: 08	M= 15 F= 0 T= 15	Road development and drainage condition	Road badly damaged; Inundation/water logging on road at vulnerable points	Road raising in combination with side drain; Construction monitoring to be ensured.	People will extend all sorts of help as required by appropriate authority.
8.	(R-20, R-22, R-23: Road Improvement, D-3, D-7, D-8: Drain	Sep 09, 2014	Kuniapara, Ward: 08	M= 10 F= 0 T= 10	Road damage and drainage disruption	Damage to road along with side erosion; pour compaction & road subsedence	Repair/ reconstruction with placiding works.	They welcome early road improvement works.

(M=No. of male participants; F= No. of female participants; T=Total participants)

PHOTOGRAPH

Location: Shahid Bulbul Road, Date:Sept 09, 2014 for Road R:01



Location: Mubarakpur, Date: Sept 09, 2014 for Road R:02



Location: Chapatoli, Date:Sept 09, 2014 for Road R:03



Location: Chapatoli, Date:Sept 09, 2014 for Road R:04



Location: Kasba Kacharipara, Date:Sept 09, 2014 for Road R:05



Location: Chapatoli, Date:Sept 09, 2014 for Road R:06



Location: Mubarakpur, Date:Sept 09, 2014 for Road R:07



Location: Mubarakpur, Date:Sept 09, 2014 for Road R:08



Location: Chapatoli, Date:Sept 09, 2014 for Road R:09



Location: Mubarakpur, Date:Sept 09, 2014 for Road R:10



Location: West Sheripara, Date:Sept 09, 2014 for Road R:11



Location: Shahed Bulbul Road, Date:Sept 09, 2014 for Road R:12



Location: Chapatoli, Date:Sept 09, 2014 for Road R:13



Location: Chapatoli, Date:Sept 09, 2014 for Road R:14



Location: Mubarakpur, Date:Sept 09, 2014 for Road R:15



Location: Kasba Kacharipara, Date:Sept 09, 2014 for Road R:16



Location: Kasba Kacharipara, Date:Sept 09, 2014 for Road R:17



Location: Mubarakpur, Date:Sept 09, 2014 for Road R:18



Location: Kasba Kacharipara, Date:Sept 09, 2014 for Road R:19



Location: Kuniapara, Date:Sept 09, 2014 for Road R:20



Location: Kuniapara, Date:Sept 09, 2014 for Road R:22



Location: Kuniapara, Date:Sept 09, 2014 for Road R:23



Location: West Sheripara, Date:Sept 09, 2014 for Road R:24



Location: Kasba Kacharipara, Date:Sept 09, 2014 for Road R:47



Location: Mubarakpur, Date:Sept 09, 2014 for Road R:50



Location: Mubarakpur, Date:Sept 09, 2014 for Road R:55



PARTICIPANT LIST

Town: Sherpur Pourashava
Location: Shahid Bulbul Road, Ward-02, 05 (R-1, R-12, D-11, D-12, D-14)
Meeting Place: Road side
Date: Sep 09, 2014
Time: 10:00am

Sl.	Name	Age	Sex	Cell No	Occupation
1.	Abdur Rashid	58	Male	01712807943	Business
2.	Md. Hedaytul Islam	48	Male	01558379227	Service
3.	Arman	20	Male	01744887785	Shop Keeper
4.	Shahjahan	45	Male	01552303181	Business
5.	Nilufer	35	Female	-	Tailoring(Home based)
6.	Mishuk	22	Male	01911467926	Student
7.	Salamat	74	Male	-	Business
8.	Jamiruddin (user)	55	Male	-	Rickshaw Puller
9.	Noor Jahan	35	Female	-	House Wife
10.	Hena	50	Female	01921901509	Shop Keeper
11.	Gokul Karmakar	47	Male	01715110637	Business

Town: Sherpur Pourashava
Location: West Sheri para, Ward: 04(R-11, R-24)
Meeting Place: Roadside Tea Stall
Date: Sep 09, 2014
Time: 10.30am

Sl.	Name	Age	Sex	Cell No.	Occupation
1.	Md. Bashir Uddin	60	Male	-	Shop Keeper
2.	Abul Kalam Azad	45	Male	01675008194	Business
3.	Abul Hossain	50	Male	01838394984	Mason
4.	Md. Shaher Ali	70	Male	-	Shop Keeper
5.	Latifur Rahman Chanchall	28	Male	01754225366	Tea Stall (Roadside)
6.	Susanta Dey	44	Male	01913135235	Business
7.	Jamir Uddin	60	Male	-	Farmer
8.	Joshna	50	Female	01965331914	House Wife
9.	Manwara	30	Female	01927378547	Tea Stall (Roadside
10.	Surat Ali	47	Male	01920967730	Mason
11.	Md. Haroon Zillani	50	Male	01716217467	Councilor, Poura.

Town: Sherpur Pourashava
Location: Kasba Kacharipara, Ward:06 (R:16, R-17)
Meeting Place: Roadside Shop
Date: Sep 09, 2014
Time: 11.10am

Sl.	Name	Age	Sex	Cell	Occupation
1.	Golam Mustafa	60	Male	01934336866	Business (Rtd.)
2.	Arzu Begam	25	Female	-	House Wife
3.	Atiqur Rahman	28	Male	01674115658	Driver (Auto Van)
4.	Rokeya Begum	45	Female	-	House Wife
5.	Sofia Begam	34	Female	01715661712	House Wife
6.	Munira	30	Female	-	House Wife
7.	Md. Mukkaram Hossain	28	Male	01863393215	Imam
8.	Mohd. Rafiq	35	Male	01927519539	Shop Keeper
9.	Yusuf Ali	53	Male	01917836571	Service
10.	Md. Shamsul Haque Ratan	48	Male	01961778980	Tea Stall(Roadside)
11.	Md. Shaheen	28	Male	-	Farmer

Town: Sherpur Pourashava
Location: Kashba Kathgar, Ward: 06 (R:17)
Meeting Place: Roadside (Near Tribal Palli)
Date: Sep 09, 2014
Time: 12.00noon

Sl.	Name	Age	Sex	Cell	Occupation
1.	Golapi	40	Female	-	House Wife
2.	Jorna Chichim	53	Female	-	House Wife
3.	Chinoy	38	Male	-	Farmer
4.	Manuel Rema	42	Male	01830995186	Service
5.	Rabimal	28	Male	01939841028	Fishing
6.	Nadar Ali	50	Male	-	Farmer
7.	Nani	60	Female	-	House Wife
8.	Abinoy	70	Male	-	Artist (Cottage)
9.	Sudarshon	36	Male	01725807930	NGO Service
10.	Salamat	42	Male	-	Farmer
11.	Dilakshon	22	Female	-	Student

Sl.	Name	Age	Sex	Cell	Occupation
12.	Suchitra	33	Female	-	House Wife

Town: Sherpur Pourashava
Location: Kashba Kacharipara Ward: 06 (R-5, R-19, R-47, D-1, D-2)
Meeting Place: Roadside Shop
Date: Sep 09 , 2014
Time: 1.00 pm

Sl.	Name	Age	Sex	Cell No.	Occupation
1.	Md. Roman Mia	43	Male	01930971651	Business/Farmer
2.	Md. Shah Alam	35	Male	01739303081	Business
3.	Md. Azim	48	Male	-	Shop Keeper
4.	Ibrahim	65	Male	-	Farmer
5.	Md. Saiful	30	Male	-	Farmer
6.	Md. Nazrul Islam (user)	56	Male	-	Rickshaw Driver
7.	Karim	50	Male	-	Rickshaw Driver
8.	Shahera Begum	48	Female	-	Shop (Roadside)
9.	Halima	50	Female	-	House Wife
10.	Sufia Begum	45	Female	-	House Wife
11.	Md. Sadek Ali	62	Male	01620641498	Business
12.	Md. Samejuddin	65	Male	-	Shop Keeper
13.	Mohd. Ali	45	Male	01713576118	Truck Driver
14.	Md. Hashu	35	Male	01913761005	Driver (Auto Van)
15.	Md. Mehedi Hassan	20	Male	01721973796	Student
16.	Kamrul Hasan	18	Male	01962468932	Student
17.	Md. Shahidul Islam	30	Male	01931650073	Driver (Auto Van)

Town: Sherpur Pourashava
Location: Chapatali Ward: 05 (R-3, R-4, R-6, R-9, R-13, R-14, D-5)
Meeting Place: Roadside Shop
Date: Sep 09, 2014
Time: 1.40 pm

Sl.	Name	Age	Sex	Cell No.	Occupation
1.	Mizan	50	Male	-	Service
2.	Abdus Sunny	28	Male	01922469927	Business
3.	Md. Abdul Halim	40	Male	0175354082	Business
4.	Md. Abu Sayeed	34	Male	01928042262	Carpenter
5.	Md. Sadek Hossain	36	Male	01716272541	Shop Keeper
6.	Shahinur Rahman	30	Male	01734441416	Business
7.	Afsar Ali (user)	50	Male	-	Rickshaw Puller
8.	Erfan Ali (user)	55	Male	-	Rickshaw Puller
9.	Shahibar	40	Male	01749734851	Business
10.	Rezwan	18	Male	01931700382	Student
11.	Osman (user)	45	Male	01846164058	Driver (Auto Van)
12.	Humayun Kabir	28	Male	01864533193	Driver (Auto Van)

Town: Sherpur Pourashava
Location: Mubarakpur, Ward: 08 (R-2, R-8, R-10, R-15, R-18, R-50, R-55, D-9)
Meeting Place: Roadside Shop
Date: Sep 09, 2014
Time: 3.00 pm

Sl.	Name	Age	Sex	Cell No.	Occupation
1.	Md. Omar Ali	50	Male	01921839383	Farmer

2.	Md. Jalaluddin	51	Male	-	Business
3.	Abdul Khalek	60	Male	-	Business
4.	Md. Babul	33	Male	01939102983	Service
5.	Md. Shahjahan Ali	32	Male	01915993027	Business
6.	Nayem Islam	20	Male	01988919918	Student
7.	Md. Quddus Akand	65	Male	-	Labor
8.	Md. Noor Hossain	60	Male	-	Farmer
9.	Haji Amanullah	70	Male	-	Business
10.	Lokman Ali	54	Male	-	Farmer
11.	Shuva (user)	32	Male	01913339823	Business
12.	Md. Hanif	49	Male	01937025876	Business
13.	Md. Shah Ali	50	Male	01989804255	Farmer
14.	Md. Mosharaf Hossain	38	Male	01735048493	Tailor
15.	Alhaj Mohd. Abdul Awal	70	Male	-	Service (Rtd)

Town: Sherpur Pourashava
Location: Kuniapara, Ward: 08 (R-20, R-22, R-23, D-3, D-7, D-8)
Meeting Place: Roadside
Date: Sep 09, 2014
Time: 4.30 pm

Sl.	Name	Age	Sex	Cell No.	Occupation
1.	Md. Tota Mia	55	Male	-	Driver
2.	Abdul Karim	60	Male	-	Farmer
3.	Md. Ainul Haque	45	Male	-	Abroad
4.	Md. Ukil Mia	18	Male	-	Student
5.	Md. Abdul Matin	20	Male	01791207613	Student
6.	Md. Mukkaram Hossain	30	Male	01933284770	Business
7.	Md. Sekandar Ali	20	Male	-	Student
8.	Md. Nasim (user)	55	Male	-	Rickshaw Puller
9.	Md. Badsha (user)	40	Male	-	Rickshaw Puller
10.	Md. Nawshad Ali	35	Male	01916782900	Farmer

Officials Consulted during FGD conducting For Environment Safeguard

Sl.	Name	Position	Cell No.
	Sherpur:		
1.	Humayun Kabir Ruman	Mayor	01715891489
2.	Harun Zillani	Councilor	01716217467
3.	Mukhlesur Rahman	Executive Engineer	01718605832
4.	Khorshed Alam	Assistant Engineer	01731910549
5.	Md. Shurhab Hossain	SAE€	01713547455
6.	Md. Muakhin hossain	SAE(Civil)	01711519602

Appendix 7: Sample Grievance Registration Form

(To be available in Bangla and English)

The _____Project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

Date		**Place of Registration**			
Contact Information/Personal Details					
Name		**Gender**	* Male * Female	**Age**	
Home Address					
Place					
Phone no.					
E-mail					
Complaint/Suggestion/Comment/Question Please provide the details (who, what, where, and how) of your grievance below: If included as attachment/note/letter, please tick here:					
How do you want us to reach you for feedback or use on your comment/grievance?					

FOR OFFICIAL USE ONLY

Registered by: (Name of Official Registering Grievance)	
Mode of Communication: Note/Letter E-mail Verbal/Telephonic	
Reviewed by: (Names/Positions of Officials Reviewing Grievance)	
Action Taken:	
Whether Action Taken Disclosed:	Yes No
Means of Disclosure:	

Appendix 8: Sample Semi-Annual Reporting Format

This template must be included as an appendix in the EIA/IEE that will be prepared for the project. It can be adapted to the specific project as necessary.

I. INTRODUCTION

- Overall project description and objectives
- Description of subprojects
- Environmental category of the sub-projects
- Details of site personnel and/or consultants responsible for environmental monitoring
- Overall project and sub-project progress and status

No.	Sub-Project Name	Status of Sub-Project				List of Works	Progress of Works
		Design	Pre-Construction	Construction	Operational Phase		
		☐	☐	☐	☐		
		☐	☐	☐	☐		
		☐	☐	☐	☐		

Compliance status with National/ State/ Local statutory environmental requirements

No.	Sub-Project Name	Statutory Environmental Requirements	Status of Compliance	Action Required

Compliance status with environmental loan covenants

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance	Action Required

II. COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

- Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.

- There should be reporting on the following items which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the semi-annual report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:

(i) What are the dust suppression techniques followed for site and if any dust was noted to escape the site boundaries?
(ii) If muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads;
(iii) Adequacy of type of erosion and sediment control measures installed on site, condition of erosion and sediment control measures including if these were intact following heavy rain;

(iv) Are there designated areas for concrete works, and re-fuelling?
(v) Are there spill kits on site and if there are site procedure for handling emergencies;
(vi) Is there any chemical stored on site and what is the storage condition?
(vii) Is there any dewatering activities if yes, where is the water being discharged;
(viii) How are the stockpiles being managed?
(ix) How is solid and liquid waste being handled on site?
(x) Review of the complaint management system;
(xi) Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary Monitoring Table

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						
Operational Phase						

Overall Compliance with CEMP/ EMP

No.	Sub-Project Name	EMP/ CEMP Part of Contract Documents (Y/N)	CEMP/ EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed and Additional Measures Required

III. APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

Brief description on the approach and methodology used for environmental monitoring of each subproject

- Monitoring of environmental IMPACTS on PROJECT SURROUNDINGS (ambient air, water quality and noise levels)
- Brief discussion on the basis for monitoring
- Indicate type and location of environmental parameters to be monitored
- Indicate the method of monitoring and equipment to be used

- Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements

As a minimum the results should be presented as per the tables below.

Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Site No.	Date of Sampling	Site Location	Parameters (Monitoring Results)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Noise Quality Results

Site No.	Date of Testing	Site Location	LAeq (dBA) (Government Standard)	
			Day Time	Night Time

Site No.	Date of Testing	Site Location	LAeq (dBA) (Monitoring Results)	
			Day Time	Night Time

IV. SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

Summary of follow up time-bound actions to be taken within a set timeframe.

V. APPENDIXES

Photos
Summary of consultations
Copies of environmental clearances and permits
Sample of environmental site inspection report
Others