



GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH
MINISTRY OF ROAD TRANSPORT AND BRIDGES

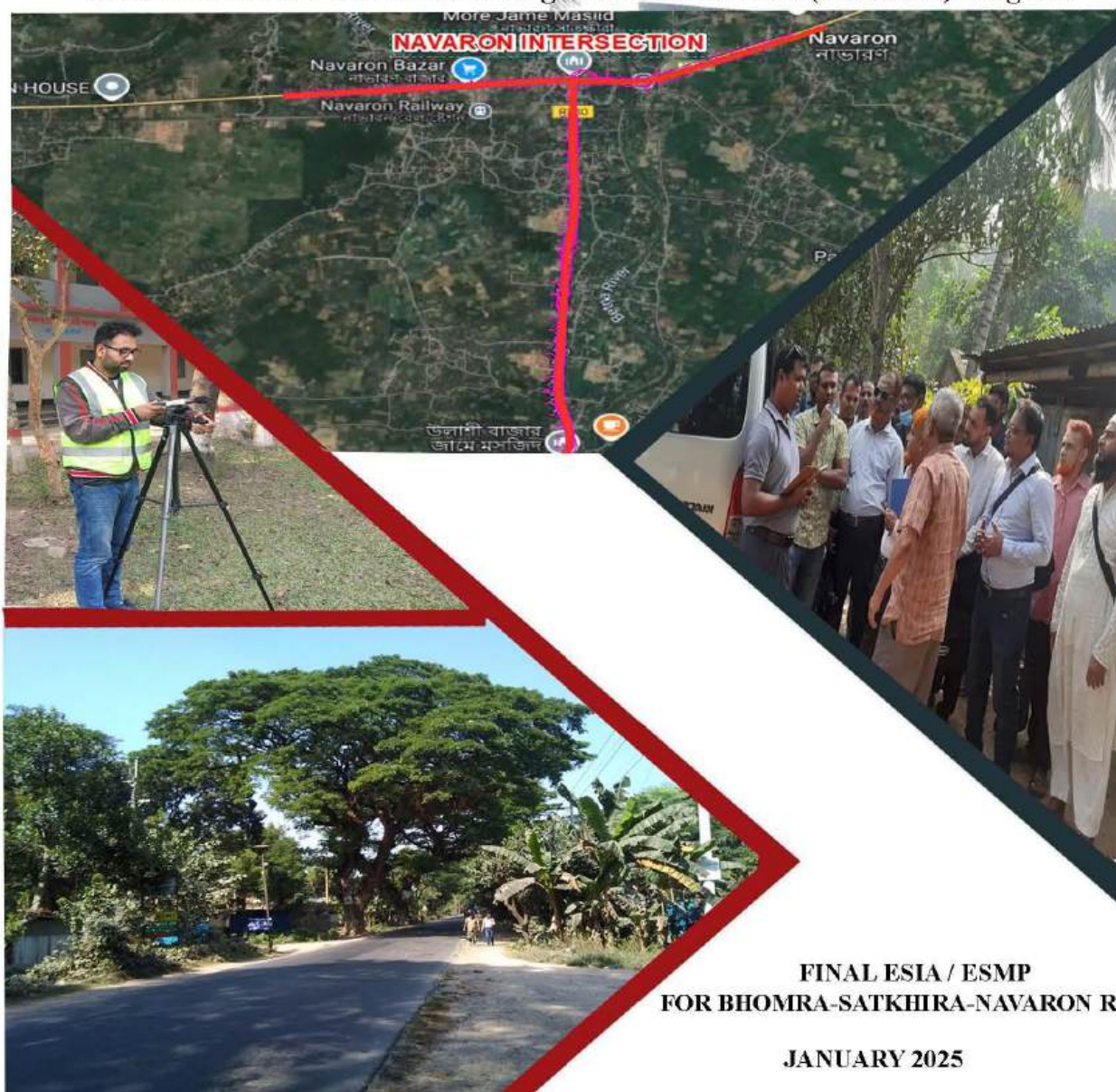


ROADS AND HIGHWAYS DEPARTMENT

Environment and Social Assessment & Management Plans and Resettlement Actions Plan for Bhomra-Satkhira-Navaron under Package (SP-06) (RHD)

Phase-3

Western Economic Corridor and Regional Enhancement (WeCARE) Program



FINAL ESIA / ESMP
FOR BHOMRA-SATKHIRA-NAVARON ROAD

JANUARY 2025

JOINT VENTURE OF



STUP CONSULTANTS PVT. LIMITED (STUP), INDIA



BCL ASSOCIATES LIMITED (BCL), BANGLADESH

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List of Abbreviations

LIST OF ABBREVIATIONS

AC Land Assistant Commissioner Land
ADB Asian Development Bank
AIDS Acquired Immunodeficiency Syndrome
AIIB Asian Infrastructure Investment Bank
AP Affected Person
APD Additional Project Director
ARIPA, 2017 Acquisition and Requisition of Immovable Property Act, 2017
BWDB Bangladesh Water Development Board
BR Bangladesh Railway
BBS Bangladesh Bureau of Statistics
BDT Bangladesh Taka
BG Business Grant
BFD Bangladesh Forest Department
BIN Business Identification Number
BMP Biodiversity Management Plan
CCL Cash Compensation under Law
CMP Current Market Price
CMIS Computerized Management Information System
CMVs Current Market Values
CoC Code of Conduct
COD Cut-off-Date
CoI Corridor of Impact
CPR Community Property Resource
CSC Construction Supervision Consultants
CRO Chief Resettlement Officer
DAE Department of Agricultural Extension
DAM Department of Agricultural Marketing
DC Deputy Commissioner
DF Department of Forest
DPs Displaced Persons
DoE Department of Environment
DPD Deputy Project Director
DPM Deputy Project Manager
DSM Design Supervision & Management Consultant
EA Executing Agency
E&SC Environmental & Social Consultant
E&SSC Environmental and Social Safeguard Consultant
EHSG Environmental and Health Safety Guidelines
EM Entitlement Matrix
EPs Entitled Persons
ESF Environmental and Social Framework
ESIA Environmental and Social Impact Assessment
ESMP Environmental and Social Management Plan
ESS Environmental and Social Strategy
FGD Focus Group Discussion
FOB Foot Over-bridge
FOs Field Officers
GBV Gender Based Violence
GIIP Good International and Industry Practices
GoB Government of Bangladesh
GRC Grievance Redress Committee
GRM Grievance Redress Mechanism
GRS Grievance Redress Services
HIV Human Immunodeficiency Virus
HHs Households
IBAS Integrated Budget and Accounting. System
INGO Implementing NGO
IOL Inventory of Losses
IPF Investment Project Financing
IGA Income Generating Activities
ILRP Income and Livelihood Restoration Program
IR Involuntary Resettlement
ITS Intelligent Traffic System
J-J R Jhenaidah-Jashore Road
JVC Joint Verification Committee
KIIs Key Informant Interviews

Km Kilometer
Km² Square Kilometer
LA Land Acquisition
LAO Land Acquisition Officer
LAPs Land Acquisition Plans
LAR Land Acquisition and Resettlement
LCS Labor Contracting Society
LDT Land Development Tax
LGED Local Government Engineering Department
LGI Local Government Institutions
LHS Labor Health and Safety
LO Land Owner
MIS Management Information System
MPR Monthly Progress Report
M&E Monitoring & Evaluation
MP Member of Parliament
MoL Ministry of Land
MoRTB Ministry of Road Transport and Bridges
NWDP National Women Development Policy
NTHHs Non-Title Holder Households
OCC One-Stop Crisis Cell
OSD Occupational Skill Development
OFC Optical Fibre Cable
OHS Occupational Health and Safety
PAPs Project Affected Persons
PAEs Project Affected Entities
PAHs Project Affected Households
PEA Project Execution Agency
PD Project Director
PDCPR Project Displace Community Property Resources
PDPs Project Displaced Persons
PDB Project Displaced Business
PDEs Project Displaced Entities
PDHs Project Displaced Households
PDOEs Project Displaced Other Entities
PIC Project Implementation Committee
PIU Project Implementation Unit
PMs Project Managers
PMO Project Management Office
POPs Pedestrian Overpasses
PRAC Physical Relocation Assistance Committee
PSC Project Steering Committee
PVC Property Valuation Survey
PWD Public Works Department
RP Resettlement Plan
RAP Resettlement Action Plan
RAVC Resettlement Assessment and Valuation Committee
RC Replacement Cost
RCC Reinforced Cement Concrete
RG Reconstruction Grant
RHD Roads and Highways Department
RMFD Road Maintenance Fund Board Act
ROs Resettlement Officers
RoR Records of Rights
RoW Right of Way
RPF Resettlement Policy Framework
RS Revisionary Survey
RTSICP Road Transport Sector Integration and Coordination Platform
RV Replacement Value
SA State Acquisition
SESA Strategic Environmental and Social Assessment
SCDP Safe Corridor Demonstration Program
SCMs Stakeholder Consultation Meetings
SBD Standard Bidding Documents
SEA Sexual Exploitation and Abuse
SEID Stakeholder Engagement and Information Disclosure
SEP Stakeholder Engagement Plan
SES Socioeconomic Survey
SH Sexual Harassment

List of Abbreviations

SMVT	Slow Moving Vehicle Traffic
SMP	Social Management Plan
SMR	Social Monitoring Report
THHs	Title Holder Households
TGBs	Target Group Beneficiaries
TMP	Traffic Management Plan
TNA	Training Needs Assessment
ToR	Terms of Reference
UNO	Upazila Nirbahi Officer
VOPs	Vehicular Overpasses
WeCARE	Western Economic Corridor & Regional Enhancement
WB	World Bank

EXECUTIVE SUMMARY

INTRODUCTION

- i. The Government of Bangladesh (GoB), with funding from multilateral agencies such as the World Bank (WB) and the Asian Infrastructure Investment Bank (AIIB), has launched the Western Economic Corridor & Regional Enhancement (WeCARE) program. This initiative aims to provide efficient, safe, and resilient connectivity along a segment of a regional transport corridor in the country's western region while also strengthening road sector management.
- ii. The Bhomra—Satkhira—Navaron road project is in the western part of the country and is proposed for development under Phase 3 of the WeCARE program. The road segment is regionally significant as it connects the Bhomra land port to the hinterland. Under the program, the existing two-lane highway will be upgraded to a safer, climate-resilient four-lane road.
- iii. The Road and Highways Department (RHD) under the Ministry of Roads, Highways, and Bridges is responsible for constructing and maintaining national and regional road networks. As the program's implementing agency for Phase 1 and Phase 3, RHD ensures the sustainable development of the proposed road project.
- iv. The RHD has appointed Environmental and Social (E&S) Consultants—M/s Assystem STUP and BCL Associates (JV)—to conduct an Environmental and Social Impact Assessment (ESIA) and develop an Environmental and Social Management Plan (ESMP) and a Resettlement Action Plans (RAP) for the proposed road development.

POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

- v. The country's environmental legal framework includes various acts, rules, and policies. Article 18A of the Constitution, added in 2011, recognizes environmental protection as a fundamental right and mandates the state to safeguard the environment and natural resources for present and future generations.
- vi. The legislation addresses critical issues such as air, water, and noise pollution, biodiversity conservation, and resource management, alongside agriculture, fisheries, disaster risk management, and renewable energy regulations. Since the first environmental policy in 1992, various laws have been established, with ECA 1995 being the cornerstone of environmental protection. This act aims to promote conservation, enhance quality standards, and control pollution, including setting limits on emissions, requiring environmental clearances for projects, and enforcing penalties for noncompliance.
- vii. The Acquisition and Requisition of Immovable Property Act (ARIPA), 2017, addresses risks related to land acquisition for projects, while the Environmental Conservation Rules 2023 regulate harmful activities to ensure sustainable development.
- viii. The Ministry of Environment, Forest, and Climate Change (MoEFCC) is the primary body responsible for environmental protection, with the Department of Environment (DOE) tasked with implementing laws. The project road requires an Environmental Clearance Certificate (ECC) from the DOE and approved terms of reference for the Environmental and Social Impact Assessment (ESIA) have been followed in preparing this report.
- ix. This section 2 reviews the applicable policies, laws, and frameworks for the Bhomra-Satkhira-Navaron Section (Phase-3) Road project, including relevant World Bank environmental and social safeguards, and identifies any gaps in compliance.

DESCRIPTION OF PROJECT

- x. The design engineer designed the alignment using the Mx Road. The RHD Geometric Design Standards Manual (Revised) 2005 has been followed for Geometric design and other international standards such as AASHTO. The proposed development of the road is 55 km in length and has been designed for a design speed of 80 km/h. The project road alignment will comprise Fly over bridge (4 No), culverts, Vehicular overpass (9), L Vehicular overpass (9 No), Bridges (5), Railway overpass cum flyover (1No), Underpass (1No.), Service roads, drains, and bypass. The longitudinal gradient will be 3%. The right of way will be 60m. The project has been divided into four lots:

- ▶ Lot 1: from Km 0+000 to Km 7+200 and from Km 119+700 to Km 123+000 (Bhanga-Benapole Road)
- ▶ Lot 2: from Km 7+200 to Km 23+000
- ▶ Lot 3: from Km 23+000 to Km 39+400

Executive Summary

► Lot 4: from Km 39+400 to Km 55+245

xi. To implement the Bhomra-Satkhira-Navaron road section under Phase-3, about 907.2370 acres of land will be required. This includes 636.8314 acres of private land, 123.9948 acres from the RHD, and 146.4108 acres from other government agencies land including 1.2721 acres of the CPRs.

DESCRIPTION OF ENVIRONMENTAL AND SOCIAL BASELINE

xii. The Project area includes the Bhomra, Satkhira, and Navaron regions in southwestern Bangladesh's Jashore and Satkhira districts. It starts at Navaron (Lat: 23° 3'29.07"N, Lon: 88°59'56.26"E) and ends at R-766 on the Satkhira Bhomra highway (Lat: 22°40'10.79"N, Lon: 88°56'46.35"E). The elevation profile of the exiting Bhomra—Satkhira—Navaron Road alignment varies between 2 and 8 meters above mean sea level. The area's general slope is from north to south, and the road traverses from high to low land.

xiii. The project area's soil characteristically has textural classes ranging from silty clay to clay. The project area, consisting of soils having average bulk density with such range of particle density (<3 gm/cc) and low organic carbon content (indicative of low organic matter), clearly indicates the good load-bearing capacity of the soils.

xiv. The predominant land use pattern is agricultural land, built-up areas, fishing cultivation ponds/shrimp farming, water bodies, and others. There is a righthand side international boundary from Navaron to Bhomra.

xv. The project area has a humid subtropical climate with significant variations between summer and winter temperatures. The annual average temperature is 31.3 C, with a maximum of 31.3 C and a minimum of about 16° C. In the study area, the average yearly rainfall is 1,651 mm. Humidity during the monsoon season is high, with a maximum average relative humidity of 93.9% in August and a minimum of 55.4% in March. The south-westerly monsoon begins in the middle of March and ends around the end of September. From March to October, monsoon winds blow from the south with sustained force; in January, winds blow from the north and northeast. February is a quiet month, with foggy mornings.

xvi. A primary field investigation was conducted along Project Road, measuring ambient air quality at eight locations, noise and vibration at three, surface water at three, and groundwater at two locations. Results indicated that dust particles (PM2.5, PM10) and gaseous pollutants (NO2, SO2, CO, CO2, and O3) were monitored. Air quality met national PM2.5, NO2, CO, and O3 standards, but SO2 was higher than allowed, and one location exceeded PM10 limits. Noise levels adhered to standards, with average vibration between 0.08 to 1.97 mm/s. Surface water parameters were within national standards, while groundwater samples showed coliforms and arsenic at all locations, with one site having low pH, but other parameters were compliant.

xvii. Bangladesh is prone to seasonal floods (10%) and highly vulnerable during wet years (up to 24%). Its unique geography makes it susceptible to deadly tropical cyclones, which create tidal waves in the northern Bay of Bengal, impacting many along the coast.

xviii. Due to its low-lying geography, the area has a moderate risk of natural disasters like cyclones and floods. The project road starts at a higher elevation in Navaron and descends to the lower-lying endpoint in Satkhira.

xix. Field investigations along the road alignment established the baseline of ecology and biodiversity. The assessment of terrestrial and aquatic flora and fauna found no species listed under IUCN Red List categories or protected by CITES and the Wildlife Protection & Security Act, 2012, in the project area.

xx. Social Impact Assessment (SIA) is based on field investigations from October 15, 2023, to June 30, 2024, in the Corridor of Impact (COI) using Census Surveys, Inventory of Loss (IOL) Surveys, socioeconomic surveys, stakeholder consultations, focus group discussions, and key informant interviews per ESS1. The road length is distributed in four lots to carry out the land acquisition and to identify social risks and impacts.

xxi. The total population of the Affected Persons (AP) in the corridor of impacts is 16126. Total AP, the maximum AP is in Lot 2 (4867), followed by Lot 1 (4711), lot 4 (4480), and Lot 3 (2068). The Sex ratio (Male to Female in the project area is 1.04. There are no indigenous people/ethnic in the project-affected area.

ANALYSIS OF ALTERNATIVE ALIGNMENTS

Executive Summary

xxii. Alternative alignment options have been analyzed in the section to ensure sustainable development in the design of the proposed road. It was studied considering the social, environmental, and costs involved. After thorough analysis, Option 3 was revised and considered the most feasible alignment option.

xxiii. Further “With the project” and “Without Project” options have also been studied by working on CO₂ emissions for both. It is found that there will be a reduction in the “With the Project” option and is recommended for implementation.

CONSULTATIONS, PUBLIC PARTICIPATION, AND INFORMATION DISCLOSURE

xxiv. Various methods were used for carrying out SEID, namely Stakeholder Consultation, Meetings (SCM), Focus Group Discussions (FGD), Key Informant Interviews (KII), spot discussions during the census, and holding stakeholder consultation meetings with stakeholders and PAPs. To organize these events, separate checklists/questionnaire was developed to assess the impacts and risks that arise from Land Acquisition (LA) and Rehabilitation Action Plans (RAP), gender-based issues (Violence)

xxv. The project's Primary stakeholders are affected people, including landowners, farmers, businessmen, structure owners, sharecroppers, poor, pro-poor, squatters, vulnerable persons and groups, women's groups, underprivileged groups, owners of commercial and business enterprises, vendors, small ethnic communities, wage earners, marginal workers, drivers, and transport workers.

xxvi. Venues were selected in coordination with RHD officials and in line with the Bank's ESS requirements. Potential PAPs were notified about the venue, date, and time through announcements, leaflets, and local administration support. There are nine (9) SCMs, ten (10) FGDs, and twenty-eight (28) conducted in the project area between October 2023 and 27 April 2024

xxvii. Throughout the consultation process, the following topics were discussed with the relevant parties: Project objectives and benefits, Land acquisition (LA) and involuntary resettlement for the proposed development, as well as the LA process, compensation process, issues of gender-based violence, human trafficking, and the need for skill development under the Livelihood Restoration Program for poor and vulnerable households. The influx of workers during construction, removal of trees to make way for road sections, impact on pedestrian safety, pollution, and drainage due to movement of construction vehicles and equipment.

xxviii. Though people agreed with the proposed development, there are some demands that have been addressed/considered in design as well as in ESMP such as an effective drainage system and necessary bridge over the waterbodies and culvert, provision for underpass or foot over bridge and pedestrian overpass, toilet blocks, extension of present roadway, widening of RoW, provision of adequate lighting system, noise barriers and retaining walls. RAP for the project is being prepared separately as a standalone document to address the social issues.

ENVIRONMENTAL AND SOCIAL IMPACTS, RISKS, AND MITIGATION MEASURES

xxix. Dust and air pollutant emissions from construction vehicles and operations will affect the project's air quality. Key contributors to air pollution include land clearing, diesel engine use, demolition, and material transport. A safe distance of 500m downwind from residential areas is recommended for hot mix plants. The air pollution impacts during construction are expected to be short-term and localized, which can be mitigated through vehicle maintenance and dust suppression methods.

xxx. A preliminary assessment of the project site indicates that approximately 67,224 trees will likely need to be cut. This includes about 58,321 private trees from 90 species and 8,903 government trees from 34 species. Trees along the corridor designated for cutting will be considered for compensatory planting.

xxxi. Operation of equipment at the construction site will be the primary source of increased noise levels, expected to range from 74 to 101 dB (A). A point source of 95 dB (A) at 2m will not exceed 45 dB (A) beyond 250m from the site boundary. Noise control measures, such as silencers and ear plugs, can significantly reduce impacts.

xxxii. Soil in the haulage roads and construction camps may become compacted and contaminated from construction vehicles, waste disposal, and liquid spills. Mitigation measures include proper waste storage and restricting movement to designated routes.

Executive Summary

xxxiii. To reduce the impacts on the socioeconomic environment, a separate Resettlement Action Plan (RAP) has been prepared. The mitigation measures include Payment of Cash Compensation, Payment of Top-up, compensation for the loss of pond and private trees, social and economic development support to restore the livelihoods of women and vulnerable groups, Grievance Redress Mechanism (GRM), etc.

xxxiv. Mitigation measures are suggested to ensure Community Health and Safety, barricading excavated areas and to prevent trespassing from construction sites/construction camps/labor camps, provision of warning sign boards, prevention of water logging at the construction sites to prevent community exposure to water-borne, vector-borne diseases, and communicable and non-communicable diseases.

xxxv. Measures to prevent impacts on gender, SEA/SH, the contractor will take the mitigation measures including the installation of Close circuit cameras at prominent locations such as contractor's facilities/office/camps/canteen, etc.; necessary arrangements and systems for effective and timely patrolling to ensure the safety of the women and girls; implementation of a SEA/SH-free work environment at the project site in; measures for preventing gender-based discrimination and violation; Any type of sexual harassment shall be dealt strictly with as per local law of the country; Code of conduct (CoC) will be rolled out which need to be signed by the worker; Staff shall be encouraged to report suspected or actual GBV or SEA/SH incidences; Grievance redress mechanism is suggested to be established at the site to address the issues immediately.

LABOR MANAGEMENT PROCEDURE

xxxvi. The Labor-Management Procedure (LMP) has been prepared to ensure that the project complies with the Bangladesh Labor Act of 2006, as well as the World Bank's Environmental and Social Framework (ESF), and Environmental and Social Standard (ESS). The whole hiring and recruitment process will be conducted considering the standard procedure of relevant rules and regulations (national and international) as well as rolling out a code of conduct for workers.

xxxvii. The contractor will follow the CoC/LMP for employment, remuneration, leaves, holidays, housekeeping, facilities e.g., lodging, drinking water supply, sanitation, and waste disposal, supply of fuel/cooking gas, firefighting, medical services, etc.

EMERGENCY RESPONSE AND DISASTER MANAGEMENT PLAN

xxxviii. To prevent untoward incidents/accidents due to construction activities, an Emergency Response and Disaster Management Plan (ESMP) is presented to manage emergencies and crises arising from construction activities. ESMP will be included in the contractor bidding document to implement the mitigation measures as a mandatory requirement for the contractor to comply.

xxxix. The ESMP suggests that the contractor engage a Safety specialist. The contractor must formulate a Site Emergency Response Team (SERT), wherein senior management at the Project Management level and Deputy Project Management, among others, will be present to deal with the emergency depending on its severity.

xl. Any emergency must be reported immediately to CSC and PIU so that the situation can be addressed at the district or national level if necessary. The contractor is also advised to maintain up-to-date information on local authorities, nursing homes/clinics, hospitals, and ambulances.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

xli. An Environmental and Social Management Plan (ESMP) is devised to ensure the project's sustainable development. It is prepared for the Design/preconstruction, Construction, and Operation/post-construction phases.

xlii. A matrix suggesting mitigation measures for different construction activities along with the implementation agency and responsible agency has been presented in the ESMP. It includes an institutional agreement, capacity building measures, tree and shrub plantation, and environmental checklists for environmental pollutants such as ambient air quality and ambient air concerning noise, soils, sediments, and vibration, as suggested in the updated ESMP. In addition, a provision is made that the contractor will purchase portable environmental monitoring equipment for each contract as an obligatory requirement of ESMP for random monitoring by PIU and CSC. This equipment will be kept at PIU.

Executive Summary

xliii. The total budgetary cost of the Environmental Management Plan (EMP) is approximately BDT 8,30,67,000 (Eighty-Three Million Sixty-Seven Thousand). This includes environmental monitoring costs and tree and shrub plantation per the Greenbelt development plan. The estimates also include a 2-day training cost of BDT 250,000 (Two Hundred Fifty Thousand) per lot. This will be conducted before the project's implementation phase. The ESMP budgetary cost estimates in the construction phase are BDT 2,36,25,000 for Lot 1, BDT 2,41,08,000 for Lot 2, BDT 2,22,99,000 for Lot 3, and BDT 1,30,35,000 for Lot 4. The operation phase ESMP budget estimate for the total road is BDT 6,760,000 (Six Million Seven Hundred Sixty Thousand).

xliv. It is recommended (if funds are available) that an extruded acrylic (1.17 – 1.19 g/cm³ of density) sheet noise barrier of 6mm thick) be provided on the loop, take-off, and landing sides of the Navaron junction to reduce the noise impact on the community nearby. This sheet should be fixed on both sides. This will attenuate the noise level by 20db (A). The cost is about 400 BDT per square foot. A 2m height for a total 5 km length (2.5km on each side) will cost approximately 4,00,00,000 (Four hundred million or Forty crore Bangladeshi taka).

1. Introduction and Project Background

1 INTRODUCTION AND PROJECT BACKGROUND

1.1 INTRODUCTION

1. Bangladesh is one of the world's most densely populated countries, with a population density of 1333 persons/square km.^{1,2} It is a low-lying country in the delta region of several large rivers, including the Brahmaputra, Ganges, and Meghna Rivers. The country's landscape is crisscrossed by hundreds of smaller rivers, tributaries, and distributaries, making it highly susceptible to flooding. Flooding is a widespread feature in the country, particularly during the monsoon season, and has been a significant challenge for the country's development and economy.

2. The literature also reportedly states that cyclones and storms are the leading disaster types in Bangladesh, claiming 60% of total deaths worldwide. Flooding is the second most damaging disaster, with almost 75% of natural hazard-related disasters affecting the country.

3. The people of Bangladesh have developed many innovative ways to cope with flooding and have made significant progress in recent years in reducing the impacts of floods through improved infrastructure and disaster management systems. However, the country's existing road design standards lack climate resilience, especially in areas prone to flooding and storm surges that may cause erosion and road damage.



1.2 PROJECT BACKGROUND

4. Road transport is the prevalent mode of transport in the country. About 70% of passenger traffic and 60% of freight are on road transport. The government has significantly developed an extensive transport system, particularly road transport. The total road network size of the country is roughly 375,000 km (road density of approximately 250 km per 100 km²).³ The primary road network is congested and in poor condition.¹ It operates at or near maximum capacity and cannot meet rapidly increasing traffic demand. The vehicular average speed on the primary network is less than 30 km/hour. It is imperative to note that the country has made tremendous progress in improving connectivity, particularly at the subnational levels. However, considerable investment is still needed to improve, upgrade, and maintain the current road network.

5. Thus, to provide efficient, safe, and resilient connectivity along a section of a regional transport corridor in Western Bangladesh, the Government of Bangladesh (GoB), with the World Bank's (Bank) financing, is implementing the Western Economic Corridor & Regional Enhancement (WeCARE) Program through the Road and Highways Department (RHD) under the Ministry of Roads, Transport and Bridges (MoRTB).

1.3 THE PROGRAM AND THE PROJECT ROAD

6. The WeCARE Program is devised to upgrade and improve the national highways along with improved utilities, infrastructure, and services. Improvement through the program will help narrow the gap in the poverty reduction measures between the eastern and western regions. These poverty reduction impacts have been substantive and concentrated in central and eastern regions since 2010, compared to western divisions.³

7. This program is a 10-year-long initiative that has the following four phases as given in Table 1-1

¹ Project Appraisal Document, WeCARE, PAD3635, The World Bank

² <https://www.worldometers.info/world-population/bangladesh-population/>

³ Terms of Reference, RHD

1. Introduction and Project Background

Table 1-1: Phases of the Wecare Program	
Phase	Scope
Phase-1: Upgrading the Jashore-Jhenaidah road section as an intelligent, resilient, and safe highway and local economic infrastructure	► This phase upgrades the Jashore-Jhenaidah National Highway (J-J)—about 48km—from a two-lane single-carriageway to a climate-resilient four-lane dual-carriageway. It includes separate service lanes for slow-moving vehicles and vulnerable users on both sides of the carriageway, the installation of Optical Fibre Cable (OFC), the Safe Corridor Demonstration Program (SCDP), and the deployment of an Intelligent Transport System (ITS). ► Upgrading of priority Upazila, Union, and village roads and complementary logistics infrastructure at rural markets (commonly called growth centers) in the four (4) Program Districts of Jashore, Jhenaidah, Magura, and Chuadanga. ► Establishing a Road Transport Sector Integration and Coordination Platform (RTSICP) and operationalizing the Road Maintenance Fund Board Act (RMFD).
Phase-2: Road Maintenance Financing and Strengthening Road Sector Management & Institutional Capacity	This phase will primarily focus on improving the management and maintenance of road sector and will include mainly technical assistance.
Phase-3: Upgrading of Bhomra - Satkhira-Navaron road section as a smart, resilient, and safe highway; and local economic infrastructure	► Upgrade the Bhomra—Satkhira—Navaron National Highway (62km) from a two-lane single-carriageway to a climate-resilient four-lane dual-carriageway. This includes separate service lanes for slow-moving vehicles and vulnerable users on both sides of the carriageway, installation of OFC, and deployment of ITS. ► Development of Upazila, Union, village roads, and complementary logistics infrastructure in the three (3) Program Districts of Jashore, Satkhira, and Meherpur.
Phase-4: Upgrading of Local Economic Structure	Upgrade priority upazila, union, village roads and complementary logistics infrastructure in the four (4) Program Districts of Natore, Sirajganj, Pabna, and Kushtia.

Source: Terms of Reference (TOR), RHD

1.4 THE PROJECT ROAD

8. The project road Bhomra – Satkhira – Navaron Road is in western Bangladesh and is part of a significant regional infrastructure. This is proposed to be developed in phase 3 of the WeCARE program, as shown above in Table 1-1. Under the program, the existing two-lane highway will be upgraded to a safer and climate-resilient four-lane highway. This upgrade will enhance transportation efficiency, reduce travel time, and improve road safety. Additionally, the project includes the installation of fiber optic cables to provide reliable internet access, which is crucial for emergency responses and business continuity.⁴ The Index map of the proposed road is shown in Figure 1-1.

⁴ <https://documents1.worldbank.org/curated/en/151961615418765488/pdf/Disclosable-Version-of-the-ISR-Western-Economic-Corridor-and-Regional-Enhancement-Program-P169880-Sequence-No-02.pdf>

1. Introduction and Project Background

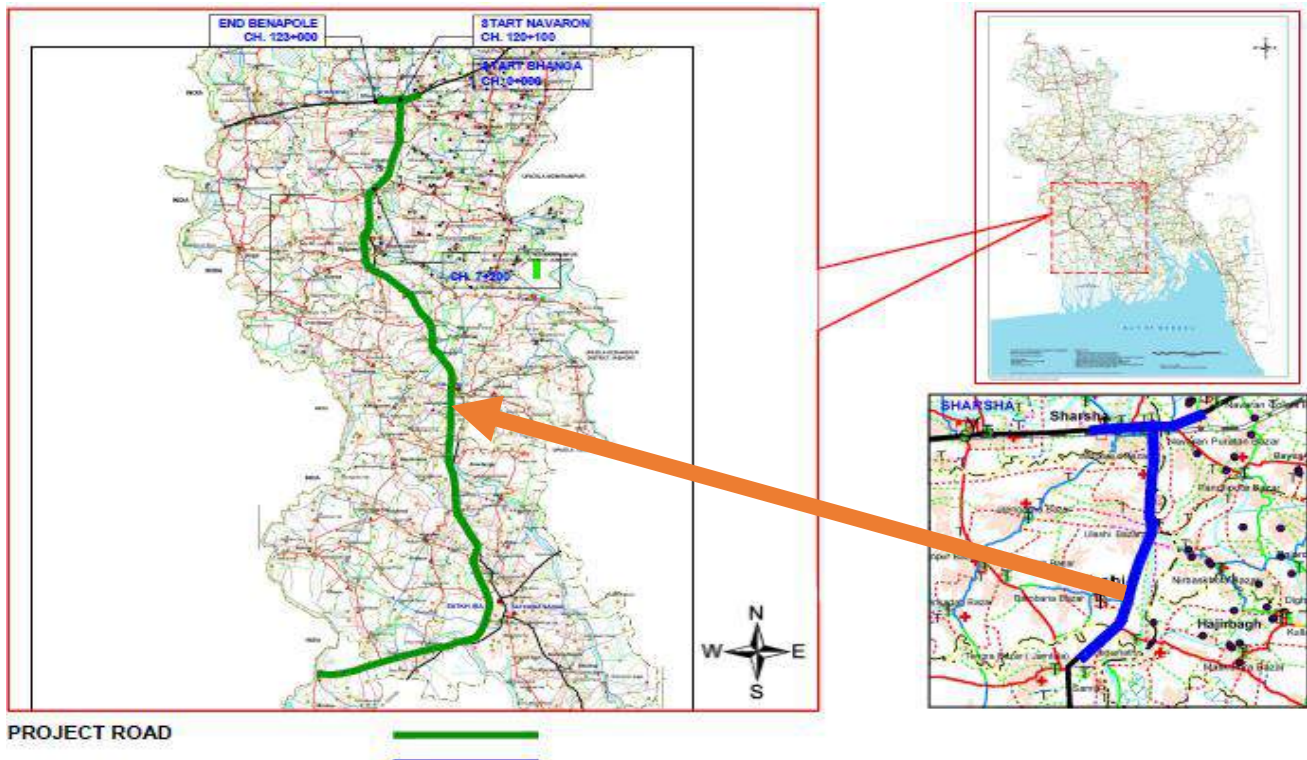


Figure 1-1: The Index Map Showing the Project Road

1.5 THE PROJECT PROPONENT

9. The Road and Highways Department (RHD) of the Ministry of Roads, Highways, and Bridges is responsible for constructing and maintaining major road networks, including national highways, regional highways, and district roads. As an implementing agency for Phase 1 and Phase 3 of the program, RHD is responsible for the sustainable development of the proposed road project. The address of the project proponent is as follows:

Project Director,
WeCARE
Roads and Highways Department (RHD)
Allen Bari Tejgaon,
Dhaka-1215

1.5.1 CONSULTANT APPOINTMENT

10. Accordingly, the RHD has appointed Environmental and Social (E&S) Consultants – M/s Assystem STUP and BCL Associates (JV) – to carry out Environmental and Social Impact Assessments (ESIAs), including Environmental and Social Management Plans (ESMPs) and Resettlement Action Plans (RAPs) for the proposed development of Bhomra – Satkhira - Navaron section of the National Highway. The objective of the ESIA study is to:

- ▶ Establishment of Environmental and Social Baseline Conditions
- ▶ Identify and assess the potential environmental and social impact.
- ▶ Evaluate alternatives to the proposed development.
- ▶ Design appropriate mitigation, management, and monitoring measures
- ▶ Preparation of an Environmental and Social Management Plan (ESMP)

1.6 NEED FOR THE ESIA STUDY

11. The proposed road development is likely to cause adverse environmental and social risks and impacts in terms of loss of mature trees along the Right of Way (RoW), health and safety of workers and communities, acquisition of private lands for the up-gradation and expansion of road networks and related utilities, potential impacts on Land Use Pattern, Common Property Resources (CPR) structures such as houses, mosques, temples, graves, and madrasas.

12. Considering these adverse impacts, the project road has been categorized as high-risk per the WB Environmental and Social Framework (ESF). A summary of the screening exercise is given in Annex 1.1.

1. Introduction and Project Background

13. According to ECR 2023, this road project is also classified under the red category, necessitating obtaining an environmental clearance certificate from the Department of Environment (DOE). Consequently, the Roads and Highways Department (RHD) has secured approved Terms of Reference (TOR) from the DOE to conduct an environmental and social impact assessment study. The approved TOR is attached as Annex 1.2.

1.7 STRUCTURE OF THE ESIA REPORT

14. The ESIA report contains:

Section 1: Introduction

Section 2: Regulatory Framework, Standards and Guidelines

Section 3: Project Description

Section 4: Description of Environmental and Social Baseline

Section 5: Analysis of Alternatives

Section 6: Consultations, Public Participation, and Information Disclosure

Section 7: Environmental and Social Impacts, Risks and Mitigation Measures

Section 8: Labor Management Procedures

Section 9: Emergency Response Plan and Disaster Management

Section 10: Environmental and Social Management Plan

2. Regulatory Framework Standards and Guidelines

2 REGULATORY FRAMEWORK, STANDARDS AND GUIDELINES

2.1 INTRODUCTION

15. This section reviews the policies, laws, and administrative frameworks applicable to the Bhomra-Satkhira-Navaron Section (Phase-3) Road project. It presents the World Bank's relevant environmental and social safeguards (ESS) policies.

16. The World Bank's (WB) Environmental and Social Framework (ESF) is a set of policies, directives, and standards that guide the Bank's support to its client countries in achieving sustainable development.

17. A comparison of the national legislations and the ESSs is made to identify the gaps and opportunities for enhancing the environmental and social performance of the projects supported by the Bank in the country. Some of the areas where the national legislation may not fully align with the banks' ESSs are discussed in this section.

2.1.1 EXISTING NATIONAL LEGISLATIVE FRAMEWORK AND REGULATION

18. Bangladesh adopted its Constitution in 1972. The Constitution's third part ensures fundamental human rights, such as the Right to life, which the courts interpreted to cover the Right to Environment in 1997. The Constitution of Bangladesh has recently been amended, and provisions on environment and natural resource management have been added. This amendment underscores the State's crucial role in protecting and enhancing the environment and conserving and securing natural resources, biodiversity, wetlands, forests, and wildlife for current and future citizens. However, it's worth noting that this provision is now placed in part two of the Constitution under the Fundamental Principles of State Policy.

19. Bangladesh's national environmental protection and natural resource management legislative framework comprises various acts, rules, policies, and strategies, which are summarized in **Table 2-1**.

2. Regulatory Framework Standards and Guidelines

Table 2-1: Existing Policy/Acts/Rules

Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
1.	National Environmental Policy, 1992 (Amendment 2018)	This policy has been formulated based on the National Environmental Policy 1992 aimed at achieving Sustainable Development Goals (SDGs). The main consideration of this policy is to ensure sustainable development, reducing the dependency of humans on natural resources. A total of 19 sectors have been considered in this policy, including environment, water, agriculture, water resources dev	Regarding the transport sector, environmental policy aims to prevent pollution and degradation of resources caused by roads and inland waterways transport.
2.	National Environmental Management Action Plan (NEMAP), 1995	The NEMAP was developed with the following objectives: to identify key environmental issues affecting Bangladesh, to identify actions to halt or reduce the rate of environmental degradation, to improve the management of the natural environment, to conserve and protect habitats and biodiversity, to promote sustainable development, and to improve the quality of life.	The plan proposes developing and applying guidelines to avoid environmental pollution due to transport and communication systems. It particularly emphasizes different environmental pollution, hamper of natural drainage patterns, and agricultural land acquisition due to the development of transport systems.
3.	Environmental Conservation Act (ECA), 1995	The main objectives of ECA are the conservation and improvement of the environment and the control and mitigation of environmental pollution. The main focuses of the Act can be summarized as a Declaration of ecologically critical areas and restriction on the operations and processes that can or cannot be carried out/ initiated in the ecologically critical areas (ECA); Regulations for vehicles emitting harmful pollutants to the environment. Environmental clearance. Regulation of industries and other development activities' discharge permits. Promulgating air, water, noise, and soil quality standards for different areas. Promulgation of a standard limit for discharging and emitting waste and Formulation and declaration of environmental guidelines.	According to this law, no industrial unit or project shall be established or undertaken without obtaining an Environmental Clearance Certificate from the Director General, in the manner prescribed by rules.
4.	The Water Act, 2013	The Act recognizes the significance of managing all water resources in the context of the natural flow of surface water and groundwater recharging. Per the Act, private landowners can use the surface water inside their property for all purposes. No individuals or organizations can extract, distribute, use, develop, protect, and conserve water resources. They will not be allowed to build any structure that would impede the natural flow of rivers and creeks.	To regulate the water quality during the construction phase.
5.	Environment Conservation Rules, 2023	ECR 2023 is promulgated under the ECA 1995, superseding earlier ECR 1997 and amendments. Based on actual and anticipated pollution load, industries, development projects, and other activities are categorized into green, yellow, orange, and red categories. The rules set (i) the National Environmental Quality Standard for Surface Water, Groundwater, Drinking Water, Industrial effluents, Emissions, and Vehicular Exhaust. (ii) It also outlines the procedure for obtaining environmental clearance, (iii) Requirements for undertaking IEE and EIA study as well as formulating EMPs according to categories of industries/development projects/activities, (iv) procedures for damage claim by persons affected or likely to be affected due to polluting activities or activities causing hindrance to normal civic life. The rules authorize the Director General of the Department of Environment	Per ECR 2023, the Project is classified as Red Category item No 38, requiring an approved Terms of Reference (ToR) from the DOE to carry out the EIA study and to obtain Environmental clearance. Accordingly, RHD has submitted a letter dated 15-05-2023 to the Department of Environment (DoE) along with the requisite documents for site clearance and approval of Terms and Reference for conducting an Environmental Impact Assessment for the proposed project.

2. Regulatory Framework Standards and Guidelines

Table 2-1: Existing Policy/Acts/Rules			
Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
		(DoE) to grant the project “Environmental Clearance” with stipulated conditions to comply. Per ECR 2023, the road sector projects, including bridge construction, have been categorized as orange and red based on their length, as shown below: Orange Item 21: Road construction/expansion (5km to 10 km) Orange Item 22: Bridge construction (100m to 500m) Red Item 38: Road construction/expansion (more than 10km); Red Item 39: Bridge/flyover construction (more than 500m);	
6.	Environmental Courts Act, 2000	This act sets out a policy for effective prosecution and completion of legal proceedings related to environmental crimes. Under this Act, the Director General of the DoE has the power to impose heavy penalties on industrial polluters who dump untreated wastewater into the environment or do not operate their legally mandated ETPs.	According to this act, the government can take legal action if any environmental violations due to project interventions.
7.	National Land Transport Policy	This policy aims to introduce long-term network planning and maintain the road network at a level that protects the value of the investment. It also aims to secure a sustainable means of funding road maintenance, improve traffic management, manage road-side activities, develop an integrated planning approach in road construction, involve the private sector more in infrastructure, services, and maintenance, and protect the environment from road construction programs.	According to the policy, all new roads and major improvements, tolled or otherwise, are subject to an Environmental and Social Impact Assessment (ESIA).
8.	RHD’s Road Master Plan	The objectives of RHD’s road master plan are: Protecting the value of RHD’s road and bridge assets, Improving the connectivity of the road network, Enhancing and developing the strategic road network to meet economic and traffic growth targets, Improving the Zila road network to enhance connectivity; Improving road safety to reduce road accidents; Providing environmental and social protection; and outlining the institution improvements required for RHD.	According to the plan, the physical and social environment must be protected from the adverse effects of road construction.
9.	Water Reservoir Conservation Act 2000	It signifies the preservation of natural water bodies. Section 1 of this Act suggests that it has application to the water bodies of the cities, divisional and district towns, and municipalities. The water bodies in the rural areas are outside the jurisdiction of this Act.	As per this, water bodies shall be conserved during the construction and operation phase of the project.
10.	The Forest Act (1927) and the Forest (Amendment) Act (2000)	It is the main legislative context for forestry protection and management in Bangladesh. It was enacted to control trespass and illegal resource extraction from forests and to provide a framework for the forestry revenue collection system	The act is relevant to the project as the road construction will require cutting trees belonging to government agencies.
11.	National Forest Policy (amendment), 1994	The policy is designed to conserve the existing forest areas, bring about 20% of the country's land area under the Forestation Program, and increase reserve forests by 10 percent annually to 2015.	The Act is relevant because trees will be removed for the project. Trees shall be planted in place of the tree removed to construct the road.
12.	The Private Forests Ordinance, 1959	An Ordinance to provide for the conservation of private forests and the afforestation in certain cases of wastelands in Bangladesh.	According to section 61 of this ordinance, if any land is required, such land shall be deemed needed for a public purpose.

2. Regulatory Framework Standards and Guidelines

Table 2-1: Existing Policy/Acts/Rules			
Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
13.	Bangladesh Wildlife (Conservation & Security) Act, 2012 (previously known as Bangladesh Wildlife (Preservation) Order, 1973; amended as Bangladesh wildlife (Preservation) Act 1974)	This Act protects 1,307 species of plants and animals under four schedules, and it mandates imprisonment and fines for wildlife poaching, capturing, trapping, and trading.	This Act is relevant to the project as intervention may affect wildlife habitation, obstruct movement.
14.	National Water Policy, 1999	The policy emphasizes efficient and equitable management of water resources, proper harnessing and development of surface and ground water, water availability to all concerned, and institutional capacity building for water resource management.	Measures must be taken to minimize disruption to the natural aquatic environment in streams and water channels (Clause 4.9b).
15.	National Fisheries Policy, 1998	The National Fisheries Policy focuses on aquaculture and marine fisheries development. The policy suggests, among other things, that biodiversity will be maintained in all natural water bodies and the marine environment, and control measures will be taken against activities that negatively impact fisheries and resources and vice versa.	Proper mitigation measures shall be adopted during the construction and operation phase to prevent an impact on biodiversity in natural water bodies and the aquatic environment.
16.	Protection and Conservation of Fish Act 1950 (Amended 1982)	This is framework legislation with rule-making powers. Among others, some of these rules may prohibit the destruction of, or any attempt to destroy, fish by the poisoning of water or the depletion of fisheries by pollution, industrial effluent, or otherwise.	Proper mitigation measures shall be adopted during the construction and operation phase of the project to prevent an impact on biodiversity in natural water bodies and the aquatic/marine environment.
17.	National Agriculture Policy, 1999	This policy aims to make the nation self-sufficient in food by increasing the production of all crops, including cereals, and ensuring a dependable and secure food system.	Adequate measures should be taken to prevent waterlogging or to protect the irrigation systems from damage caused by the construction of the project road.
18.	National Road Design Standard	A comprehensive National Transport Policy (NTP) needs to be formulated to integrate different modes of transport for the most efficient performance, consider intermodal interactions, develop a communications network without damaging the physical environment, and allocate resources according to conservation and environmental considerations and economic development priorities.	This will specify the proper design required for the project road to avoid maximum damage.
19.	National Land Use Policy, 2001	The main contents of this policy are: Stopping the high conversion rate of agricultural land to nonagricultural purposes. Utilizing agroecological zones to determine maximum land use efficiency and adopting measures to discourage the conversion of agricultural land for urban development. Improving the environmental sustainability of land-use practices.	The proposed project must adhere to this policy so that the environmental sustainability of land-use practices is assured.
20.	The Embankment and Drainage Act, 1952	It provides for constructing, maintaining, managing, removing, and controlling embankments and water courses to improve land drainage.	No dredging activities will be conducted during the construction period.

2. Regulatory Framework Standards and Guidelines

Table 2-1: Existing Policy/Acts/Rules			
Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
21.	Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009	This is a comprehensive strategy to address climate change challenges in Bangladesh. Bangladesh Climate Change Strategy and Action Plan built on and expanded the NAPA.	This is relevant as the project road is vulnerable to climate change effect
22.	Constitution of the People's Republic of Bangladesh, 04 November 1972	Bangladesh's Constitution defines the rights of every citizen irrespective of their ethnicity and religion, where the State is responsible for the provision of Basic Necessities for the citizens	This is applicable to ensure laborers' and project-related persons' health and safety.
23.	The Acquisition and Requisition of Immovable Property Act 2017 (ARIPA)	The Act is the main law for acquiring land in Bangladesh. The Act requires compensation for (i) land and assets that are permanently acquired (including crops, trees, and buildings) and (ii) any other damage from such acquisition. The Act also lets the government acquire the properties of religious groups like mosques, temples, pagodas, and graveyards if it is in the public interest. The Ministry of Land (MoL) oversees the land acquisition process. The MoL gives some of its power over land acquisition to the Commissioner at the Divisional level and the Deputy Commissioner at the District level. The Deputy Commissioner (DC) can acquire the land under the Act and compensate the legal owners.	The nature of the civil works related to the project will entail land acquisition and subsequent economic and physical displacement. ARIPA 2017 defines the land acquisition process and contains pertinent information related to titleholder compensation payments.
24.	Khas Land Policy 1997	In 1997, the Khas Land Settlement Policy was promulgated, allowing the distribution of Khas land for a 99-year lease (or for a one-year temporary lease). Khas land means government-owned fallow land, where nobody has property rights. The government owns the land, and it is available for allocation according to government priorities.	This is applicable to confirm the acquisition of Khas land along the RoW. The compensation will be handed over to the government authority as per policy.
25.	Vested Property (Repeal) Act. 2013	The Vested Property Act—2013 in Bangladesh amends the previous laws regarding the management and return of properties confiscated by the state government through the erstwhile “Enemy Property Act.” The 2013 amendment aimed to rectify these issues by providing a legal framework for returning vested properties to their rightful owners or heirs. It also sought to streamline the process of identifying and releasing such properties, though it is a challenging task.	It is to be noted that no such or disputed property was found within the proposed ROW during the consultant's census and Inventory of Loss (IOL) survey. Thus, the Vested Property Act does not apply to the project.
26.	Labor Related Laws (Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013)	Labor Act 2006: This act updates and combines the laws about labor employment, relations, wages, compensation, unions, disputes, and workers' health, safety, welfare, working conditions, and apprenticeship. ^{5, 6, 7, 8} Bangladesh Labor Rules 2015: ^{9, 10, 11, 12} These rules explain the Labor Act 2006 more, giving specific regulations on working terms, worker types,	To carry out the civil works, a significant amount of labor will be required to be hired. Therefore, these laws will be triggered to safeguard the interests of labor, the host community, project authorities, contractors, and other project stakeholders. The project will

⁵ <https://www.doulah.net/bdlaws/Bangladesh%20Labor%20Act,%202006.pdf>,

⁶ <https://betterwork.org/reports-and-publications/bangladesh-labour-act-2006/>,

⁷ <https://www.askbd.org/ask/wp-content/uploads/2013/07/Analysis.-Labour-Law-Amendment-2006.pdf>

⁸ <https://compliancebangladesh.com/bangladesh-labour-law-2006-english-version/>

⁹ <https://dol.gov.bd/>

¹⁰ <https://compliancebangladesh.com/bangladesh-labor-rules-2015-english-version/>

¹¹ <https://compliancebangladesh.com/bangladesh-labour-rules-2015/>

¹² <https://archive.org/details/bangladesh-labour-rules-2015-amendment-2022-included>

2. Regulatory Framework Standards and Guidelines

Table 2-1: Existing Policy/Acts/Rules			
Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
		leave rules, pay, and more. It also has rules for health and safety at work. Occupational Health and Safety Policies 2013. ^{13,1415} The National Occupational Health and Safety (OSH) Policy of 2013 requires using personal safety gear, having health centers in big companies, forming safety committees, keeping standard OSH protection, and planning for workplace safety.	ensure that the stipulations of the law are duly followed when it comes to labor-related activities
27.	Community Health and Safety-Related Laws	The management of community health and safety of development projects is covered under ECA and ECR. Typically, OHS measures extend to the public at construction sites. There are two components of CHS. One is the physical safety of project communities that are exposed to the project activities during construction and operation, including risks of accidents and risks of violence due to the increase in crimes and cultural conflict between locals and the migrant population. The other pertains to the community's exposure and/or increased risks of diseases due to the influx of people during construction and operation and the changes in the project area, including pollution and ecological change. The physical safety aspects are partly addressed by the OHS provisions of the Labor Act. Traffic road accidents are a severe issue in Bangladesh, and road safety issues have been incorporated into the projects.	Land acquisition and upgradation of roads are likely to cause negative impacts, especially on those communities living nearby.
28.	Cultural Heritage	The Antiques Law of 1968 consolidates all laws relating to the preservation and protection of antiquities under the auspices of the Department of Archaeology. The law empowers the Director of the Department of Archaeology to take steps necessary for the custody, preservation, and protection of antiquity.	Project activities may lead to the unearthing of antiques or may impact cultural heritage by chance. Therefore, laws related to cultural heritage and antiques aim to protect these finds.
29.	Stakeholder Engagement and Information Disclosure.	The DoE guidelines for IEE/EIA preparation instruct the implementing agency to conduct public consultations of orange-B and red category projects. Implementing agencies usually conduct public consultations during EIA studies and present the outcome in the IEE/EIA reports, which they submit to the DoE for clearance. However, opportunities for the public to review the final/completed IEE/EIA report are at the discretion of the DoE's Director-General. The DoE does not officially disclose EIA report findings publicly on its website.	Stakeholder engagement is an important instrument of public policy, and these regulations/laws aim to make the development project inclusive by giving the communities a voice. The anticipated civil work makes it necessary to implement stakeholder engagement.
30.	Electricity Act 2018	It relates to the supply and use of electrical energy and allows any person to secure a license to supply energy and to put down or place electrical supply lines for the transmission of energy. The Act provides that the licensee, in the exercise of any of the powers conferred by or under this Act, will cause as little damage, detriment, and inconvenience as may be and will make full	This Act applies to the project when electricity is used for construction camps, accommodation, machinery, vehicles, workshops, maintenance, road construction, etc.

¹³ https://dife.portal.gov.bd/sites/default/files/files/dife.portal.gov.bd/page/a51db80d_ca8e_4cae_9579_5f6f089d5754/2021-09-15-05-58-20b6eeb7481056b939b691d2d26a401a.pdf

¹⁴ http://www.bilsbd.org/wp-content/uploads/2016/03/BILS-IL-O-Study_OSH-Profile_Final-Report_29-June-2015.pdf

¹⁵ <https://occup-med.biomedcentral.com/articles/10.1186/s12995-022-00366-y>

2. Regulatory Framework Standards and Guidelines

Table 2-1: Existing Policy/Acts/Rules			
Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
		compensation for any damage, detriment, or inconvenience caused by the licensee or by anyone employed by the licensee.	
31.	Electricity Rules 2020 (Amendment 2022)	The ministry published Electricity Rules in November 2020 based on Clause 59 of the Electricity Act 2018 (SRO 297 of Act/2020). The main observation is to provide compensation for the installation of transmission line towers to the landowners as per the applicable laws and policy	This rule applies to rearranging, installing, and shifting the transmission line, tower, poles, etc., along the project road.
32.	Solid Waste Management Regulations 2021	► The Solid Waste Management Regulations 2021 were published in Bangladesh on December 23, 2021, under the Bangladesh Environmental Protection Act, 1995. The Regulations define the responsibilities of businesses involved in solid waste management and impose collection, recycling, and disposal obligations according to Extended Producer Responsibility (EPR) on manufacturers of non-biodegradable products such as glass, plastic, and bottles. The Regulations also include provisions for treating solid waste, such as composting and energy recovery. The main provisions of the Regulations are as follows- ► When recovering resources from waste, the principles of management that consider the waste hierarchy, such as the 3Rs, segregation, and reduction, must be followed at all stages, from waste generation to final disposal. Responsibilities of waste generators, consumers, and users: Dispose of waste per authorities' regulations, including local government. Dispose of waste separately; do not dump, store, or burn waste outdoors. Responsibilities of manufacturers (*not defined) and importers of products- Collect non-biodegradable products such as glass, plastic, polyethylene, multi-layered packaging, bottles, and cans from consumers and recycle or dispose of them if appropriate; Determine work plans and implementation procedures for recycling and disposal; Ensure that EPR is properly implemented; Submit an annual report to the Department of Environment (DOE) on the amount of plastic recycled; Raise public awareness of proper waste management.	This is applicable to the project road to ensure the whole project area with zero waste pollution and also comprehensive practices for waste management as well as sourcing, separation, dumping, reuse etc. A vast number of solid wastes will be generated from the project activities and this regulation is applicable to proper management of the induced wastes.
33.	E-Waste Management Rules 2021	Under the Bangladesh Environmental Protection Act of 1995, Bangladesh's Department of Environment (DoE) announced the Hazardous Waste (e-waste) Management Rules, 2021, on June 10, 2021. The E-waste regulation imposes duties on the producers, assemblers, collectors, marketers, and users of the items mentioned in the Schedule (home appliances, monitoring and control equipment, medical equipment, automated machines, IT and communication equipment). Additionally, the regulation establishes	The proposed project must comply with this rule for managing the electronic waste from the road project's construction.

2. Regulatory Framework Standards and Guidelines

Table 2-1: Existing Policy/Acts/Rules			
Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
		restrictions on using the 10 compounds covered by the EU RoHS Directive. Following publication, this legislation became enforceable.	

Source: Adopted from Environmental and Social Impact Assessment (ESIA) Report for Jashore-Jhenaidah Road Corridor, 2019, RHD

2. Regulatory Framework Standards and Guidelines

2.1.2 WORLD BANK GUIDELINES

20. The World Bank has defined ten specific Environmental and Social Standards (ESSs) designed to avoid, minimize, reduce, or mitigate the adverse environmental and social risks and impacts of projects. These are as follows:

- ▶ ESS 1: Assessment and Management of Environmental and Social Risks and Impacts.
- ▶ ESS 2: Labor and Working Conditions.
- ▶ ESS 3: Resource Efficiency and Pollution Prevention and Management.
- ▶ ESS 4: Community Health and Safety.
- ▶ ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement.
- ▶ ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.
- ▶ ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities.
- ▶ ESS 8: Cultural Heritage.
- ▶ ESS 9: Financial Intermediaries; and
- ▶ ESS 10: Stakeholder Engagement and Information Disclosure.

21. Since the WB financed the proposed project, the ESIA and ESMP have been prepared following the environmental and social safeguard standards. These environmental social safeguards standards and the gap between WB's ESS and relevant national laws and policies are listed in **Table 2-2**.

2. Regulatory Framework Standards and Guidelines

Table 2-2: The World Bank's Environmental and Social Standard, Related National Laws and their Gaps on WeCARE Phase 1

World Bank ESS Standards	Objectives	Requirements	Applicability
ESS-1: Assessment and Management of Environmental and Social Risks and Impacts	► Identify, assess, evaluate, and manage environmental and social risks and impacts in a manner consistent with the ESF. ► Adopt differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable people.	The types of E&S risk and impacts should be considered in the environmental and social assessment. The environmental and social framework should be used and strengthened to assess, develop, and implement World Bank-financed projects where appropriate. Relevant GoB Laws/Regulation ► ECR 2023 Gaps: – The EIA screening and scoping study may not comprehensively cover all the WB's ESS in their analysis. – Stakeholder engagement is carried out during the EIA. However, the scope of the engagement is limited. The EIA report is also not publicly disclosed as required in ESS. – The EIA framework doesn't require the analysis of alternatives.	► The ESS1 applies to all associated facilities.¹⁶
ESS-2: Labor-and-Working- Conditions	► Promote safety and health at work. ► Promote fair treatment, non-discrimination, and equal opportunity for project workers. ► Protect project workers, with particular emphasis on vulnerable workers. Prevent the use of all forms of forced labor and child labor. ► Support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law. ► Provide project workers with accessible means to raise workplace concerns.	Labor management procedures (LMP) covering terms and conditions of work, non-discrimination, equal opportunity, workers' organizations, and provisions to protect child/forced labor, Occupational health and safety requirements per the World Bank Group's Environmental, Health, and Safety Guidelines (EHSG) shall be prepared for the projects for direct, contracted, community, primary supply workers, and government civil servants. Relevant GoB Laws/Regulation ► Labor Act 2006 (Amendment 2013) ► Occupational Health and Safety Policy 2013 ► Public Procurement Rule 2008 Gaps: – The Labor Act does not require project interventions regarding labor and working conditions, including OHS, to be assessed and reviewed before approval. – The Labor Act does not require development projects to prepare labor management plans/procedures/OHS Plans.	Project will be hiring the following types of workers: i. Direct workers will include the project managers and supervisors, who are employees of RHD; ii) All the workforce deployed by the Contractors and the Project Management Consultant (for all contracts) under the RHD will be deemed to be contracted workers. The Contractor(s) might further engage multiple subcontractors; iii) Influx of migrant labor from other districts for construction works is a norm in this district and is likely to continue in this project; ii. A labor management procedure will be prepared to regulate working conditions and the management of workers' relations, including worker-specific GRM, terms and conditions of employment, non-discrimination, equal opportunity, GBV, protection of workforce, the prohibition of child /forced labor, and provision of OHS.
ESS-3: Resource-Efficiency-and-	Promote the sustainable use of resources, including energy, water, and	It requires an estimate of gross greenhouse gas emissions from the project (unless minor) where technically and financially	Concerning Resource Efficiency, the project preparation and the ESIA process will identify feasible measures for:

¹⁶ Note: Associated Facilities will meet the requirements of the ESSs, to the extent that the Borrower has control or influence over such Associated Facilities.

2. Regulatory Framework Standards and Guidelines

Table 2-2: The World Bank's Environmental and Social Standard, Related National Laws and their Gaps on WeCARE Phase 1			
World Bank ESS Standards	Objectives	Requirements	Applicability
Pollution-Prevention-and- Management	raw materials. Avoid or minimize adverse impacts on human health and the environment caused by pollution from project activities. Avoid or minimize project-related emissions of short and long-lived climate pollutants. Avoid or minimize the generation of hazardous and non-hazardous waste. Minimize and manage the risks and impacts associated with pesticide use. It requires technically and financially feasible measures to improve efficient energy, water, and raw materials consumption, and it introduces specific water efficiency requirements where a project has high water demand.	feasible. Requirements on managing wastes, chemicals, and hazardous materials, and contains provisions to address historical pollution. ESS-3 refers to national law and Good International Industry Practice, in the first instance the World Bank Groups' EHSGs. Gaps: - ESS-3 requirements are addressed by existing regulations and indirectly for resource efficiency and climate change. - Existing energy and water conservation policies, laws, and regulations do not require development projects to assess resource efficiency issues and incorporate resource efficiency measures in their ES risk management plans	(a) energy use; (b) water usage and management to minimize water usage during construction, conservation measures to offset total construction water demand and maintain balance for water resource demand; and (c) raw materials use by exploring the use of local materials, recycled aggregates, and innovative technology to minimize the project's footprints on finite natural resources. Concerning Pollution Management, based on past road project experiences, the project will develop, as part of the ESIA process, prevention and management measures to offset risks and impacts of pollution from potential sources such as dust and emission from the operation of hot-mix and batching plants, crushers, construction and haulage vehicles, material and spoil stockpile; effluents and wastewater from labor camps, construction camp; spillage or leakage during handling of chemical admixtures, hazardous materials like bitumen, high strength diesel, used oil, battery wastes etc.; and disposal of non-hazardous wastes (municipal wastes) generated during project implementation period.
ESS-4: Community-Health-and- Safety	Anticipate or avoid adverse impacts on the health and safety of project-affected communities during the project lifecycle from routine and non-routine circumstances. Promote quality, safety, and climate change considerations in infrastructure design and construction, including dams. Avoid or minimize community exposure to project-related traffic and road safety risks, diseases, and hazardous materials. Effective measures should be put in place to address emergency events. Ensure that personnel and property are safeguarded to avoid or minimize risks to the project-affected communities.	Requirements on infrastructure, considering safety and climate change, and applying the concept of universal access, where technically and financially feasible. Requirements on traffic and road safety, including road safety assessments and monitoring. Addresses risks arising from impacts on provisioning and regulating ecosystem service. Measures to avoid or minimize the risk of water-related, communicable, and non-communicable diseases. Requirements to assess risks associated with security personnel and review and report unlawful and abusive acts to relevant authorities. GoB Laws and Regulation - National Road Transport Act - ECR 2023 - BLA 2006 - Public Procurement Rule, 2008 - Water Act 2013 Gaps: - While other acts cover all ESS-4 requirements, gaps exist for Community exposure to health issues.	In the project corridor there is likely to be, road excavation, use of vibratory equipment, construction debris handling and disposal etc. during construction; ii) high likelihood of direct exposure to increased construction related traffic and equipment especially at road sections traversing settlement area with limited carriageway/roadway width, and sensitive receptors such as schools, religious place, health center/hospitals; iii) high dust levels from earthworks, high noise and emission level from traffic congestion and idling of vehicles; and iv) influx of migrant workers could potentially cause local discomfort or potential conflicts with local people. The gaps between GoB regulations and ESS-4 will be addressed through suitable provisions in the ESMP and the contractor's obligation as part of the Contractor's ESMP for CHS. This should also include an OHS plan, an influx management plan, a workers' camp management plan, and a traffic and road safety management plan.

2. Regulatory Framework Standards and Guidelines

Table 2-2: The World Bank's Environmental and Social Standard, Related National Laws and their Gaps on WeCARE Phase 1			
World Bank ESS Standards	Objectives	Requirements	Applicability
		Covered under ESIA, the systems do not provide clear requirements for the development project and implementation.	
ESS-5: Land-Acquisition-Restrictions-on-Land-Use- and-Involuntary-Resettlement	Avoid or minimize involuntary resettlement by exploring project design alternatives. Avoid forced eviction. Mitigate unavoidable adverse impacts from land acquisition or restrictions on land use by providing compensation at replacement cost and assisting displaced persons in their efforts to improve, or at least restore, livelihoods and living standards to pre-displacement levels or to levels prevailing before the beginning of project implementation, whichever is higher. Improve living conditions of poor or vulnerable persons who are physically displaced through provision of adequate housing, access to services and facilities, and security of tenure. Conceive and execute resettlement activities as sustainable development programs.	Applies to permanent or temporary physical and economic displacement resulting from different types of land acquisition and restrictions on access. Does not apply to voluntary market transactions, except where these affect third parties. Provides criteria for “voluntary” land donations, sale of community land, and parties obtaining income from illegal rentals. Prohibits forced eviction (removal against the will of affected people, without legal and other protection, including all applicable procedures and principles in ESS5). It requires that the acquisition of land and assets be initiated only after payment of compensation and resettlement has occurred. It requires community engagement and consultation, disclosure of information, and a grievance mechanism. GoB Laws and regulation Acquisition and Requisition of Immovable Property Act, 2017 Gaps: - Preparation of SIA and RAP is not required. - Compensation or assistance is not provided to non-title holders. - ARIPA does not include provisions for transitional allowances to restore livelihoods for informal settlers, which may be viewed as a short-term strategy. It does not include sustainable or inclusive developmental objectives. - No special provisions for specific groups, such as the vulnerable population groups. - Valuation of lost assets is not based on the replacement cost principle.	Land will be required for widening, upgradation works in identified corridors and possibly for rehabilitation corridor works, curve/geometric improvements, blind spots, etc. Hence impacts on land, private and community owned assets including structures, trees and crops within existing and proposed ROW is likely. Physical and economic displacement too is very likely. I) Important gaps (between ESS and GoB policy) exist in terms of determination of compensation, identification of non-titleholders, cut-off dates for non-title holders and valuation of structures with depreciation. These gaps, along with other short- and long-term measures will be included in the RAP.
ESS-6: Biodiversity-Conservation and Sustainable Management of Living Natural Resources	Protect and conserve biodiversity and habitats. Apply the mitigation hierarchy and the precautionary approach in designing and implementing projects that could impact biodiversity. To promote the sustainable management of living natural resources.	Requirements for projects affecting areas that are legally protected, designated for protection, or regionally/internationally recognized to be of high biodiversity value. Requirements on sustainable management of living natural resources, including primary production and harvesting, distinguishing between small-scale and commercial activities. Requirements relating to primary suppliers, where a project is purchasing natural resource commodities, including food, timber, and fiber. Gaps:	Site clearance activities for road construction will involve removing roadside vegetation and felling trees. The biodiversity studies have indicated that the entire corridor along the project road is rich in biodiversity, interspersed with invasive species. Other than the clearance of roadside vegetation, road construction will also require felling trees.

2. Regulatory Framework Standards and Guidelines

Table 2-2: The World Bank's Environmental and Social Standard, Related National Laws and their Gaps on WeCARE Phase 1			
World Bank ESS Standards	Objectives	Requirements	Applicability
		No equivalent requirements on: - the application of the hierarchy of measures. - the preparation of the Biodiversity Management Plan. - differentiated measures on types of habitats. - conduct of due diligence on primary suppliers.	
ESS-7: Indigenous-Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	To ensure that the development process considers full respect for affected parties' human rights, dignity, aspirations, identity, culture, and natural resource-based livelihoods. Promote sustainable development benefits and opportunities in a manner that is accessible, culturally appropriate, and inclusive. Improve project design and promote local support by establishing and maintaining an ongoing relationship based on meaningful consultation with affected parties. Obtain the Free, Prior, and Informed Consent	This applies when the Indigenous Peoples are present or have a collective attachment to the land, whether they are affected positively or negatively and regardless of economic, political, or social vulnerability. The option to use different terminologies for groups that meet the criteria set out in the Standard. The use of national screening processes, providing these meet World Bank criteria and requirements. Coverage of forest dwellers, hunter-gatherers, pastoralists, and other nomadic groups. Requirements for meaningful consultation tailored to affected parties and a grievance mechanism. Requirements for a process of free, prior and informed consent in three circumstances. Gaps: No equivalent requirements on: - coverage of IP impacts in the ESIA; - special treatment or differentiated approach to IPs and vulnerable groups. - conduct of FPIC. - development of IP Plan.	This ESS will identify measures to minimize the disruption of livelihoods caused by the project development. There are no indigenous people in the project areas.
ESS-8: Cultural-Heritage	Protect cultural heritage from the adverse impacts of project activities and support its preservation. Address cultural heritage as an integral aspect of sustainable development. Promote meaningful consultation with stakeholders regarding cultural heritage. Promote the equitable sharing of benefits from the use of cultural heritage.	Requires the establishment of a chance finds procedure to ensure peoples' continued access to culturally important sites. It also requires confidentiality when revealing information about cultural heritage assets that would compromise or jeopardize their safety or integrity. The requirement also requires the fair and equitable sharing of benefits from commercial use of cultural resources. Provisions of archaeological sites and materials. Gaps: No equivalent requirements on: - the application of hierarchy of measures. - the development of Cultural Heritage Management Plan; - the development and adoption of project-specific Change Find Procedures; and - the engagement of cultural heritage experts.	The alignment of the project road does not have any ancient monuments and/or archaeological site(s), protected. i) If an of them (antiques/cultural heritage) are found, they need to be relocated, and provisions must be made in the RAP.
ESS-9: Financial-Intermediaries	Sets out how Financial Intermediaries (FI) will assess and manage	Financial Intermediaries (FIs) to have an Environmental and Social Management System (ESMS) - a system for identifying,	Not applicable

2. Regulatory Framework Standards and Guidelines

Table 2-2: The World Bank's Environmental and Social Standard, Related National Laws and their Gaps on WeCARE Phase 1			
World Bank ESS Standards	Objectives	Requirements	Applicability
	environmental and social risks and impacts associated with the subprojects it finances.	assessing, managing, and monitoring the environmental and social risks and impacts of FI subprojects on an ongoing basis Gaps: Not applicable to the country system. Project proponents are subject to the same country's laws regardless of funders.	
ESS-10: Stakeholder-Engagement- and-Information-Disclosure	To identify stakeholders and maintain a constructive relationship with them. Assess stakeholder interest and support for the project and enable stakeholders' views to be considered in project design. Promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle. Ensure that appropriate project information is disclosed to stakeholders in a timely, understandable, accessible, and appropriate manner.	It requires identifying the stakeholders, both project-affected and other interested parties and clarifying how effective engagement occurs. It requires stakeholder engagement throughout the project life cycle and the preparation and implementation of a Stakeholder Engagement Plan (SEP). GoB Laws/Regulation No Specific Policy or Legislation identified Gaps: – The ECA/ECR does not specifically require consultation, but the ESIA guidelines issued by the DoE and other agencies recommend public consultations during scoping and preparing the ESIA. – There is also no provision for stakeholder engagements during project implementation.	This is relevant to the project, and RHD has prepared a stakeholder engagement plan. The project will ensure: i. Stakeholders have been/are to be consulted on the Stakeholder's engagement plan. ii. The updated SEP will be followed during the project implementation. iii. Ensure stakeholders are well informed and have access to the project documentation, which is expected to be publicly disclosed as and when available and in publicly accessible places in local languages to the people. iv. Stakeholder engagement is to be conducted in a manner proportionate to the project's nature, scale, risks, and impacts and appropriate to stakeholders' interests
Gender-Based Violence	GBV are considered a cross-cutting theme across all the World Bank's ESS and are especially relevant for Major Infrastructure Projects.		Adequate measures to address gender issues and GBV, including GRM have been addressed in this ESA

Source: Adopted from Environmental and Social Impact Assessment (ESIA) Report for Jashore-Jhenaidah Road Corridor, 2019, RHD

2. Regulatory Framework Standards and Guidelines

2.1.3 CLEARANCES/PERMISSIONS REQUIRED FOR THE PROJECT ROAD

22. As listed in **Table 2-3** for the proposed project's development, the following clearances/approvals must be obtained during the preconstruction and construction stages.

Table 2-3: List of Clearances/Approvals Required				
Sl. No.	Clearances/Permissions Required	Competent Authority to Accord Clearances	Responsibility to Obtain Clearance	Remarks
A. Pre-construction Stage				
1.	Clearances for the project	Department of Environment (DoE) under MoEFCC, Bangladesh	RHD	The RHD has initiated the necessary process per ECR 2023, and accordingly, terms of reference for carrying out the ESIA report have been received. This ESIA report is prepared considering the TOR received from the DOE and the requirement of the World Bank (ESS-1 through 10).
2.	Permission for Tree felling	Divisional Forest Officer, Department of Forests	RHD	RHD will request that the Forest Department and Zilla Parishad remove the tree before the construction work commences.
B. Construction Stage				
3.	Establishment and Operation of construction campsites, crusher units, hot mix plants, concrete batch mix plants, WMM plants, workforce camps	Department of Environment (DoE)	Contractor	To establish the construction camps permission will be needed from the DoE, along with agreements from the landowners and the community through consultation meetings. The contractor must follow the ECC requirement and ESMP requirements.
4.	Water for construction activities (Surface Water)	Bangladesh Water Development Board	Contractor	The contractor must follow the ECC requirement, national rules/regulations, and ESMP requirements.
5.	Permission to Establish Construction camps	As Per terms and conditions of ECC, agreement with land owner and local community engagement.	Contractor	The contractor must follow the ECC requirement, national rules/regulations, and ESMP requirement.
6.	Extraction of Groundwater	DPHE and UP	Contractor	The contractor must follow the ECC requirement, national rules/regulations, and ESMP requirement
7.	Labor License	Not Required	Contractor	The contractor must follow ECC (Mentioned in Chapter 8 and Annex 3-1), Labor Act 2006, Bangladesh Labor Rules 2015, Occupational Health and Safety Policies 2013, Khas Land Policy 1997, and Vested Properties (Repeal) Act 1974 requirement, national rules/ regulations and ESMP requirement

Source: Adopted from Environmental and Social Impact Assessment (ESIA) Report for Jashore-Jhenaidah Road Corridor, 2022, RHD

2.2 NATIONAL STANDARDS

23. For pollution prevention and abatement, the DOE has issued ambient air quality standards and groundwater and surface water quality standards, which the contractor shall meet at the construction site. These standards are presented in Annex 2.1 through Annex 2.9.

3. Description of the Project

3 DESCRIPTION OF THE PROJECT

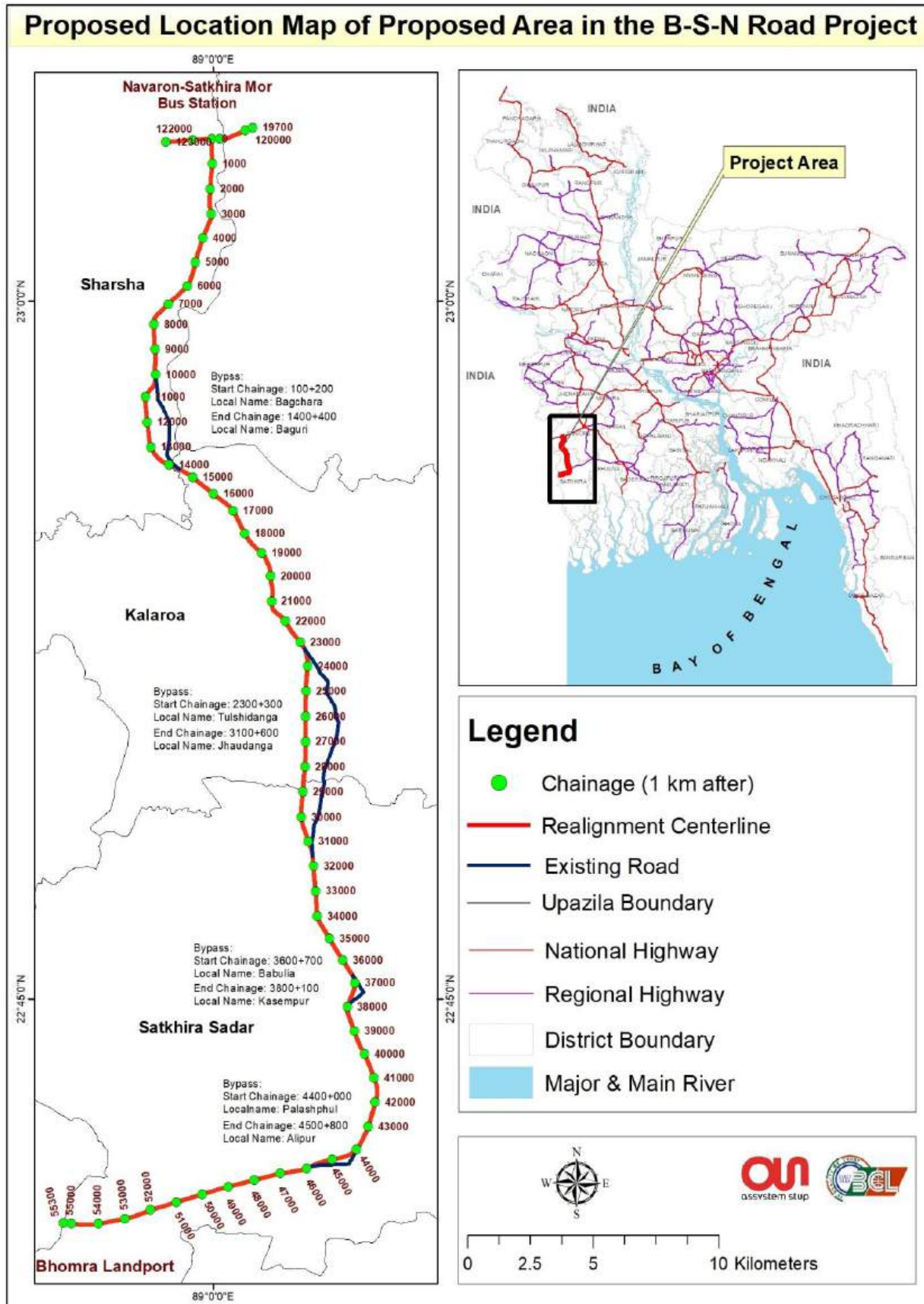
3.1 PROJECT LOCATION

24. The project road under Phase-3 (Bhomra – Satkhira – Navaron Road) is an important western link that connects the Bonpara – Jhenaidah Road on the Northern Side and the Bhanga Benapole road section on the Eastern Side. The WGS 84 Datum Co-ordinates give the Geo-graphical disposition of the Start and End of the Project Road for the starting point are 22°40'09.98" N and 88°56'48.16" E and the end point coordinates are 23°03'29.28" and 88°59'57.83" E. The Project roads under Phase -3, WeCare program is presented in **Table 3-1**.

Table 3-1: Project roads under the Phase -3			
Section No	Description	Existing Length (Km)	Designed Length (Km)
Bhomra – Satkhira – Navaron Road Section			
1	Bhanga-Benapol road Junction improvement at Navron	3.550	3.300
2	Bhomra – Satkhira – Navaron Road Section	55.930	55.245
	Total	59.930	58.545

25. The alignment of the proposed project road passes through Jashore district and Satkhira district. Jashore district. The total area of the district is 6,674 sq. km and is bounded by Jhenaidah districts on the north, Khulna and Satkhira districts on the south, Narail and Magura on the east, and West Bengal State of India on the west. Some prominent rivers in this district are Kopothakko, Bhairab, Chitra, Ichamoti, Harihor, Dadra, and Betraboti & Kodla. Satkhira District (Khulna division) is located in between 21°36' and 22°54' north latitudes and in between 88°54' and 89°20' east longitudes. (Map in Figure 3-1).

3. Description of the Project



3.2 PROJECT CATEGORY

26. The current project will be upgraded from the current 2-lane highway into a 4-lane national highway with separate service lanes for the slow-moving vehicles. According to the Bangladesh Environmental Conservation Rule, 2023 this project is deemed as “Red” or ‘A’ category, which requires the preparation of an Environmental Impact Assessment (EIA) and an approval of Site Clearance Certificate (SCC) Environmental Clearance

3. Description of the Project

Certificate (ECC) from the Department of Environment (DoE) under the Ministry of Environmental, Forest and Climate Change. (MoEFCC) for implementation.

27. The proposed project interventions include the extensive civil works and land acquisition due to widening 2-lane National Highway into 4-lane Highways with service roads on both sides including other facilities and hence their impacts will be more significant on the social environments than the ecological impacts.

28. The existing RoW is between 24 to 36 m. In 2015, the engineering design of the proposed RoW for the project was considered 34.6-39 m wide depending on the nature of areas, viz., rural, urban or markets setting. However, the present Technical Design Consultant of the RHD is now considering a total clear width of 45m in urban areas and 50m in rural areas for their proposed detailed design. Therefore, the project requires more land acquisition on both sides of the existing road than the proposed RoW, which was considered to prepare the previous design in 2016¹⁷.

29. The project alignment is outside of any legally protected area; that is, the road will not pass through any notified eco-sensitive zone boundary or through any critical protected area notified by the of Bangladesh or in accordance with the International agreement or Convention. Any impact on biodiversity due to the proposed widening and improvement may not be anticipated in terms of impact on wildlife movement characterized by vehicular accidents during the operation of the project. Most of the adverse impacts are co-terminus with the construction stage, limited within the proposed RoW, that will be mitigated through a comprehensive plantation program, good engineering, and housekeeping practices.

30. However, the ESIA and ESMP for the project road, based on the final design, are required to comply with the World Bank's ESS guidelines, ECR, and relevant environmental and land acquisition laws and regulations of Bangladesh.

3.3 EXISTING ROAD PROFILE

31. The project road has major junctions with National and Regional Highways. It is also connected with LGED roads and various small, semi-pucca roads from nearby unions and growth centers. The primary modes of vehicles plying over project roads are local and long-distance, inter-district buses, trucks, cars and motorcycles, locally made vans, three and four-wheeler moving vehicles, etc.

32. The project road under Phase-3 (Bhomra—Satkhira—Navaron Road) is an essential western link connecting the Bonpara—Jhenaidah Road on the northern side and the Bhanga Benapole Road section on the eastern side. Improving the Project Road will significantly enhance the economic development along the Western Corridor and be part of the crucial Western link.

33. Bhomra -Satkhira- Navaron, a national plus regional highway N715 and R765, is a 62 km long stretch that starts from Bhomra Land Port on the Western Border with West Bengal, India, at Ghodzaldanga and ends at Navaron township of Sharsa Upazila on Jashore – Benapole Highway N706. The Bhomra-Navaron and Jashore–Benapole Highways are located within the RHD western network corridors under the Khulna Zone and are important gateways connecting Bangladesh with West Bengal and Mainland India. The Benapole is Bangladesh's largest land port, executing approximately 80% of the import-export trade between Bangladesh and India. The Bhomra Port was established in 2013 to handle bulk imports from India, which is close to Kolkata and relieves Benapole from congestion.

34. The project involves the development of the Bhomra – Satkhira – Navaron Road section of Satkhira-Shakhipur-Kaliganj Road (Z-7602) into a 4-lane facility, which will facilitate passenger and goods movement from the hinterland to the land port at Bhomra at Indo-Bangladesh border. This will also provide an alternative to the existing land port at Benapole near Jashore, where four-lane road connectivity is underway, and this may result in further congestion in the already busy land port. Bhomra-Satkhira-Navaron road (R765, N715) starts at the India-Bangladesh Border near Bhomra Land Port and ends at the junction with the Jashore-Benapole Highway near the Navaron bus terminal. The Bhomra-Satkhira-Navaron road section passes through the Bhomra under Satkhira District and Navaron under Jashore District.

35. The district's total area is 3,858.33 sq. km. The Jessore district on the north bounds the district, the Bay of Bengal on the south, the Khulna district on the east, and the West Bengal State of India on the west. Some prominent rivers in the project impacted districts are Bhairab, Kalindi, Arpangachhia, Malanchha, Kobadak, Raimangal, Betna, Hariabhanga, and Ichamoti. Bhomra -Satkhira- Navaron, a national plus regional highway N715 and R765, is a 62 km long stretch that starts from Bhomra Land Port on the Western Border with West

¹⁷ Detailed Engineering Design Doulatdia-Magura-Jhenaidah-Jessore-Khulna Road (N7), Sub regional Transport Project Preparatory Facility (STPPF) Project RHD, 2015

3. Description of the Project

Bengal, India, at Ghozaldanga and ends at Navaron township of Sharsa Upazila on Jashore – Benapole Highway N706. The Bhomra-Navaron and Jashore–Benapole Highways are located within the RHD western network corridors under the Khulna Zone and are important gateways connecting Bangladesh with West Bengal and Mainland India.

36. Bhomra-Satkhira-Navaron Road section is a two-lane asphalt road with earthen shoulders on both sides. The carriageway width varies from 5.5 m to 7.3 m. The road geometry is generally good; however, a few sharp horizontal curves with inadequate sight distance are noticed at isolated locations where improvement is required. A few locations along this road were identified as accident-prone, as explained by the locals during the site visit.

37. The existing pavement conditions vary from good to poor. Pavement distress, such as alligator cracks, raveling, and rut failure, was noticed during the site visit. The initial 12 km road section (from Km 0.00 to Km 12.00) is very poor, and rehabilitation work is underway.

38. The road intervenes with rivers Betna and Ichamoti Rivers by 2- lane bridges. Historically, the Bhomra – Satkhira – Navaron Road and Navaron –Benapole Road under the WeCARE Phase-3 project in the south-western zone of Bangladesh is not a flood-prone area. The historical Highest Water Level (HHWL) is the design flood level (DFL). BWDB flood embankment has controlled river flood water within the polder area. Considering this, the formation level of the road at this reach has been recommended as only 1.00 m above the existing road level.

39. The road from Navaron to Satkhira Medical College spans 44.00 km and runs north to south. From Satkhira to Bhomra, the 11.00 km stretch runs east to west along the Bhomra – Satkhira – Navaron Road. A 2.90 km segment of the Navaron – Benapole Road major junction at the Navaron starting point is considered in Phase 3 of the WeCARE Program. This area is known to experience flooding during the wet season. Consequently, any road construction over the river would impede the natural surface water flow and cause drainage congestion. Therefore, an adequate number of drainage structures, such as culverts, must be implemented. The drainage structures have been identified from available information, and the catchment area of Bhomra – Satkhira – Navaron Road is shown in Figure 3-2

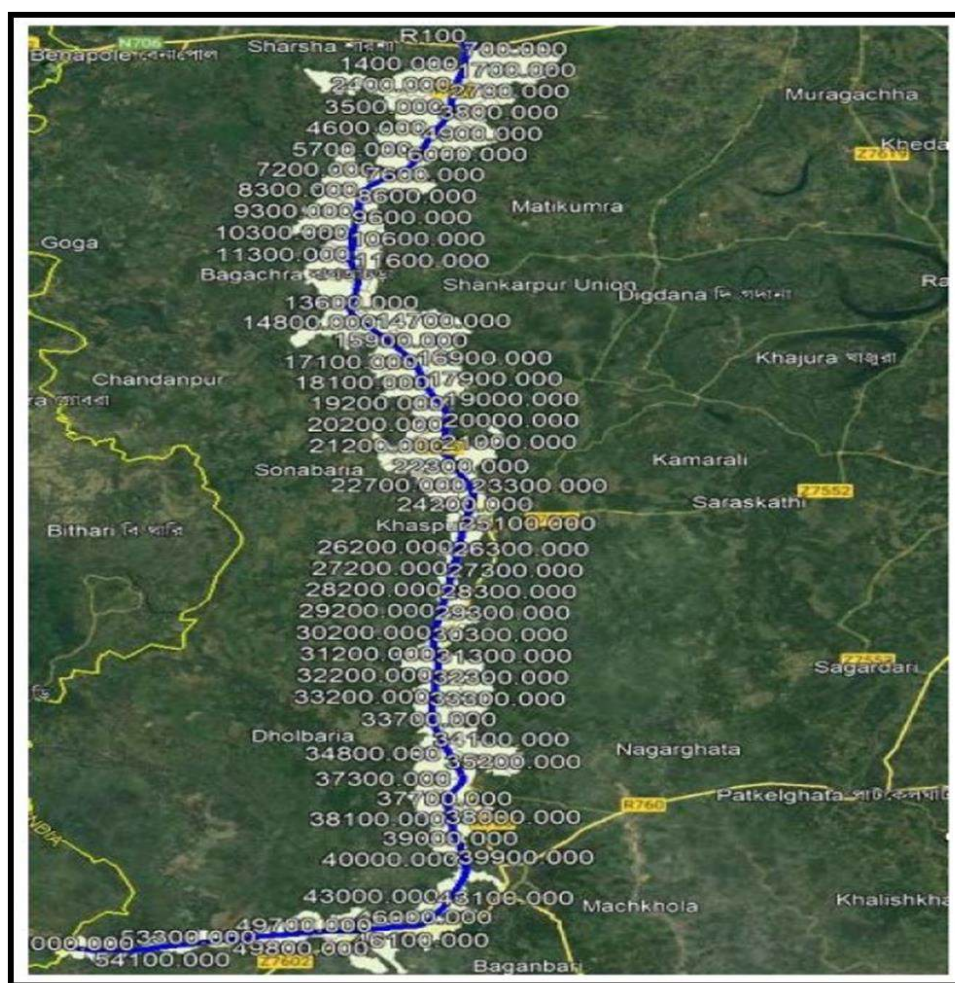


Figure 3-2: Chainage wise Bhomra – Satkhira – Navaron Road

3. Description of the Project

40. There is no natural stream or wetland / low-lying areas within the proposed RoW, so upgrading the 4-lane will not impact local or regional hydrology. There are 53 culverts with inadequate openings and insufficient drainage systems, and during the disruption of local drainage during the monsoon season, flooding occurs in agricultural lands, and waterlogging occurs in some places in urban areas.

41. No natural wetlands, forests, sensitive areas, or archaeological sites were noticed. The project is in the Betna River catchment and interspersed with numerous interconnected canals and rivulets, often connected with low-lying areas and waterbodies. The project road crosses 3 canals and 1 tributary of the Betna River. According to the survey contract wise major and minor intersections has been designed where 6 major and 33 minor intersections for Lot 1; 6 major and 27 minor intersections for Lot 2, and 8 major and 31 minor intersections fall in Lot 3. Last six major and 36 minor intersections in Lot 4 (Table 3-2).

Table 3-2: Typical Cross Section Schedule Under Phase 3

LOT	Chainage		Length	Tcs Type
	From	To		
Lot 1 - Bhanga to Benapole				
1 (Lot-1 Bhanga to)	119+700	119+975	275	Maching With Existing
2 (Lot-1 Bhanga to)	119+975	120+270	295	TCS 12-E
3 (Lot-1 Bhanga to)	000+205	000+510	305	TCS 12-H
4 (Lot-1 Bhanga to)	000+510	000+534	24	TCS 12-G
5 (Lot-1 Bhanga to)	000+534	000+840	306	TCS 12-H
6 (Lot-1 Bhanga to)	120+270	120+628	358	TCS 12-A
7 (Lot-1 Bhanga to)	120+628	120+765	137	TCS 12
8 (Lot-1 Bhanga to)	120+765	120+923	158	TCS 12-C
9 (Lot-1 Bhanga to)	120+923	120+990	67	TCS 12-B
10 (Lot-1 Bhanga to)	120+990	121+170	180	TCS 12-C
11 (Lot-1 Bhanga to)	121+170	121+700	530	TCS 12-F
12 (Lot-1 Bhanga to)	121+700	122+324	624	TCS 12
13 (Lot-1 Bhanga to)	122+324	122+530	206	TCS 12-A
14 (Lot-1 Bhanga to)	122+530	122+700	170	TCS 12-D
15 (Lot-1 Bhanga to)	122+700	123+000	300	Matching With Existing
			7875	
1 (Lot-1 Navara to Satkhira to Bhomra)	0+000	-0+250	250	TCS 9-D
2 (Lot-1 Navara to Satkhira to Bhomra)	0+000	0+095	95	TCS 9-C
3 (Lot-1 Navara to Satkhira to Bhomra)	-0+100	0+095	195	TCS 10-A
4 (Lot-1 Navara to Satkhira to Bhomra)	0+100	0+330	230	TCS 10
5 (Lot-1 Navara to Satkhira to Bhomra)	0+095	0+600	505	TCS 9
6 (Lot-1 Navara to Satkhira to Bhomra)	0+600	0+699	99	TCS 9-A
7 (Lot-1 Navara to Satkhira to Bhomra)	0+699	0+965	266	TCS 9-B
8 (Lot-1 Navara to Satkhira to Bhomra)	0+965	1+050	85	TCS 1
9 (Lot-1 Navara to Satkhira to Bhomra)	1+050	2+550	1500	TCS 2
10 (Lot-1 Navara to Satkhira to Bhomra)	2+550	3+060	510	TCS 1
11 (Lot-1 Navara to Satkhira to Bhomra)	3+060	3+382	322	TCS 6
12 (Lot-1 Navara to Satkhira to Bhomra)	3+382	3+397	15	TCS 5
13 (Lot-1 Navara to Satkhira to Bhomra)	3+397	3+720	323	TCS 6
14 (Lot-1 Navara to Satkhira to Bhomra)	3+720	4+050	330	TCS 1
15 (Lot-1 Navara to Satkhira to Bhomra)	4+050	7+100	3050	TCS 2
16 (Lot-1 Navara to Satkhira to Bhomra)	7+100	7+200	100	TCS 1
(Lot-2)	07+200	07+455	255	TCS 1
2 (Lot-2)	07+455	07+753	298	TCS 6
3 (Lot-2)	07+753	07+773	20	TCS 5
4 (Lot-2)	07+773	08+075	302	TCS 6
5 (Lot-2)	08+075	08+400	325	TCS 1
6 (Lot-2)	08+400	09+915	1515	TCS 2
7 (Lot-2)	09+915	10+268	353	TCS 4
8 (Lot-2)	10+268	10+331	63	TCS 3
9 (Lot-2)	10+331	10+690	359	TCS 4
10 (Lot-2)	10+690	13+775	3085	TCS 2
11 (Lot-2)	13+775	14+107	332	TCS 4
12 (Lot-2)	14+107	14+211	104	TCS 3

3. Description of the Project

Table 3-2: Typical Cross Section Schedule Under Phase 3

LOT	Chainage		Length	Tcs Type
	From	To		
13 (Lot-2)	14+211	14+575	364	TCS 4
14 (Lot-2)	14+575	18+650	4075	TCS 2
15 (Lot-2)	18+650	18+925	275	TCS 1
16 (Lot-2)	18+925	19+237	312	TCS 6
17 (Lot-2)	19+237	19+252	15	TCS 5
18 (Lot-2)	19+252	19+570	318	TCS 6
19 (Lot-2)	19+570	19+950	380	TCS 1
20 (Lot-2)	19+950	21+250	1300	TCS 2
21 (Lot-2)	21+250	21+380	130	TCS 1
22 (Lot-2)	21+380	21+732	352	TCS 8A
23 (Lot-2)	21+732	21+807	75	TCS 7
24 (Lot-2)	21+807	22+170	363	TCS 8A
25 (Lot-2)	22+170	22+350	180	TCS 1
26 (Lot-2)	22+350	23+000	650	TCS 2
(Lot-3)	023+000	023+180	180	TCS 2
2 (Lot-3)	023+180	023+548	368	TCS 4
3 (Lot-3)	023+548	023+611	63	TCS 3
4 (Lot-3)	023+611	023+990	379	TCS 4
5 (Lot-3)	023+990	027+885	3895	TCS 2
6 (Lot-3)	027+885	028+162	277	TCS 6A
7 (Lot-3)	028+162	028+177	15	TCS 5A
8 (Lot-3)	028+177	028+470	293	TCS 6A
9 (Lot-3)	028+470	030+860	2390	TCS 2
10 (Lot-3)	030+860	031+208	348	TCS 4
11 (Lot-3)	031+208	031+271	63	TCS 3
12 (Lot-3)	031+271	031+645	374	TCS 4
13 (Lot-3)	031+645	033+400	1755	TCS 2
14 (Lot-3)	033+400	033+575	175	TCS 1
15 (Lot-3)	033+575	033+867	292	TCS 6
16 (Lot-3)	033+867	033+882	15	TCS 5
17 (Lot-3)	033+882	034+155	273	TCS 6
18 (Lot-3)	034+155	034+300	145	TCS 1
19 (Lot-3)	034+300	036+615	2315	TCS 2
20 (Lot-3)	036+615	036+968	353	TCS 4
21 (Lot-3)	036+968	037+031	63	TCS 3
22 (Lot-3)	037+031	037+100	69	TCS 4
23 (Lot-3)	037+100	037+350	250	TCS 8C
24 (Lot-3)	037+350	037+425	75	TCS 8
25 (Lot-3)	037+425	037+466	41	VIADUCT
26 (Lot-3)	037+466	037+570	104	TCS 8
27 (Lot-3)	037+570	037+615	45	TCS 7A
28 (Lot-3)	037+615	037+920	305	TCS 8
29 (Lot-3)	037+920	039+400	1480	TCS 2
(Lot-4)	39+400	40+620	1220	TCS 2
2 (Lot-4)	40+620	40+892	272	TCS 6A
3 (Lot-4)	40+892	40+908	16	TCS 5A
4 (Lot-4)	40+908	41+205	297	TCS 6A
5 (Lot-4)	41+205	43+820	2615	TCS 2
6 (Lot-4)	43+820	44+193	373	TCS 4
7 (Lot-4)	44+193	44+256	63	TCS 3
8 (Lot-4)	44+256	44+320	64	TCS 4
9 (Lot-4)	44+320	44+540	220	TCS 8C
10 (Lot-4)	44+540	44+781	241	TCS 8
11 (Lot-4)	44+781	44+843	62	TCS 7A
12 (Lot-4)	44+843	45+080	237	TCS 8
13 (Lot-4)	45+080	45+845	765	TCS 2

3. Description of the Project

Table 3-2: Typical Cross Section Schedule Under Phase 3

LOT	Chainage		Length	Tcs Type
	From	To		
14 (Lot-4)	45+845	46+129	284	TCS 6A
15 (Lot-4)	46+129	46+144	15	TCS 5A
16 (Lot-4)	46+144	46+430	286	TCS 6A
17 (Lot-4)	46+430	46+700	270	TCS 2
18 (Lot-4)	46+700	47+600	900	TCS 1
19 (Lot-4)	47+600	49+000	1400	TCS 2
20 (Lot-4)	49+000	49+355	355	TCS 1
21 (Lot-4)	49+355	49+642	287	TCS 6
22 (Lot-4)	49+642	49+657	15	TCS 5
23 (Lot-4)	49+657	49+955	298	TCS 6
24 (Lot-4)	49+955	50+750	795	TCS 1
25 (Lot-4)	50+750	50+980	230	TCS 2
26 (Lot-4)	50+980	51+336	356	TCS 8B
27 (Lot-4)	51+336	51+398	62	TCS 7A
28 (Lot-4)	51+398	51+750	352	TCS 8B
29 (Lot-4)	51+750	53+400	1650	TCS 2
30 (Lot-4)	53+400	55+245	1845	TCS 11
31 (Lot-4)	00+000	01+377	1377	TCS 11A (LHS Service road (Bhomra))
32 (Lot-4)	00+000	01+114	1114	TCS 11A (RHS Service road (Bhomra))

Source: Final Detail Design Report of Roads & Bridges (Main Report) Phase 3 Study

3. Description of the Project

3.4 PROPOSED UPGRADING AND IMPROVEMENT OF THE PROJECT ROAD

42. The project road improvement will mostly follow special codal provisions relevant to highways prescribed by the design code standards of Geometric Design Standard and Manual 2005 of RHD and Geometric Design of Highway and Streets of American Association of State Highway and Transportation Officials (AASHTO), 2001, Asian Highway Classification Design standards of United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), Overseas Road Note 6 “A Guide to Geometric Design” published by TRRL 1988. The improvement/upgrading of the Bhomra – Navaron Road Project road involves the following civil works:

- ▶ Widening of Bhomra-Navaron 2-lane national highway (N7) to 4-lane national highway configuration;
- ▶ Construction of Service lanes instead of SMVT route on both sides;
- ▶ Improved realignments in congested areas;
- ▶ Raising embankment height and widening of Cross drainage (CD) structures and provision of roadside drains in water-logged sections in urban areas;
- ▶ Construction of widened bridges and culverts, including a few new cross-drainage structures;
- ▶ Construction of VOPs, POPs, ROB, and Flyover at big and congested bazaar areas and grade U-turns;
- ▶ Improvement of the bus stop/bus shelter, FOBs, pedestrian crossings, rumble strips, wildlife crossings signage, footpath cum storm water drains, and road intersections improvements;
- ▶ Mandatory compensatory plantations and additional plantations alongside the proposed improved road
- ▶ Improved road furniture with safety provisions.

43. The full project length has been divided into four (4) packages; details are given in **Table 3-3**.

Lot	LAP	Chainage (Km+M to Km+M)	Length (Km)	Upazila	District	Remarks
Lot-1	LAP-1	(a) 119 Km +700 M to 120 Km +850 M	1.15	Jhikorgachha	Jashore	
		(b) 120 Km +850 M to 123 Km +330 M	2.48	Sharsha		
	Entire LAP-1	(a+b)	3.63			LAP-1 is under Jhikargachha and Sharsha Upazilas
	LAP-2	(c) 0+000 M to 7 Km +200 M	7.2	Sharsha		
Entire Lot-1	LAP-1 & Part of LAP-2	(a+b) +c	10.83	Jhikorgachha & Sharsha		Entire Lot-1 is under Jhikargachha and Sharsha Upazilas
Lot-2	LAP-2	(d) 7 Km +201 Km to 9 Km +900 Km	2.7	Sharsha	Jashore	
	Entire LAP-2	c+d	9.9	Jhikorgachha & Sharsha	Jashore	Entire LAP-2 belongs to Lots-1 & 2 under Sharsha Upazila
	LAP-3 (Bypass) can be under Lot-2	(e) 9 Km +901 Km to 14 Km +230 M	4.00	Sharsha	Jashore & Satkhira	Bypass highway length 4.00 Km.
	LAP-4	(f) 14 Km +231 M to 23 Km +000 M	8.77	Kalaroa		
Entire Lot-2	LAP-2, LAP-3 & LAP-4	d + e + f	15.470	Sharsha & Kalaroa	Jashore & Satkhira	Lot-2 is 15.470 Km including bypass but excluding the existing part at Bagachra.

3. Description of the Project

Table 3-3: LAP and Lot-wise Length, Upazila, and district distribution of the proposed Bhomra-Satkhira-Navaron Road section						
Lot	LAP	Chainage (Km+M to Km+M)	Length (Km)	Upazila	District	Remarks
Lot-3	LAP-5	(g) 23 Km+001 M to 31 Km+240 M	8.24	Kalaroa	Satkhira	Entire Lot-3 covers LAP-5 and LAP-6 under Kalaroa Upazila of Satkhira district.
	LAP-6	(h) 31 Km+241M to 39 Km+400 M	8.16			
Entire Lot-3	LAP-5 & LAP-6	g + h	16.4			
Lot-4	LAP-7	(i) 39+401 Km to 52 Km+500 M	13.1	Satkhira Sadar	Satkhira	
		(j) Two (2) Service Road length = 3.4 Km	3.4			
	LAP-7	i + j	16.5			
	LAP-8	(k) 52 Km+501 M to 55 Km +245 M	2.744			Bhomra Land Port Area
Lot-4 (4 Lane road)	LAP-7 & LAP-8	(i+j) + k	15.844			
Lot-4 (Service road)		l	2.491			Bhomra port area service road
Grand Total	(a +b+c+d+e+f+g+h+i+j+k+l)		61.036			Including 2.491 Bhomra port area service road

44. The proposed RoW width of the project road in urban and rural areas varies according to the total available land, and the proposed RoW perimeter has been designed to provide a minimum of 5 meters' space between the outer extent of the construction works and boundary line of RoW for utility corridor. This margin will allow full access to all parts of the highway for maintenance and emergency vehicle parking/breakdown and equipment placement. No provision for borrow-pits has been considered within the RoW adopted. During road alignment design, land acquisition requirements have been kept to the minimum inconsistent with design standards.

3.4.1 ROAD DESIGN

45. The road design speed is reduced where restrictive site conditions (intersections, bridge approaches, curves, built-up sections, educational and other sensitive receptors, forest and potential wildlife crossing sections, etc.) and adequate land width are unavailable. In built-up sections, it is generally restricted to 20 km/h. Gradual changes will be introduced by providing successive sections of increasing/decreasing design speeds so that road users become progressively conditioned to such changes. Road safety, Speed limit, and Warning signs have been proposed at intersections, bazar, and commercial areas. The adopted geometric design criteria for the project road are shown in **Table 3-3**.

Table 3-3: Proposed Road Engineering Design			
Sl.No.	Description		Value
1.	Speed Control	Design Speed (Km/h)	80
2.	Sight Distance	Stopping Sight Distance (SSD) in meter	120
		Overtaking /Passing	500
		Intermediate	250
3.	Horizontal Controls	Minimum Curve Radius (m)	500
		Maximum Super Elevation	5%
		Minimum Transition Curve (m)	70
4.	Vertical Controls	Maximum Gradients	3%

3. Description of the Project

Table 3-3: Proposed Road Engineering Design			
Sl.No.	Description		Value
		Minimum K value	70
		Vertical Clearance for roadway (m)	5.7
		Vertical Clearance for Railway(m)	8.5
5.	Cross Section Elements for main carriageway (each side)	Carriage width for dual carriageway(m)	7.3
		Traffic lane width (m)	3.65
		Normal cross fall	3%
		Emergency Breakdown Lane (m)	2.5
		Inner marginal shoulder (m)	0.3/0.6
		Raised central median width (m)	1.2/5.8
6.	Cross-Section Elements for Service Road (each side)	Service Road (m) (Rural)	5.5
		Service Road (m) (Urban)	7.3
		Carriageway cross fall	3%
		Verge width (m)	1.5
		Verge Slope	5%
		Vertical clearance for underpass (m)	4.5
		Embankment slope	2H:1V

Source: Feasibility Study Design, 2022

46. **Service Lanes:** The existing traffic on the project road consists of different types of vehicles, such as heavy vehicles and light vehicles with fast-moving and slow-moving vehicles (SMV), as well as local and long-distance vehicles. Two separate Service lanes are designed on both sides of the main road for the SMV and local traffic to achieve the optimum speed of the fast-moving vehicles and maximize the capacity and safety of the main carriageway as well as to avoid traffic congestion and accidents. The service lanes are proposed to have a width of 5.5m for urban/market areas and rural areas.

47. **Type of Structures:** Different types of structures proposed under four Lots are presented in **Table 3-4**.

Table 3-4: Number of proposed Structures under LOT-I		
Sl. No	Type of Structures	Lot-I
Project Stretch Length		Km- 0.00 to km- 7.20
1.	(ROP cum Flyover)	1
2.	(Main directional Ramp)	1
3.	(Ramp 1)	1
4.	(Ramp 2)	1
5.	(Bhanga-Benapol Flyover)	1
6.	(SR Bridgr 1)	1
7.	(SR Bridgr 2)	1
8.	(U-Loop)	1
9.	LVOP	1
10.	FOBs	3

48. The number of proposed structures in the lot other than lot L is given in **Table 3-5**.

Table 3-5: Number of proposed Structures in LOT- (II, III, IV)				
Sl. No	Type of Structures	Lot-II	Lot-III	Lot-IV
	Project Stretch Length	Km- 7.20 to km- 23.0	Km- 23.0 to km- 39.40	Km- 39.40 to km- 55.245
1.	Bridges Over River	1	1	2
2.	Flyovers (Bhanga-Benapol)	0	0	0
3.	Vehicular Overpasses (VOPs)	2	3	1
4.	Light Vehicular Overpasses (LVOPs)	2	2	3

49. Typical Road Cross Sections for Urban and Rural Areas, over bridges, LVOPs TCS for VOP/LVOP, and Navaron intersection are shown in **Figure 3-3** through **Figure 3-7**.

3. Description of the Project

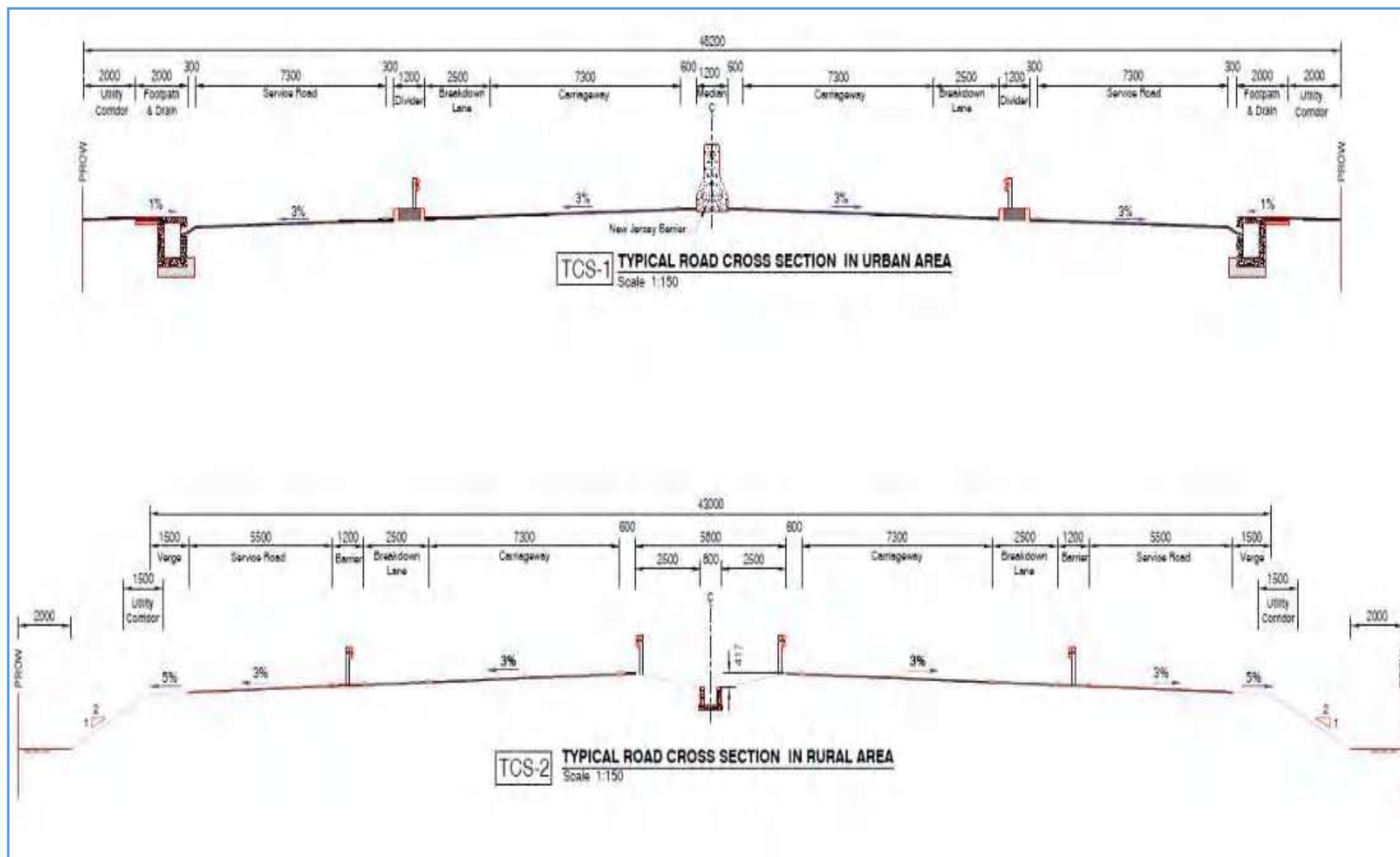


Figure 3-3: Typical Road Cross Sections at Urban and Rural Areas of the Project Road

3. Description of the Project

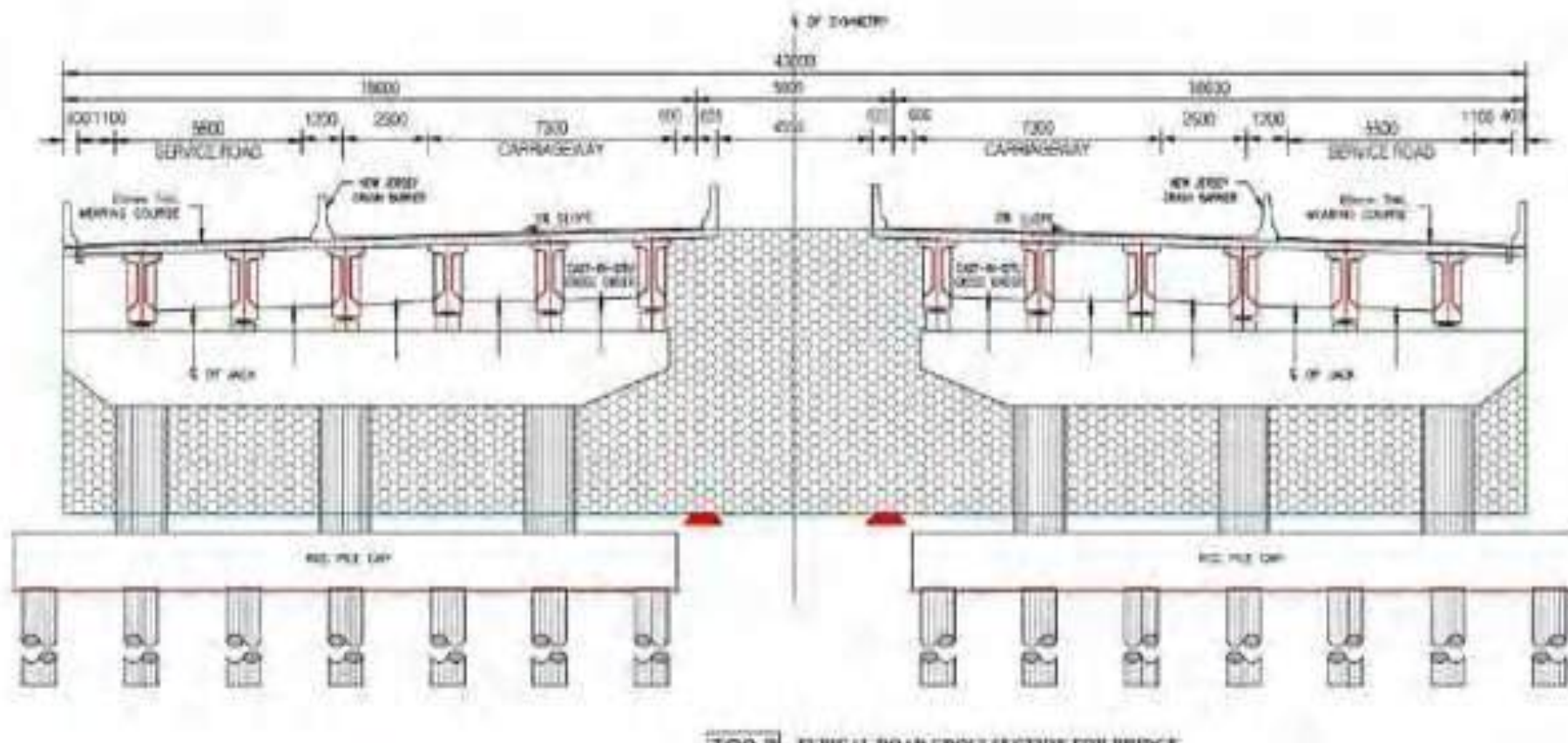


Figure 3-4: Typical Road Cross Section for Over bridges

3. Description of the Project



Figure 3-5: Typical Junction Below LVOPs

3. Description of the Project

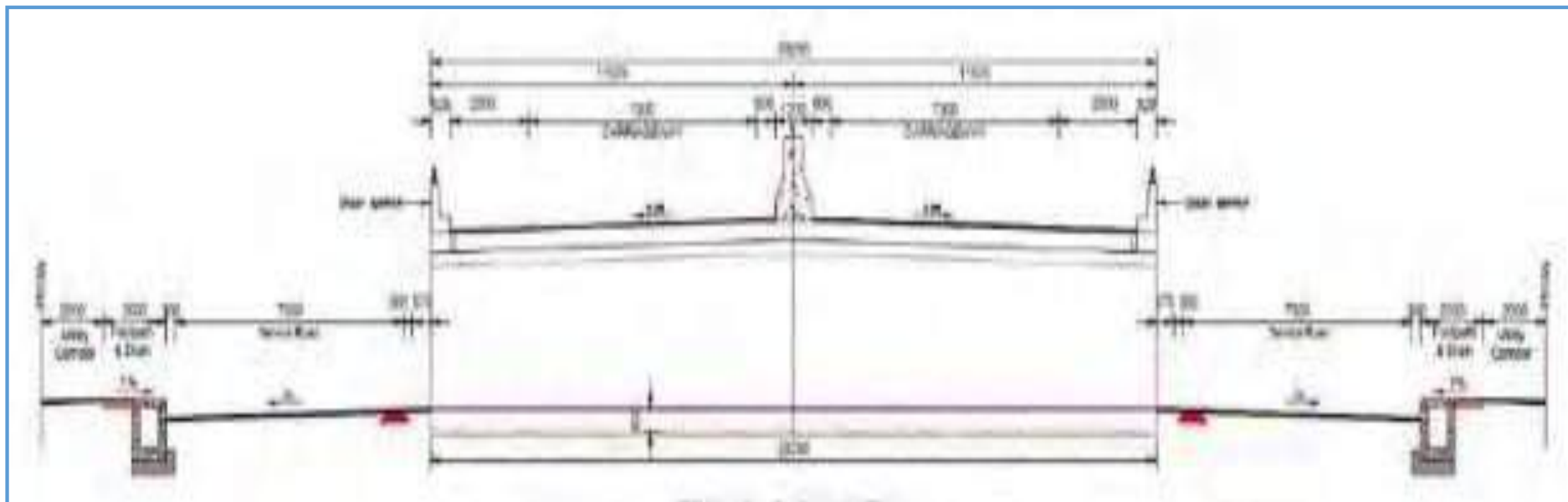


Figure 3-6: TCS for VOP/LVOP

3. Description of the Project

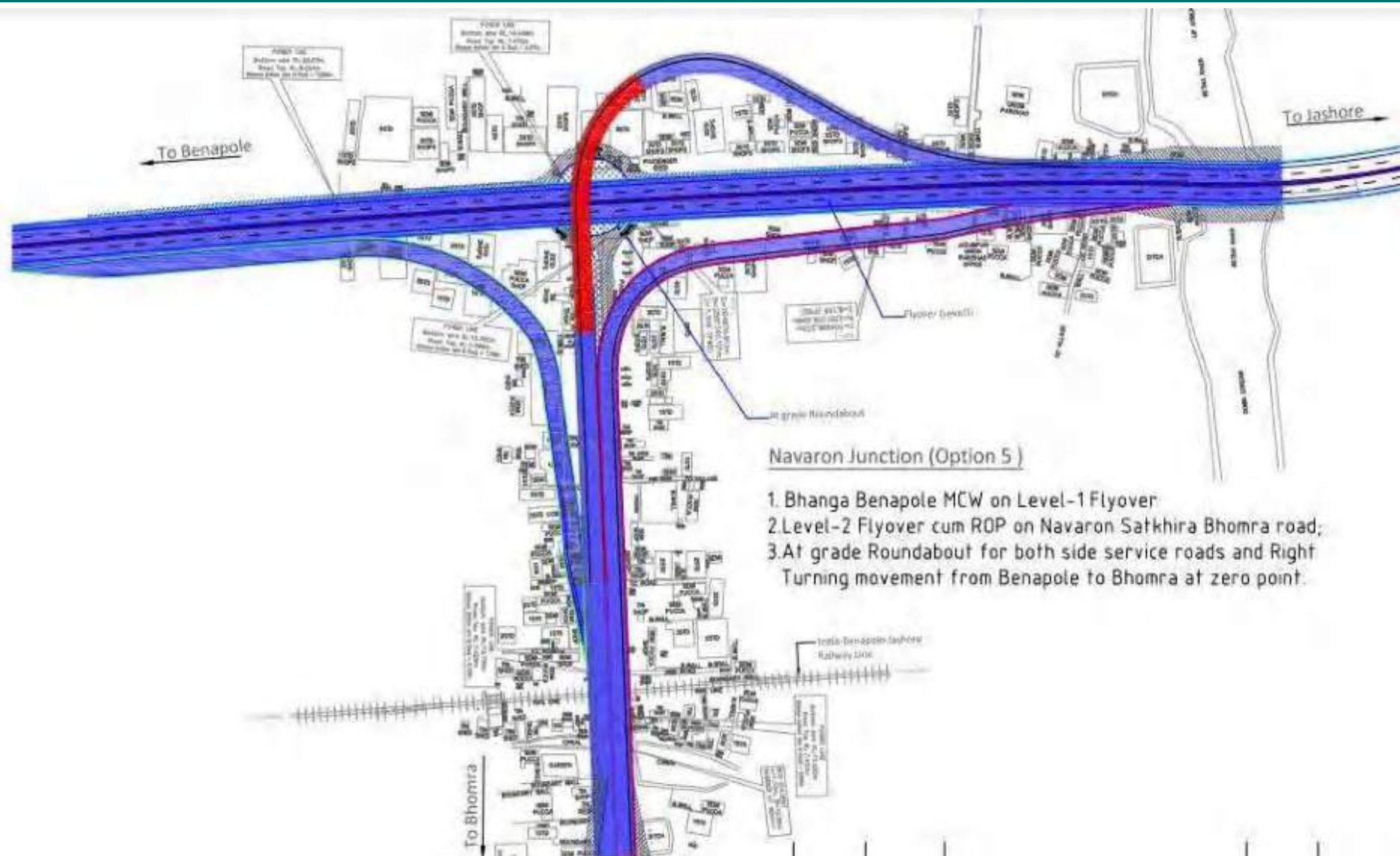


Figure 3-7: Schematic layout for Navaron intersection

3. Description of the Project

3.4.2 DRAINAGE STRUCTURE

50. Roadside drainage facilities are also required at several locations where the road passes through markets and local markets (bazaars). The total details of the proposed covered drains under all Lots is shown in Table 3-6. Provision of roadside drains to avoid water logging in built-up sections proposed with suitable outfalls, as given Table 3-6.

Table 3-6: Proposed Drainage Culvert under the Lots		
Lot Nos.	Project Stretch Length	No
Lot 1 (Bhanga-Benapole Section))	Km 3+300	5
Lot 1	Km- 0.00 to Km-7.20	15
Lot 2	Km- 7.20 to Km-23.0	27
Lot 3	Km-23.0 to Km-39.40	33
Lot 4	Km-39.4 to Km-55.245	35
Lot 4 (Bhomra Port Service road)	-	4
Total		119

Source: Detailed design report, 2024

51. The detail length of drainage are given below table.

Table 3-7: Lot Wise Drainage Detail		
LOT No	Drain Length (Km)	
	Urban Drain (Road side Drain)	Rural Drain (Median drain)
LOT-1	12.694	4.09
LOT-2	8.202	11.634
LOT-3	1.8	15.5
LOT-4	14.928	10.0631
Sub-total	37.624	41.2871
Total Drain length (Phase-3)		82.5742

3.4.3 BRIDGES

52. The existing bridges and culverts are mostly 2-lane structures in poor condition and inadequate to handle the local drainage flow across the road. They need to be rebuilt, including the construction of a few new cross-drainage structures. To control the drainage congestion of the catchment areas, five (5) bridges and 119 culverts are proposed with widened openings.

53. The Bangladesh Inland Water Transport Authority's (BIWTA) inland navigable class river standards were adopted during the design of the horizontal and vertical clearances of the bridges. To minimize the obstruction to the waterways and keep the embankment height within permissible soil capacity are proposed at approaches of all Bridge locations. The existing bridge over the Bhairab River to be retained as it is still under the Defect Liability Period (DLP). A list of proposed bridge lengths, channel width with the recommended regime, and calculated Soffit levels are presented in Table 3-6 though Table 3-8.

Table 3-8: Proposed Length of Bridges						
Sl. No.	Chainage (km)	Name of River/Channel	Existing Length of Bridge (m)	Existing No of spans and Span Arrangement (m)	Proposed length (m)	Remarks
1	21+450	Small Khal	11.00	1x11=11.00	20.00	Existing bridges are structurally ok. Which would be required to be replaced as per new planning for 6-lanes road.
2	37+230	Lapsha khal kuli canal	23.90	1x25.1=25.10	33.00	
3	44+550	Bakal canal	49.70	10.3+28+11.4=49.70	70.00	
4(new)	52+600	Gangnia canal	25.00	1X25 =25.00	33.00	
4 (old)	52+600	Gangnia canal	21.20	2X10.6=21.20	-	Proposed for dismantling

Source: Feasibility Study 2024

3. Description of the Project

Table-3-9: Calculated Soffit Levels of Bridges								
Sl. No.	Chainage	Name of bridge/ river	Navigation class	Vertical clearance (VC) over SHWL (m)	Interpolated WL 20-years flood (mPWD)	SHWL from BIWTA hyetograph (mPWD)	Existing bridge top level (mPWD)	Recommended soffit level (SHWL + VC) (mPWD)
1	21+450	Length =11m	-	3	5.45	5	6.11	8
2	37+230	Length=25m	-	3	4.83	4.5	6.46	7.5
3	44+550	Length =50m	-	3	4.83	4.5	6.52	7.5
4	52+600	Length=25m	-	3	4.83	4.5	3.7	7.5

Source: Feasibility Study, WeCare program 2022

54. Bridge construction will require the placement of bored piles, using drilling mud followed by the pile casings being filled with concrete. All other elements of the Bridge, namely the pile caps and piers will be fixed in place on top of the pile cap. The Bridge deck, consisting of precast concrete lengths as well as steel girders will be set in place from the Bridge as it is built and super structurers. The construction works from the water body also require using special cranes on barges.

55. For designing the large Bridge, BIWTA's inland navigable class river standards were adopted according to the BIWTA's river classification standard for horizontal and vertical clearances. Minimizing obstruction to the waterways and keeping the embankment height within permissible soil capacity are proposed at approaches of major Bridge locations. All bridges are <100m span and do not require an environmental impact assessment.

56. The typical cross sections for bridge and bridge approaches are presented in Figure 3-8. In the Project Road Section in Phase 3, there are five bridges, as indicated below:

- Bridge over Betna River (on the Bhanga-Benapole section of the Road)
- Local Canal Bridge over Braja Baksa Khal
- Lapsha Khal Bridge over Pran Sayer Khal
- Bridge over Bakal Khal
- Bridge over Gangnia Khal

3. Description of the Project

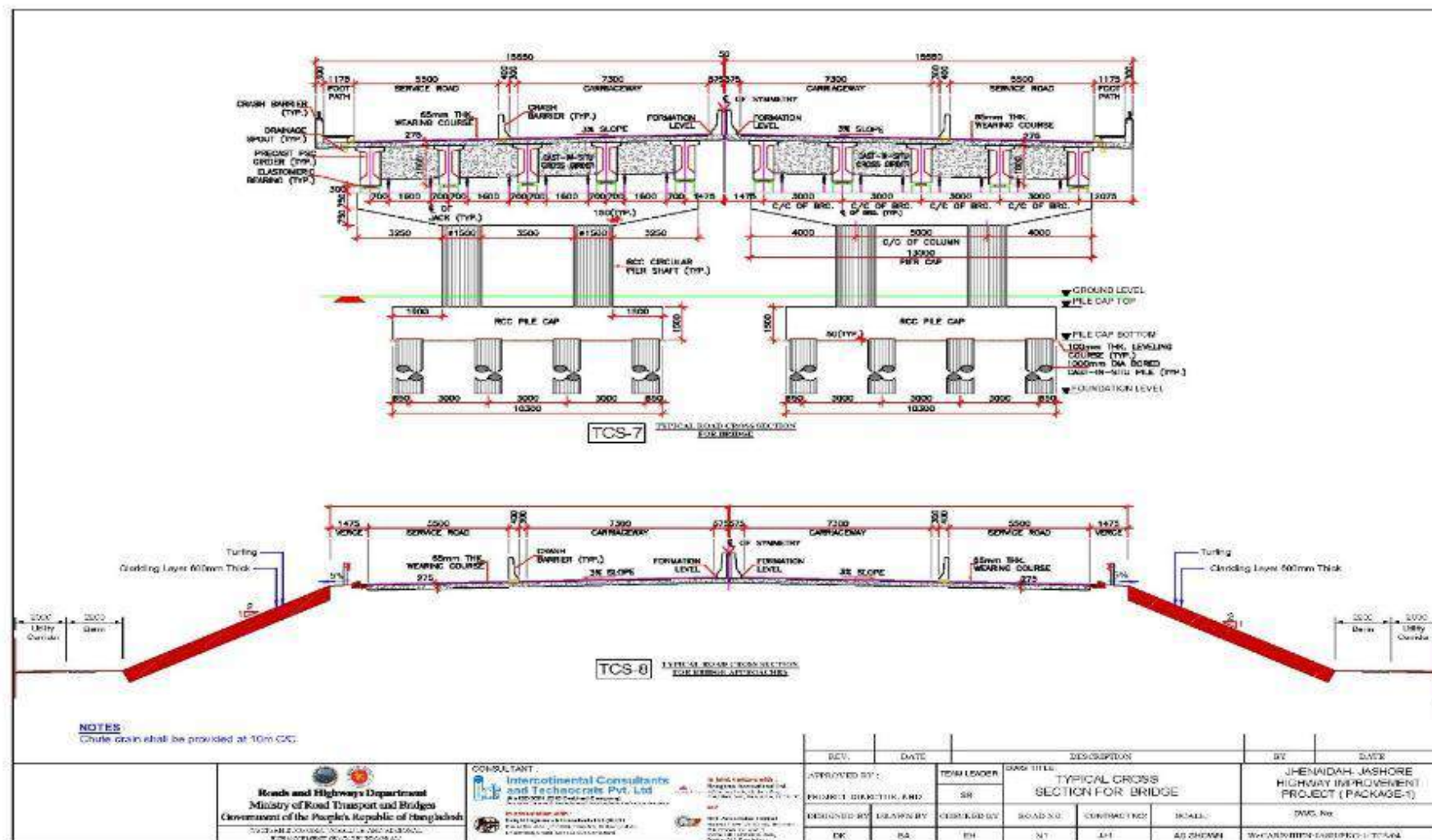


Figure 3-8: Typical Cross sections of Proposed Bridge and Approaches

3. Description of the Project

3.4.4 PAVEMENT DESIGN

57. The road portions will be strengthened by adopting the following procedure:

- ▶ Bituminous layers will be removed from the site.
- ▶ The exposed granular layer top portion will be removed, and the surface will be prepared by leveling and compacting.
- ▶ Base course Type-1 new materials will be used on the prepared surface according to engineering drawing and specification.
- ▶ Bituminous base course and wearing course to be placed on base course Type-1 according to drawing and specification.

3.5 ROAD SAFETY

58. The general road safety issues for the project are largely dependent on the mode of motorized traffic movement, Non-Motorized Vehicles (NMVs) and pedestrian. The road safety design issues mainly lie with features of road infrastructure are Horizontal and vertical alignment of road, Cross section of roads and bridges, Lane configuration and provision for NMVs, Crash barrier, Pedestrian facility along and across the carriageway, Intersection, Pavement, etc. The important road safety elements are considered in the engineering design as follows

- ▶ Roadside Safety barriers,
- ▶ Intersection, Delineation and lighting,
- ▶ Median barriers,
- ▶ Pedestrian crossings and fences,
- ▶ Central hatching, Paved shoulders,
- ▶ Formation width,
- ▶ Medians / Dividers,
- ▶ Cross-section at bridges & culvert approaches,
- ▶ At Grade Rail Crossings,
- ▶ Pavement Width and Surfaces,
- ▶ Edge drop of Paved Shoulder,
- ▶ Junctions, Pedestrian under / Overpass,
- ▶ Footpath
- ▶ Traffic Calming Measures,
- ▶ Road Signs, Pavement Markings, etc.

59. The recommended designs of the identified safety issues are documented in detail in the Road Safety Audit of Phase -1, Study Road, 2022, prepared by the Technical Design Team and adopted in the design.

3.5.1 TRAFFIC SIGN AND ROAD MARKINGS

60. For night traffic, the proposed reflectors at railings are very necessary. There is a need use them also at the ends of islands, in front of raised zebra crossings and humps and along the median and edge marking (especially in curves and at junctions – island ends are commonly broken, today). In nighttime, the reflectors would indicate changes in traffic environment (e.g., junction/bazaar), and thus, improve safety. Reflectors also make a moving pedestrian visible in darkness as a kind of a shadow, when he/she moves in front of the reflection of light beam. The proposed traffic signs and features for the safety of road users are as follows;

- ▶ Road markings (edge and centerlines and between lanes)
- ▶ Adequate safety and cautionary sign and signal
- ▶ Well-marked zebra crossings (painted stripes)
- ▶ Marking any hump on the road in the driving direction
- ▶ Refuges at pedestrian crossing
- ▶ Well-maintained junction areas, with enough but not too much space
- ▶ Good guardrails at both the edges and the centerline, etc.

61. Traffic Signs Manual 2004 of Bangladesh Road Transport Authority (BRTA) will be followed in the Project, and 80 Km/h design speed is recommended in the RHD Standard for the national and regional highways.

3.5.2 PROTECTION WORKS

62. Grass turfing on the side slopes and the shoulder of the road embankment of the project will be done to prevent soil erosion. CC blocks and geotextile filter fabric shall protect bridge abutments/ approaches and culvert

3. Description of the Project

inlets per engineering specifications. The reinforced earth wall is also proposed at approaches bridges/ culvers, at Over Passes (OVP), and Rail Over Passes (ROB).

3.5.3 CONSTRUCTION MATERIALS, SOURCING AND UTILITIES REQUIREMENT

63. Quarries in Bangladesh are not sufficient to meet the requirement. Therefore, most of the aggregates will be imported from other countries. Only authorized vendors who have valid licenses to import the materials will be engaged to supply the construction materials, such as aggregates. The vendors and suppliers will obtain essential clearance such as income tax certificates, value-added tax (VAT), and customs clearance for importing the material. If boulders need to be crushed at the site, necessary clearance as ECR 97 is to be obtained before installation of the crushers. Besides, the construction supervision consultant (CSC) will closely monitor the vendors/suppliers' clearance validity and the E&S practices strategy, following the government's valid guidelines.

64. Construction materials such as earth/sand, cement, steel, aggregate, bitumen, and water are the main requirements for road construction. The construction materials will be procured/purchased from the approved suppliers by the Contractors of their arrangement subject to compliance with statutory/legal requirements of the Bid Documents and approval of the Construction Supervision Consultant (CSC) or Engineer and RHD-PIU.

3.5.3.1 STONE/AGGREGATE MATERIAL

65. A few stone quarries have been identified for the pavement and structure construction of the project corridor. Limited aggregates are available in Bangladesh, namely Madhyapara, Dinajpur, and other places. Generally, Pakur aggregates are used to construct wearing and binder courses. Madhya Para aggregates can be used in granular aggregate base, RCC works. Aggregates can also be brought from Meghalaya, and crushed stone is available in Jafalong. Stone aggregates from Pakur and Madhyapara sources are used presently in the SASEC Phase 2 project. It is also observed that stone from India is available at Bhomra Land Port at the end of the project road. Information was gathered for the source of the aggregates. Aggregate from Bhomra is collected, and test results are presented in **Table 3-10**. Stones from Nohhati (India) will be collected at Bhomra. It is also a good stone that can be used for both asphalt and concrete work.

Table 3-10: Test Results of the Aggregates

Description	TFV (kN)	ACV (%)	LAA (%)	Specific Gravity*	Water Absorption (%)
Pakur	316	11	12	2.87	1.2
Madya Para	218	18	23	2.83	0.5
Nohhati	230	11.84	15.4	2.95	1.97
Limit	>150	<30	<30		<2%

66. From the test results and based on basic properties of the aggregates, it can be concluded that good quality aggregates are available which can be brought from India (Pakura, Nohhati) and Madhayapara. The contractor may use aggregate from Bhomra Land Port, the project end point. These aggregates are suitable for road construction and concrete works.

3.5.3.2 MANUFACTURED MATERIALS

67. Inquiries were made at the site, along with desk studies to locate sources for cement, steel, and bitumen close to the project road. Cement and steel are available from the local market. Bitumen can be obtained from Eastern Refinery and abroad.

3.5.4 QUANTITIES OF CONSTRUCTION MATERIAL AND LEAD CHART

68. During the collection of borrowed materials, sand, coarse aggregate, and water, the representatives of the Desing Consultants identified quantities of material and lead Chart, i.e., haulage distance from the project road. The tentative quantity of borrowed material is mentioned in Table 3-10. A huge quantity of sand is available within a 10-15 km lead distance from the project road. Aggregate will be available from Bhomra Land Port. Water will be available from roadside ponds and wells. The Pavement and Material Investigation Report mentions details (quantity and lead distance), which are submitted separately.

3.5.4.1 EARTH OR EMBANKMENT FILLS:

69. The fill materials will be collected from nearby sand extraction sites or can be dredged from the nearby rivers or borrow pits. The present practice in Bangladesh is to construct roadway embankments using river sand rather than clayey agricultural soil. Sand can be easily compacted to a high degree of compaction but with a higher CBR value. The sand used as fill materials requires protection against erosion by cladding with a layer of cohesive soil.

3. Description of the Project

3.5.4.2 CONCRETE AGGREGATE:

70. There are some quarries in Bangladesh that are not sufficient to meet the requirement. Therefore, most of the aggregates will be imported from other countries. Only authorized vendors who are having valid license to import the materials will be engaged to supply the construction materials such as, aggregates

3.5.4.3 CEMENT AND STEEL REINFORCEMENT:

71. Bangladesh produces different classes of EN and ASTM standard cement and high strength deformed bar of 40, 60 and 75 grades. These materials are readily available in Bangladesh. There many steel rolling mills are established in Bangladesh, like KSRM, BSRM Bandar Steel Industries Ltd. High-tech Steel & Re-Rolling Mills etc.

3.5.4.4 BITUMEN:

72. Bitumen will be imported. Commonly used bitumen in the road construction industry in Bangladesh is 80-100 penetration grade bitumen.

3.5.4.5 WATER:

73. In general the sources of the non-potable water for the construction works and sanitation purpose will extract from shallow aquifer. During construction period two types of water consumption will needed as follows;

- i. Water use with construction materials such as concrete mixing and compaction, etc;
- ii. Water will be used for site offices, construction yards, and construction camps during project operation.

74. Non-potable water sources for the construction works will come mostly from shallow aquifers or surface water. Drinking water may be taken from the deep aquifer if the shallow aquifer is contaminated with excessive iron and arsenic. In addition, the contractor will provide safe drinking water by supplying bottled drinking water at the construction sites and offices. An overhead tank and water reservoir will be constructed to supply water facilities within the site project office, contractors office and labor camps.

3.5.4.6 SEWERAGE AND WASTE:

75. Project site office, contractor's offices, construction yard and construction camps will have sanitary toilets with proper solid/liquid waste management facilities. Sufficient numbers of the toilets will be provided in all construction camps for the workers, offices and construction yard, at a formula of one toilet for every 10-12 persons.

3.5.4.7 ENERGY:

76. The project area is mostly urban and semi urban area and therefore electricity will be provided from the national grid.

3.6 LAND ACQUISITION AND RESETTLEMENT¹⁸

77. The Major built up Sections along the Project Road are Navaron, Ulasi Bazar, Jamtola Bazar, Bagachra, Kalaroa, Jhaudanga, Alipur Checkpost, Alipur Bazar and Bhomra. There are settlements along both sides of the Project Highway on these Project areas which will have a Social Resettlement Issue. There are three major settlement areas like the Baganchra, Kolaroa and Jhaudanga. Realignment is proposed for these settlement areas to avoid the adverse social impacts for the relocation of huge commercial and residential structures of the private owners due to widening the existing roads. According to the Land acquisition plan, implement the Bhomra-Satkhira-Navaron road section under Phase-3, about 907.2370 acres of land will be required. This includes 636.8314 acres of private land, 123.9948 acres from the RHD, and 146.4108 acres from other government agencies including 1.2721 acres of the CPRs land.

¹⁸ Census, Inventory of Loss (IOL) and Socio-economic Survey (SES) could not be completed under Contract -3 (approximately 2-3 km) due to non-finalization of LAP of Design Consultant in Jashore end.

3. Description of the Project

3.6.1 BAGACHRA TOWN AREA

78. Many commercial and residential structures, institutions, religious structures, small bazars etc. are built up in this township areas, here in most of the cultivable lands are, 1-2 crops land because of its low-lying nature. Mango, jackfruit and litchi are cultivated in some lands. These are seasonal fruit and usually ripen once in a year.

3.6.1.1 BAGACHRA EXISTING ROAD

79. According to the field survey, from km 9+500 to km 14+500, there are a lot of shops, markets, houses, mosques, educational institutions, and government offices on both sides of the road. As per the LA plan, the average land of RHD in the road is 30m, a total of 38.245 acres per Khatian. But currently, as per Khatian, there are 15.132 acres under the ownership of RHD, 20.677 acres under the ownership of Zilla Parishad, and 1.147 acres under the ownership of the local people.

3.6.1.2 PROPOSED BAGACHRA REALIGNMENT

80. Here, most of the land is agricultural; farmers cultivate the land 1-2 times a year. The main crops are BRRI Dhan 49, 50, 51, 52, and wheat¹⁹, etc. Mango, jackfruit, and litchi are cultivated on land. These are seasonal fruits and usually ripen once in a year.

3.6.2 KOLAROA TOWN AREA

81. These are built-up areas with large settlements of commercial structures, markets, residential houses, shops, Katcha bazaars, mosques, educational institutions, and hospitals, etc. This area is primarily agricultural, producing rice, jute, and mustard with two growing seasons per year.. Mango orchards are located among rice, jute, and mustard. Mangoes are harvested once a year. Some lands have fish farms where fish can be farmed throughout the year.

3.6.2.1 KOLAROA EXISTING ROAD

82. According to the field survey of Form Km. 23+000 to Km 31+500, there are a lot of shops, markets, houses, mosques, temples, educational institutions, government offices, and health centers on both sides of the existing road. As per the LA plan, the average width of the road is 32m, and the total land on both sides of the road, which is considered for realignment, is 72.1293 acres, as per Khatian. Among them, the distribution of the land currently, as per Khatian, is 36.794 acres under the ownership of Roads and Highways, 24.217 acres under the ownership of District Counsel, 3.036 acres under the ownership of other government agencies, 13.787 is under the ownership of local people.

3.6.2.2 PROPOSED KOLAROA REALIGNMENT

83. Much of the area is agricultural and fish farming land. Farmers harvest crops one/two times a year and farm fish around the year. Among the crops are rice, jute, mustard, mango orchards, etc. Mangoes are harvesting once a year. Some lands have fish farms where the people farm fish throughout the year.

3.6.3 JHAUDANGA TOWN AREA

84. Jaudunga is an old and historical market in this area, situated on the bank of the River Betna; the river is 50 meters away from the main road, and there is no land to expand the road on the riverside. Therefore, prefer a bypass road. The market leases out nearly one crore taka every year, which is going to the government revenue fund. The Government will lose this kind of revenue if the road and the market area are in their original shape. Every businessman in the market desires realignment of RoW and to save the market from dismantling

3.7 IMPLEMENTATION SCHEDULE

85. According to the Final Dailed Design Report, Phase-3, WeCARE about four years will be required for the Construction works.

86. After mobilized the awarded Contractor will complete of the construction of 6-Lane project road is targeted 48 months from the Commencement date and Defect liability period-12 months. Project construction period will be 48 months (4 years) after the land acquisition process is substantially completed.

87. Project Implementing Unit (PIU), Supervision Consultant or Project Implementation Consultant (PIC) and the Contractor will collectively ensure the implementation of the project ESMP and ESMoP. Compliance monitoring work will be carried out by the PIU, headed by RHD's Project Director, and the PIC. Estimated total

¹⁹ Department of Agriculture Extension Jessore, <https://dae.jessore.gov.bd/en>

3. Description of the Project

project cost is approximately BDT 103,600,546,984. The tentative project implementation schedule is indicated in Table 3-11.

Table 3-11: Recommended Implementation Schedule	
Major Work Components	Actual/Scheduled date Of Completion
Final ESIA Report	March 2025
Final RAP Report and approval	August 2025
Preparation of Final Bidding Documents with inclusion of ESMP of ESMoP as the technical specification on environmental and social issues	September - December 2025
Preparation of the Development Project Proposal (DPP) with ensuring the environmentally friendly and sustainable development	January - April 2026
Award of Contract	July -2027
Start of Construction	August - 2027
Before start the Civil work, Contractor's Preparation of C-ESMP as the project site specific based on ESMP an ESMoP of ESIA report.	August - September 2027
Construction Period	48 Months (2027-2031)
Environmental and social monitoring in compliance of the World Bank's ESSs 2018 and National ECR 2023.	48 Months (2027-2031)
End of Construction	July 2031
Opening of Road to Traffic	July, 2031

4. Description of the Environmental and Social Baseline

4 DESCRIPTION OF THE ENVIRONMENTAL AND SOCIAL BASELINE

4.1 INTRODUCTION

88. The primary objective of this chapter is to provide an environmental and socio-economic baseline that potentially impacts the construction and operation phases of the project. Baseline data includes an assessment of the physical environment along with the natural (pollution) of the project impact areas, ecological environment, and socio-economic environment of the project areas. Baseline data has been compiled in the ensuing sections to cover these aspects.

4.2 PHYSICAL ENVIRONMENT

89. The physical environment comprises the project area's physiography and topography, geology and soil, meteorology, hydrology, water resources, and natural hazardous conditions. The physical environmental data for the study area was collected through primary data and secondary data collected.

4.2.1 PHYSIOGRAPHY AND TOPOGRAPHY

4.2.1.1 PHYSIOGRAPHIC FEATURES

90. The Project area falls under the Bhomra, Satkhira, and Navaron regions in two districts, Jashore and Satkhira, in the country's southwestern region. Proposed Project starts at N706 Navaron (Lat: 23° 3'29.07"N and Lon: 88°59'56.26"E) and ends at R-766 Satkhira Bhomra highway (Lat: 22°40'10.79"N and 88°56'46.35"E). The area is across the physiographic unit of the Ganges Floodplain. Jashore District borders India to the west, Khulna District and Satkhira District to the south, Khulna and Narail to the east, and Jhenaidah District and Magura District to the north. Satkhira is part of the Khulna Division. It is bordered to the north by Jashore District, on the south by the Bay of Bengal, to the east by Khulna District, and on the west by North 24 Parganas and South 24 Parganas districts of West Bengal, India. The district produces a variety of crops year-round. Date sugar, called patali, is made from the sap of locally grown date trees²⁰Figure 4-1 shows the prominent Ganges Active and Granges Inactive floodplain in the project area. General Physiographic Features of the Bhomra – Satkhira – Navaron Road is shown in **Figure 4-1**.²¹

²⁰ Design Report Bhomra-Satkhira-Navaron Road Section Phase-3

²¹ Map prepared BCL Team

4. Description of the Environmental and Social Baseline

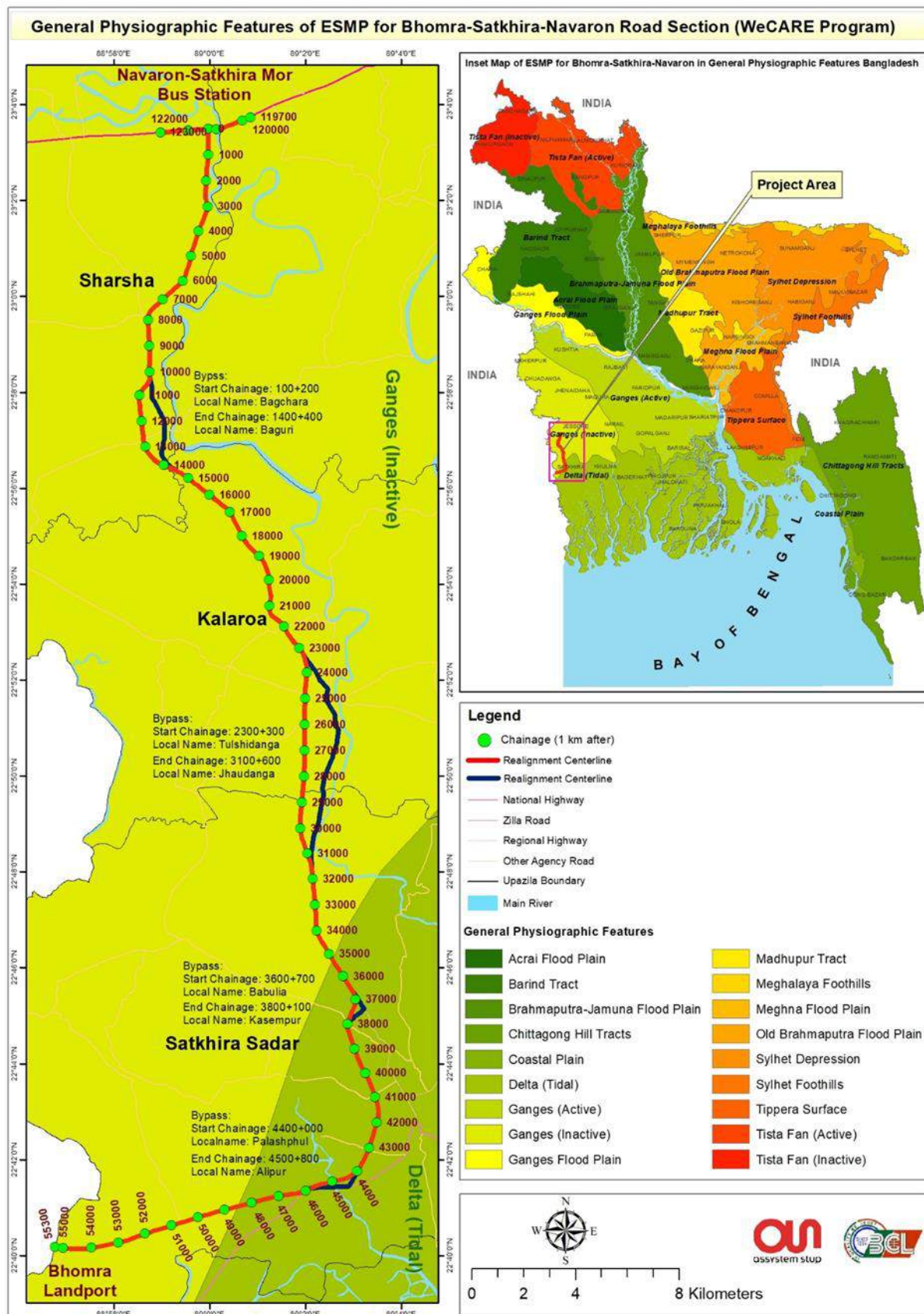


Figure 4-1: General Physiographic Features for Bhomra-Satkhira-Navaron Road

4.2.1.2 TOPOGRAPHY

91. The project area's topography is a rolling plain, as shown in **Figure 4-2**. The elevation profile of the exiting Bhomra—Satkhira—Navaron Road alignment varies between 2 and 8 meters above mean sea level. The area's general slope is from north to south, and the road traverses from high to low land.

4. Description of the Environmental and Social Baseline

92. The region's land can be broadly characterized by the Ganges-tidal floodplain having lower relief and being crass-crossed by innumerable tidal rivers and channels. It is nearly flat, and the surface is poorly drained. The land surface is not perfectly level and is characterized by six geomorphic units. These are natural levees, floodplains, old meander complexes, bars, tidal marshes, and backswamps. Natural levees are well developed along the Bhairab-Kopodak banks and are occupied mainly by the present built-up area of the town. The low-lying areas extend mainly towards fringe areas of the town characterized by swampy areas, currently used for poorly drained agricultural purposes and persistent water logging problems (Reiman, 1993).

93. Jashore and Satkhira districts²² are formed entirely by the deltaic action of the Ganges, which brought mud and limestone from the Himalayas.

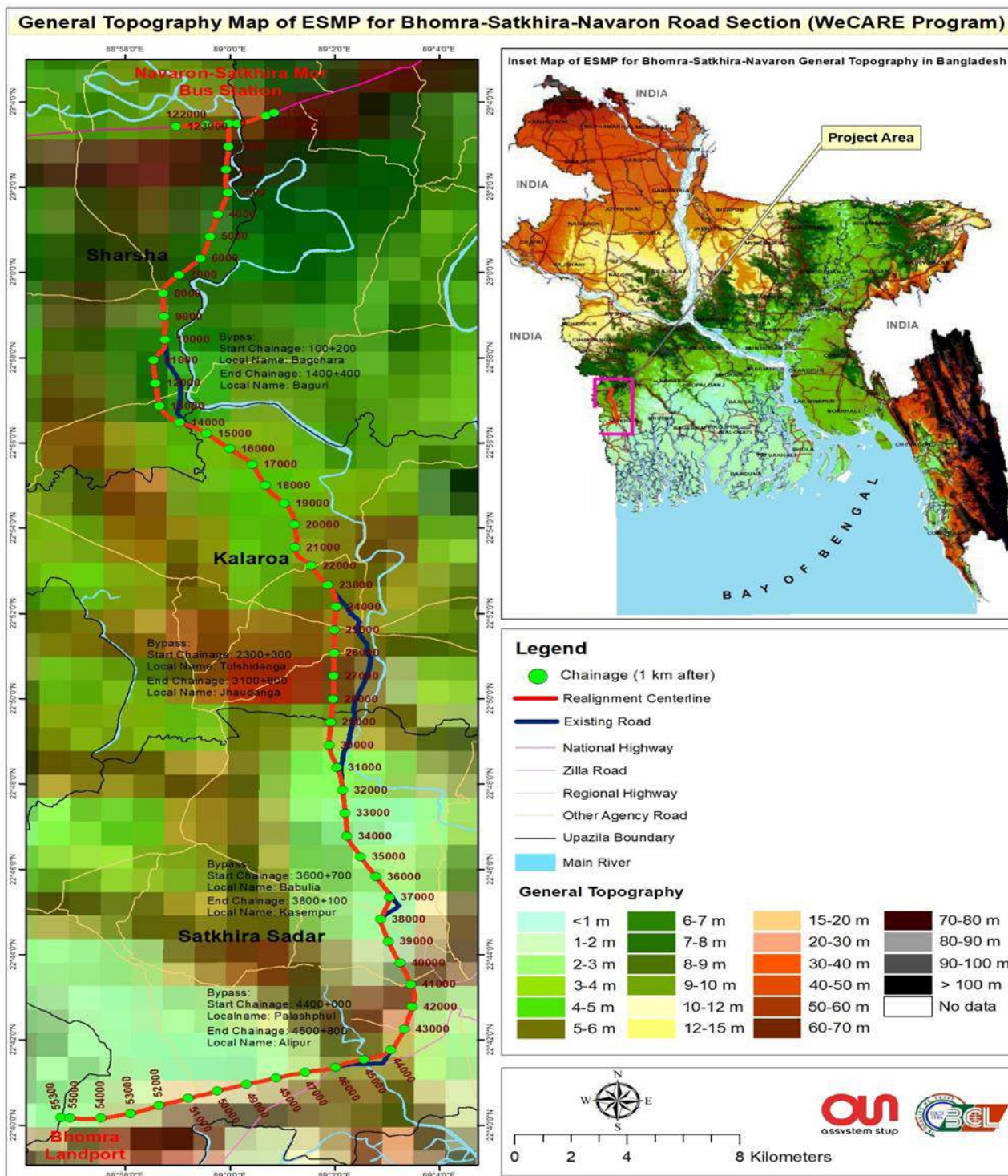


Figure 4-2: Elevation Profile of the Existing Road Alignment of Bhomra – Satkhira – Navaron Road

²² Design Report Bhomra-Satkhira-Navaron Road Section Phase-3

4. Description of the Environmental and Social Baseline

4.3 GEOLOGY AND SOIL

4.3.1 GEOLOGICAL CHARACTERISTICS OF THE PROJECT AREA

94. The Navaron region has the deposition of sediments, which is vastly controlled by Quaternary sea-level fluctuation, climatic conditions, and tectonic activities. The Bengal Basin was filled with sediments of Tertiary and Quaternary age. The Ganges deltaic deposits of the Late Holocene to Recent age mainly cover the study area. The modern deltaic plain in the western Bengal Basin can be divided into two regions: the Upper Delta plain of meander belts of the Ganges– Bhagirathi River in the north and the lower delta plain with numerous tidal creeks in the south. The lower deltaic plain, formed in Pleistocene–Holocene time, is characterized by an extensive clay layer of varying thickness (15–76 m), underlain by silt, sand, and gravel. The landforms of the Bengal lowland, including the Ganges delta and its surrounding region, consist of Pleistocene uplands and alluvial lowlands. The Pleistocene upland's relative height above the alluvial lowland's surface is 3-10 m north and 0-5 m south. The alluvial lowlands are subdivided into three geomorphological regions, namely the Brahmaputra- Jamuna floodplain in the north, the Sylhet basin in the northeast, and the Ganges Delta in the south of the region.

95. The Ganges deltaic deposits of the Late Holocene to Recent Age cover the project area. The surface lithology of the area is of deltaic deposits, composed of tidal deltaic deposits, deltaic silt deposits, and mangrove swamp deposits. A heterogeneous mixture of sand, silt, and clay characterizes the subsurface lithology. The Latest Pleistocene and Holocene sediments in the Ganges Delta and its surrounding region are divided into five units: the lowest, lower, middle, upper, and uppermost. The **Figure 4-3**, presents the Geological Map of Bangladesh.²³

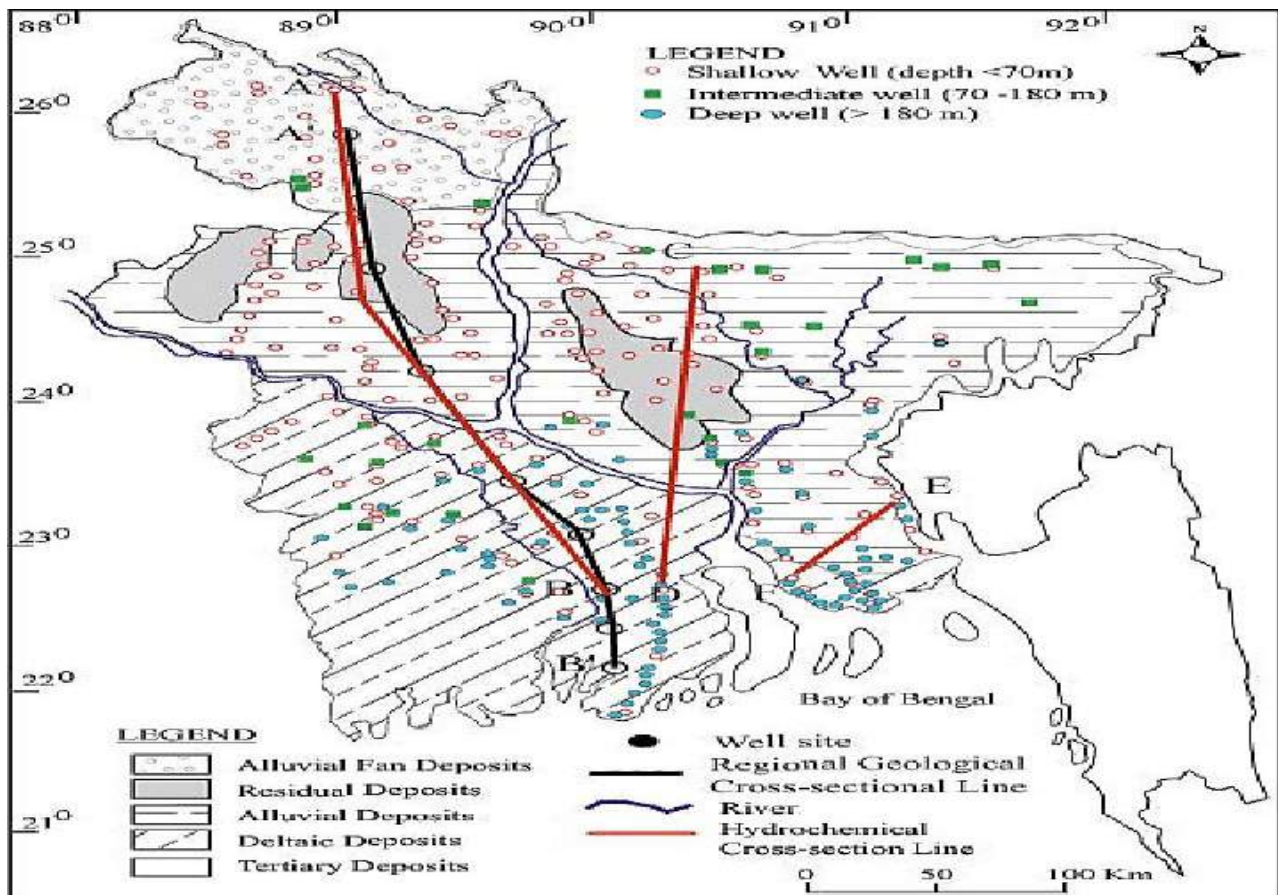


Figure 4-3: Geological Map at Bhomra – Satkhira – Navaron Road

4.3.1.1 SEISMOLOGY

96. Bangladesh is one of the world's most tectonically active regions. Bangladesh has been divided into four generalized seismic zones based on the distribution of earthquake epicenters and the morph tectonic behavior of different tectonic blocks. The south of Bangladesh is a seismically severe zone represented by zone II with a basal

²³ Design Report Bhomra-Satkhira-Navaron Road Section Phase-3

4. Description of the Environmental and Social Baseline

coefficient 0.05. So, considering Bangladesh's seismic zoning, the project area is less vulnerable to earthquakes. Characteristic features of seismic zonation of Bangladesh are presented in **Table 4-1**²⁴ and **Figure 4-4**.²⁵

Table 4-1: Characteristic features of seismic zonation of Bangladesh		
ZONING	AREA MERCALLI SCALE	MODIFIED
I	North and eastern regions of Bangladesh (Seismically most active)	IX
II	Lalmai, Barind, Madhupur Tracts, Dhaka, Comilla, Noakhali and western part of Chittagong Folded belt.	VIII
III	Khulna division S-E Bangladesh (Seismically relatively quiet)	VII

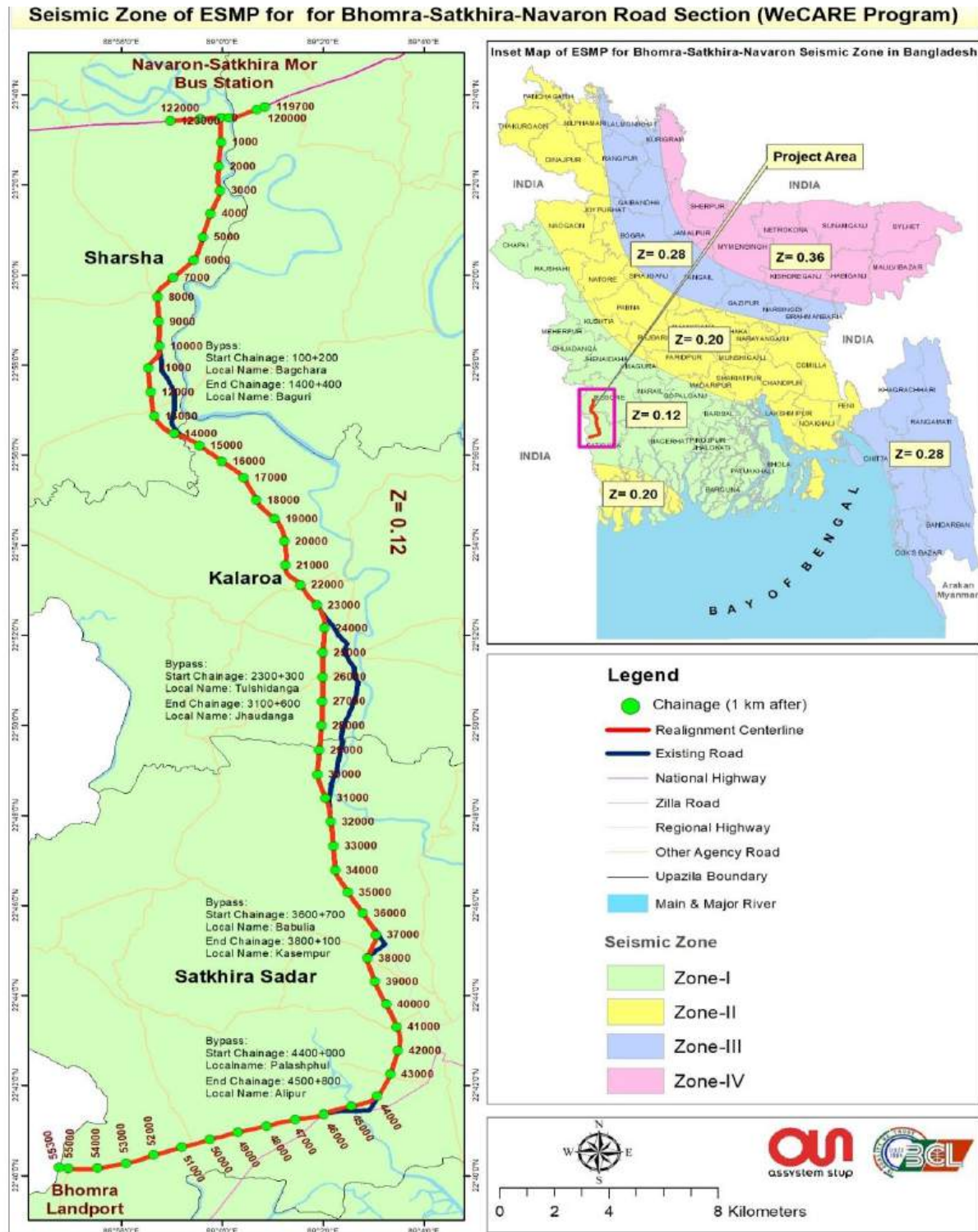


Figure 4-4: Seismic Zoning Map

²⁴ Design Report Bhomra-Satkhira-Navaron Road Section Phase-3

²⁵ Bangladesh National Building Code, 2020

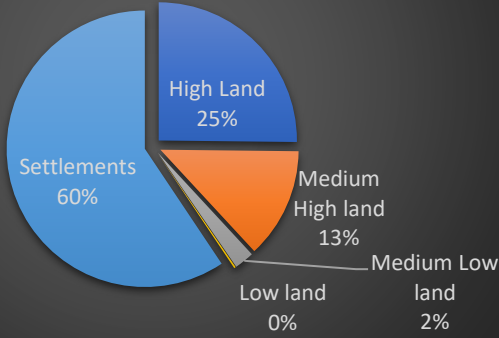
4. Description of the Environmental and Social Baseline

4.3.1.2 SOIL/ LANDS DESCRIPTION

97. The project road passes through three Upazila, namely Sharsha Upazila of Jashore District and Kalaroa and Satkhira Sadar Upazila of Satkhira District. The soil and land descriptions of these Upazila are presented in the following subsections, and the pictorial view of the landforms and soils of these upazila is shown in Annex 3.1 through Annex 3.3.

98. The map showing the different land types and soil textural classes considering a distance of 5 km on both sides of the Bhomra – Satkhira – Navaron Road section is shown in Annexes (Annex 3.1 through Annex 3.3). The land type data is summarized in **Table 4-2**.

Table 4-2: Area-wise distribution of Landforms through the project road

Land Types	Sharsha	Kalaroa	Satkhira Sadar	Throughout the Road length	Land classification within 5km both side of Road (Total Area 89320.04 sq.km)
High Land	3894.58	6748.57	11731.33	22480.18	
Medium High land	2528.7	2252.87	6750.18	11578.15	
Medium Low land	540.39	582.8	996.69	2130.88	
Low land	238.2			240.4	
Settlements	3816.67			53055.73	
Total	11018.54	9584.24	19478.2	89485.34	

The soil classification texture-wise is shown in **Figure 4-5**. The clay is 34.9% followed by loam/clay (15.5%) and Clay loam/Clay (7.1%) and the rest (42.3) is covered by settlements/ponds/ river, etc. Further to this literature review of Upazila Nirdeshika of respective upazila (Sarsha, Kalaroa and Satkhira Sadar), Soil Resource Development Institute (SRDI), the soil samples were collected from the following stations, as given in **Table 4-1** to study the profile and establish the baseline which is briefly discussed in the following subsections.

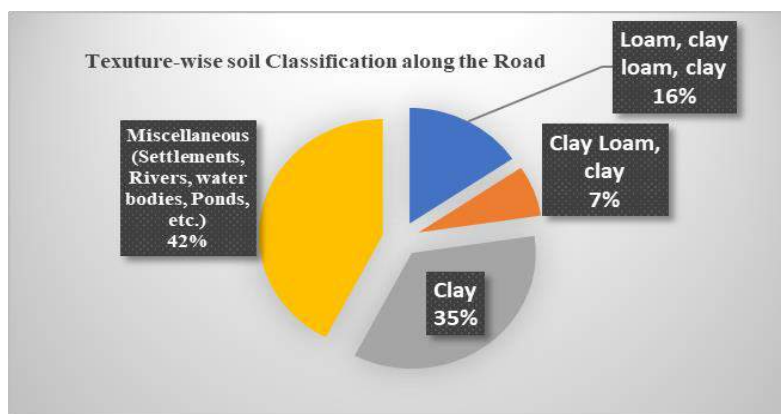


Figure 4-5: Soil Texture Pattern Classification Along The Bhomra – Satkhira – Navaron Road

Table 4-3: Soil sampling locations along the proposed road alignment						
Sl No.	Chainage (Project Area)	Location	Station Code/Package	GPS Points Information	Land Use	
SQ-1	Bhomra – Satkhira – Navaron Road road corridor. 6 km+400m	Village-Samta Union-Bagachra; Upazila-Sharsha; District- Jashore	Package 1	23°00'46''N and 88°98'58''E	Boro - Fellow - T.aman	
SQ-2	Bhomra – Satkhira – Navaron Road . 31km+600m	Village-Jhaudanga Union-Jhaudanga; Upazila-Satkhira Sadar; District-Satkhira	Package 2	22°80'12''N and 89°03'73''E	Boro - Fellow - T.aman	

99. The different horizons for sample collection are shown in below figure.

4. Description of the Environmental and Social Baseline



Ap, Ad, B21, B22, C1, C2 horizons for SQ-1



Ap, Ad, B21, B22, B23, C1, C2 horizons for SQ2

Figure 4-6: Different Horizons Of The Sampling For Establishing The Soil Profile

Source: Soil Sample Collection by the BCL Environment Team.

4.3.1.3 RESULTS AND DISCUSSION

100.19. The two soil profiles (Pit-1 & Pit-2) under two packages (Package-1 & Package-2) were described by delineating the horizon based on their differences in soil color, mottling, texture (clay content), structure, consistency, and moistness. Other identifiable properties (such as porosity, presence of plant roots, pH, etc.) visible in the field were also noted and included in the description of the respective profiles.

101. **Description** for SQ1: Six soil samples were collected from the six different horizons (Ap, Ad, B21, B22, C1, C2) delineated in the field where the 'Ishwardi' soil series was identified. The geographic location of the 'Ishwardi' series was 23000/46// N and 88098/58// E in the village – Samta, union – Bagachara, upazila – Sharsha under Jashore district. The land type of identified soil was medium highland with a topography of a nearly level shallow basin. The drainage condition of the surrounding area of the soil profile, as determined, was poorly drained and flooded up to 1.0 – 1.5 feet for about 3 – 4 months during the monsoon. The profile description of Pit No. is given in **Table 4-4**.

Table 4-4: Description Of The Soil Profile No.-1 / Pit No.-1		
Horizon	Depth (In Cm)	Description
Ap	0 –15	Olive grey (5 Y 5/2) moist and light olive grey (5 Y 6/2) dry; common fine distinct yellowish brown mottles; silty clay; massive; sticky; plastic; firm moist; very hard dry; common very fine and fine tubular pores; non calcareous; common fine roots; abrupt wavy boundary; pH 8.03
Ad	15-25	Dark grey (5 Y 4/1) moist; few fine faint yellowish brown mottles; silty clay; massive; sticky; plastic; firm; moist; common fine roots; few medium pores; non calcareous; abrupt smooth boundary; pH 8.15
B21	25-38	Olive brown (2.5 Y 4/4) moist; common; fine distinct grey mottles; silty clay; strong coarse prismatic structure; sticky; plastic; firm moist; common very fine and fine tubular pores; thick grey cutans along the vertical ped faces; moderately calcareous; few fine roots; clear smooth boundary; pH 8.20
B22	38-76	Light Olive brown (2.5 Y 5/4) moist; common fine and medium distinct light olive brown mottles; clay; strong coarse prismatic breaks into strong coarse and medium angular blocky structure; thick; plastic; firm moist; few very fine and fine tubular pores moderately thick grey cutans along the vertical and horizontal ped faces; few fine roots; calcareous; clear smooth boundary; pH 8.07

4. Description of the Environmental and Social Baseline

Table 4-4: Description Of The Soil Profile No.-1 / Pit No.-1

Horizon	Depth (In Cm)	Description
C1	76-114	Olive brown (2.5 Y 4/4) moist; common fine distinct grey mottles; clay; massive; sticky; plastic; firm moist; many very fine tubular pores; calcareous; clear smooth boundary; pH 7.92
C2	114-140+	Light olive brown (2.5 Y 5/4) moist; clay; localized iron staining on soil mass; very sticky, very plastic, very firm moist, strongly calcareous; pH 8.00

102. **Description** for SQ1: Seven soil samples were collected from the seven different horizons (Ap, Ad, B21, B22, B23, C1, C2) delineated in the field where the 'Ishwardi' soil series was identified. The geographic location of the 'Ishwardi' series was 22°08'12" N and 89°03'73" E in the village – Jhaudanga, union – Jhaudanga, upazila – Satkhira Sadar under Satkhira district. The land type of the identified soil was medium highland with the topography of the upper slope of the nearly level ridge. The drainage condition of the surrounding area of the soil profile, as determined, was poorly drained, and flooded up to 0.6 – 1.0 feet for about 2– 3 months during the monsoon. The profile description of Pit No.-2 is given in the Table 4-5.

Table 4-5: Description Of The Profile No.-2/Pit No.-2 Of (Sq2)

Horizon	Depth (In Cm)	Description
Ap	0-13	Olive grey (5Y 5/2) moist and light olive grey (5 Y 6/2) dry; common fine distinct yellowish-brown mottles; silty clay; massive; sticky; plastic; firm moist; hard dry many fine roots; common fine tubular pores; noncalcareous; abrupt wavy boundary; pH 7.34.
Ad	13-18	Dark grey (5 Y 4/1) moist; with few fine faint yellowish brown mottles; clay; massive; sticky; plastic; firm; moist; few very fine tubular pores; common fine roots; non-calcareous; abrupt smooth boundary; pH 8.0
B21	18-33	Olive brown (2.5 Y 4/4) moist; common; fine faint yellowish brown mottles; clay; sticky; plastic; firm moist; moderate coarse prismatic structure; moderately thin grey cutans along the vertical ped faces; many very fine tubular pores; common fine roots; moderately calcareous; abrupt smooth boundary; pH 7.06
B22	33-56	Olive brown (2.5 Y 4/4) moist; few, fine, faint, yellowish brown mottles; silty clay; strong coarse prismatic structure breaking into moderate coarse and medium sub angular blocky; sticky; plastic; firm moist; thick grey cutans along the vertical ped faces; many very fine and fine tubular pores, few fine roots; calcareous; clear smooth boundary; pH 8.23
B23	56-81	Light Olive brown (2.5 Y 5/4) moist; few, fine, faint, yellowish brown mottles; Silty clay; moderate coarse prismatic structure; sticky; plastic; firm moist; common, very fine tubular pores; iron manganese concretion present, calcareous; abrupt smooth boundary; pH 7.95
C1	81-97	Light olive brown (2.5 Y 5/4) moist; clay; massive; sticky, plastic, firm moist; iron manganese concretion present, calcareous, clear smooth boundary, pH 8.14
C2	97-114+	Light olive brown (2.5 Y 5/4) moist; clay; massive; sticky, plastic, firm moist; iron manganese concretion present, calcareous, clear smooth boundary, pH 8.14

4.3.1.4 SOIL CHARACTERISTICS

103. The analytical data of the parameters planned to be determined in the laboratory for assessing the soil quality regarding the proposed road construction is given in Annex 3.4 through Annex 3.5. Bangladesh has no soil regulations or standards except for the Fertilizer Recommendation Guide, published by the Bangladesh Agricultural Research Council (BARC) in 2018.

104. During the field survey, two profiles up to the depth of 140+ cm and 114+ cm were selected in Sharsha upazila and Satkhira Sadar upazila, respectively. It is evident from the particle size analysis data that the soil texture varies from silty clay to clay in both packages 1 and 2. The chemical properties of soil samples are given in Table 4-6. From the chemical properties of soil data, the pH ranges from 7.92 to 8.20 in package-1, and in package-2, varies from 7.06 to 8.23, indicating that soils described in SQ1 are slightly alkaline. In contrast, soils

4. Description of the Environmental and Social Baseline

described in SQ2 are neutral to slightly alkaline in reaction. Comparatively high status of the base material is evident in soils as defined under both soil sampling locations, signifying that both soils are not suitable for cultivating most of the crops since most of the crops thrive well in soils having pH value ranging from 5.6 – 7.3 in terms of nutrient availability in soils for plant uptake. Analytical results depict that the organic carbon content of the soils, as identified under the two sites, ranges from very low to medium, and total nitrogen content is very low to low in both soil sampling stations. The chromium content is low in the soils of both sampling stations. Although soil sulfate, as determined, is high in both sites, the soils of the project area are saline, as per the laboratory analysis report. This may be caused by the higher adsorption and desorption phenomenon of the soils of both sites having high clay content, hindering the formation of bonds between the cations and anions.

4. Description of the Environmental and Social Baseline

Table 4-6: Chemical properties of the supplied soil samples

S.NO.	CODE / HORIZONS	Elements Contents												
		PH	EC (µS/CM)	OC* (%)	N (%)	TOTAL P (MG/KG)	TOTAL K (%)	TOTAL S (MG/KG)	TOTAL CA (MG/KG)	TOTAL MG (MG/KG)	TOTAL NA (MG/KG)	CHOLRIDE (MG/KG)	SULPHATE (MG/KG)	CR (MG/KG)
SQ1														
1	Ap	8.03	137.9	1.29	0.17	1403	0.33	597.40	517.25	5.69	375	7.09	99.57	34.66
2	Ad	8.15	102.3	0.92	0.11	1367	0.33	575.76	1047.2	6.85	350	3.55	186.15	32.31
3	B21	8.20	120.2	0.37	0.04	1069	0.33	489.18	940.75	8.53	365	3.55	99.57	31.05
4	B22	8.07	104.6	0.26	0.03	1105	0.30	337.66	1021.17	8.01	350	7.09	229.44	29.24
5	C1	7.92	145.8	0.28	0.03	1319	0.40	467.53	1662.75	10.01	405	14.18	51.20	36.61
6	C2	8.00	98.50	0.32	0.04	1140	0.47	571.43	1890.25	11.49	480	3.55	41.19	36.45
SQ2														
7	Ap	7.34	232.0	1.26	0.18	1522	0.40	554.11	1384.0	6.96	395	14.18	445.89	30.50
8	Ad	8.00	139.3	0.81	0.10	1212	0.35	554.11	2085.0	7.54	350	7.09	445.89	34.79
9	B21	7.06	135.3	0.29	0.03	997	0.45	445.88	784.75	8.66	480	3.55	45.99	41.96
10	B22	8.23	140.3	0.26	0.03	1140	0.30	467.53	1804.75	10.23	360	17.73	186.15	32.63
11	B23	7.95	122.3	0.36	0.04	1081	0.30	489.18	1782.25	6.82	390	7.09	89.28	32.29
12	C1	8.14	122.6	0.42	0.05	1057	0.35	465.53	507.50	7.25	370	7.09	59.19	34.12
13	C2	8.09	137.7	0.23	0.02	1021	0.30	445.88	1154.75	7.29	480	14.18	229.44	31.14
Analyzed Values		7.06-8.23	98.50-145.8	0.23-1.29	0.02 – 0.18	1021-1522	0.30-0.47	337.66-597.40	517.25-1890.25	5.69- 11.49	350-480	3.55-17.73	41.19 – 445.89	29.24-41.96
BARC, 2018		SA**	Non Saline	VLM***	Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Low

*Organic Carbon, ** Slightly Alkaline, *** Very low to medium

4. Description of the Environmental and Social Baseline

105. The physical properties of soil samples are given in Table 4-7.

Table 4-7: Physical properties of the supplied soil samples							
SL. No.	Soil Code / Horizons	(%) Moisture	Particle Density (G/CM ³)	Bulk Density (G/CM ³)	Porosity (%)	WHC* (%) BY VOLUME	Permeability (CM/HR)
SQ-1							
1	AP	19.34	2.39	1.34	44.0	65.35	1.3
2	AD	23.88	2.45	1.53	38.0	55.97	0.1
3	B21	26.93	2.49	1.41	44.0	57.58	1.1
4	B22	26.82	2.60	1.46	44.0	61.78	0.1
5	C1	31.35	2.40	1.40	42.0	65.73	0.9
6	C2	34.23	2.51	1.29	49.0	68.06	0.2
SQ-2							
7	AP	25.93	2.37	1.18	51.0	69.35	2.0
8	Ad	25.16	2.42	1.46	40.0	63.54	0.3
9	B21	26.37	2.09	1.37	35.0	62.59	0.8
10	B22	28.82	2.46	1.31	47.0	61.29	1.9
11	B23	30.16	2.34	1.35	43.0	61.88	0.6
12	C1	31.81	2.53	1.42	44.0	62.31	0.1
13	C2	30.46	2.54	1.46	43.0	64.76	0.1

*Water Holding Capacity

106. Particle size analysis of the soil samples is summarized in Table 4-8

Table 4-8: Particle Size Distribution					
SL No.	Soil Profile Horizons	(%) Sand	(%) Silt	(%) Clay	Textural Class
SQ-1					
1	Ap	2.62	45.75	51.63	Silty clay
2	Ad	5.43	43.01	51.55	Silty clay
3	B21	4.09	51.75	44.16	Silty clay
4	B22	2.04	32.76	65.20	Clay
5	C1	1.16	32.86	65.98	Clay
6	C2	1.72	35.37	62.91	Clay
SQ-2					
7	Ap	4.79	42.50	52.72	Silty clay
8	Ad	4.55	39.91	55.55	Clay
9	B21	2.28	39.73	57.99	Clay
10	B22	3.16	44.70	52.14	Silty clay
11	B23	4.70	45.92	49.37	Silty clay
12	C1	2.04	31.76	66.20	Clay
13	C2	5.69	39.43	54.88	Clay

107. The Department of Soil and Water Conservation, University of Dhaka, analyzed the soil test reports presented in Annex 3.4 through Annex 3.6.

4.3.1.5 CONCLUSIONS AND RECOMMENDATIONS.

108. Following remarks and recommendations can be provided based on the assessment of soil quality according to the field description and subsequent laboratory analysis of soils collected from different horizons of two soil profiles

- Soils of the project area characteristically have textural classes ranging from silty clay to clay in almost all horizons, possessing the good capacity of soil to remain compact with the removal of air voids and increased sheer strength, decreased compressibility and permeability of soils leading to the reduction of voids ratio and limiting the flow of water through the soil.
- The project area, as consisting of soils having normal bulk density with such range of particle density (<3 gm/cc) and low organic carbon content (indicative of low organic matter), clearly indicates the good load-bearing capacity of the soils.
- Due to a good percentage (>35) of clay, the soils of the project area are potentially less permeable with very minimum susceptibility to erosion.
- The soil pH greater than 7.5 in almost all the horizons shows the presence of ample liming materials, including calcium and magnesium, which will significantly reduce wetness in soggy and clayey, enabling the natural stabilization of the road infrastructure. In addition, the calcium combines with chloride present in the soils,

4. Description of the Environmental and Social Baseline

producing calcium chloride (commonly known as hydrated lime), which may also be supplemented as an additive for obtaining optimum moisture during road construction.

- The relatively non-saline condition of the soils, together with the higher content of clay and calcium in the soils of two sites, will help the soils attain the expected compaction and soil stability for road construction.
- Sodium in soils may not cause destructive effects on soil structure owing to higher clay and calcium content, so sodium cannot negatively impact structural stability.

109. Moreover, the clay content, water holding capacity, porosity, and moisture content of the soils are not favorable for surface soil salinity in the project area due to the capillary rise and horizontal movement of salt water during the dry season.

4.4 LANDUSE PATTERN

110. Identification, delineation, and mapping of Land use /cover are important for global monitoring studies, resource management, and planning activities. A land-use study has a pivotal role in identifying and assessing the likely impacts of the proposed project on the land environment.

4.4.1 STUDY AREA

111. The land use map has been prepared for a 10 km buffer area of the road alignment to assess the impacts on the land environment.

4.4.2 METHODOLOGY

112. The downloaded satellite imagery from Google Earth was visually interpreted to study images' qualitative and quantitative aspects. On-screen digitization of the GeoEye Data has been carried out. The study area layers have been exported to ESRI shapefile format, and relevant attributes have been incorporated in GIS layer shapefiles. Land use spatial distribution statistics have been generated to study the land environment. The area statistics and maps generated have been presented in the following section.

4.4.3 LAND USE CLASSIFICATION

113. The land use classification system presented in this report includes the more generalized first and second levels to understand changing land use patterns and the extent of spatial growth along the project road alignment. At the more generalized levels, it meets the principal objective of providing land use and land cover classification system to find land use patterns over the study area.

4.4.3.1 EXISTING LAND USE PATTERN ALONG THE PROJECT ROAD ALIGNMENT

114. The analysis of the existing land use pattern along the project road alignment has been carried out for the entire alignment and is presented in **Table 4-9**.²⁶

115. Other than the common waterbodies (ponds and rivers), it is to be noted that Boar and Beel also fall within 10km of the road alignment.

Sl. No	Land Typetype	Study Area	
		Area(Sqacres)	Area(SqKm)
1.	Agricultural Land	568.736	
2.	Baor	0.675	
3.	Beel	3.591	
4.	Brick Field	1.171	
5.	Buildup Area	294.025	
6.	Commercial	0.487	
7.	Fisheries Area	285.060	
8.	River/Khal	33.623	
9.	Waterbodies	13.151	
10.	Road	21.845	

116. The percentage of different land uses is shown in **Figure 4-7**. The land use pattern shows the presence of Baor and Beels falling within 10km of both sides of the road alignments,

²⁶ Primary Data Collection by the Environment Team of BCL JV, January 2024

4. Description of the Environmental and Social Baseline

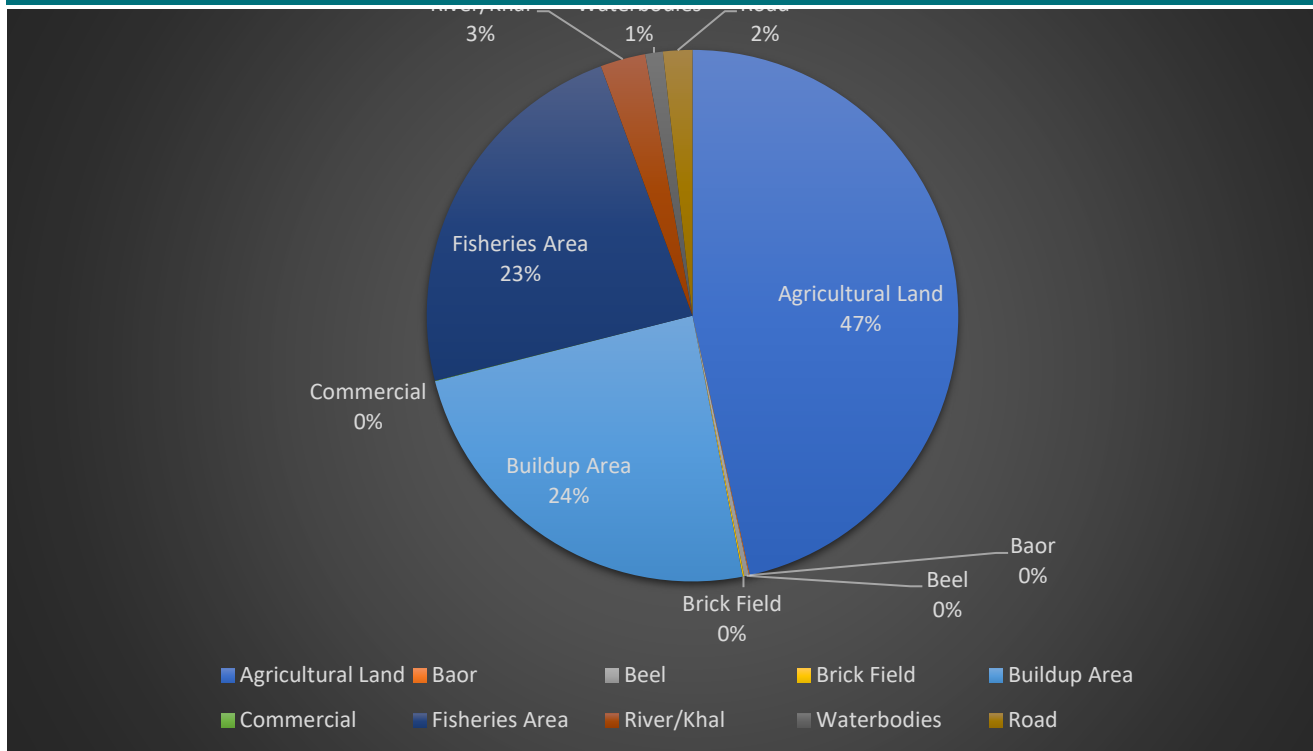


Figure 4-7: % age-wise Land uses within 10 Km of Road Alignment

117. As shown in the **Figure 4-8** within 10 km, the predominant land use pattern is agricultural land, followed by built-up areas, fishing cultivation ponds/shrimp farming, water bodies, and others. There is a righthand side international boundary from Navaron to Bhomra.

4. Description of the Environmental and Social Baseline

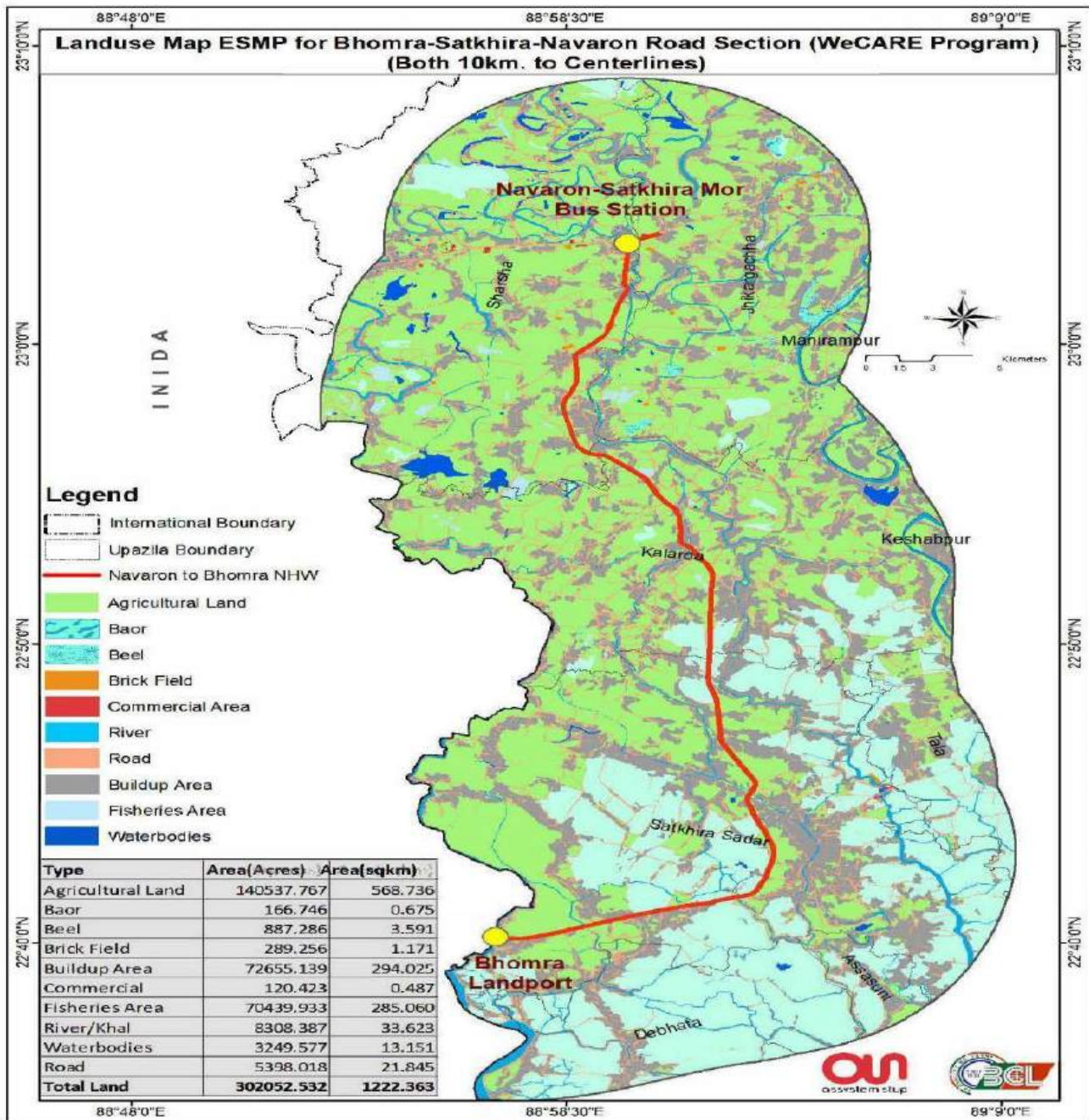


Figure 4-8: Land Use Pattern Along the Road Alignment

4.4.4 CLIMATE AND METEOROLOGY

118. The climate and meteorology of the study area are briefly discussed in the following subsections.

4.4.4.1 CLIMATE

119. Bangladesh is in the central part of the Asiatic monsoon region, where the climate is tropical. Regional climatic differences in this flat country are minor. The relatively small size of the country and generally low-lying areas cause moderate spatial variation of temperature, precipitation, relative humidity, wind speeds, and other climatic variables. However, the climate of Bangladesh exhibits pronounced temporal variability. This is because the moisture-laden monsoon winds flow predominantly from the southwest during summer and the comparatively dry and colder north-western winds during winter.

120. The project area has a humid subtropical climate with large variations between summer and winter temperatures. The cluster has a tropical monsoon climate. It has three main seasons.

- Summer/Pre-monsoon - March to May
- Rainy Season/Monsoon - June to September
- Post-Monsoon - October to November

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► Winter Season December to February

121. According to the Köppen climate classification, the project area is characterized by a tropical wet and dry climate. This region experiences a hot and humid summer and dry winter. According to these climatic characteristics, Bangladesh has seven different climatic sub-regions (A through G). As shown in Figure 4-9) Figure 4-9 the project area is in the south-western climatic sub-region of the country according to the Figure 4-9²⁷. This zone generally receives abundant rainfall, having 85 percent of annual rainfall.

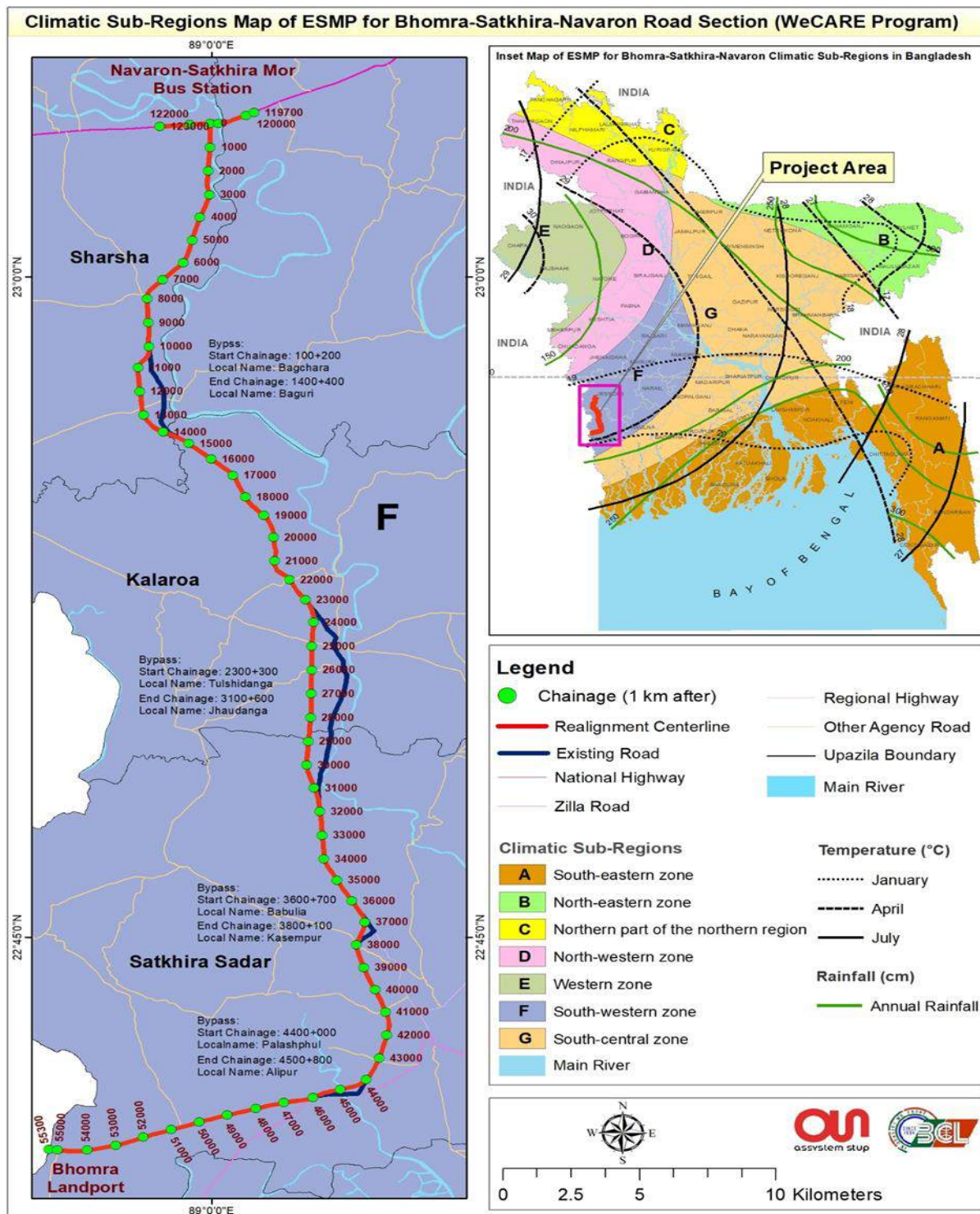


Figure 4-9: Climate Sub-region for Bhomra-Satkhira-Navaron Road Section

122. The winter is predominantly cool and dry. The summer is hot and dry, interrupted by occasional heavy rainfall. The annual average maximum temperature is 35.7 °C, and the minimum is about 10.6 °C. The annual average rainfall is about 1402 mm. This is a transitory zone between the Southeastern, northwestern, and

²⁷ Primary Data Collection by the Environment Team of BCL JV, January 2024

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southwestern zones, and most of the severe hailstorms, westers, and tornadoes have been recorded in the category 'F' Area.

4.4.4.2 TEMPERATURE

123. The project area experiences significant temperature variations as the season's change. May is the hottest month, with an average monthly high temperature of 35.7°C. The project area, on the other hand, has a milder summer than inland locations, particularly the northwest district, where summer temperatures can reach 40°C. The temperature drops dramatically in June owing to monsoon outbreaks. The monthly average temperature during the monsoon is around 29.5°C. The cool, dry winter season begins in November, and the coldest month is January, with an average minimum temperature of 10.6°C depicted in **Figure 4-10**.

4.4.4.3 RAINFALL

124. Between 2012 and 2021, the project area received an average rainfall of roughly 2.99 mm. The southern monsoon was the primary source of rain. More than 85% of total rainfall was received between May and September. The Northwestern influence causes rainfall between March and April. Winter is the driest season, with minimal or no rain. However, limited rain was recorded during December and February. The rainfall pattern between 2012 and 2021 is shown in **Figure 4-11**. According to the climate cell of the Department of Environment, changes have been seen in climatic variables such as heavy rainfalls during winter, droughts during summer, hailstorms in monsoon, and excessive temperature in pre-monsoon and monsoon seasons, and so on in the previous few years. The highest monthly average rainfall occurred in July (179.0 mm), with the lowest monthly average rainfall recorded during winter. This indicates that the rainy season is very prevalent in this area. During the monsoon season, the average monthly rainfall in the project area is 5.82 mm. According to records, the maximum rainfall during the monsoon season (June-September) ranges from 66.0 mm to 179.0 mm. Winter is the driest season, lasting from December to February, with an average rainfall of 0.50 mm.

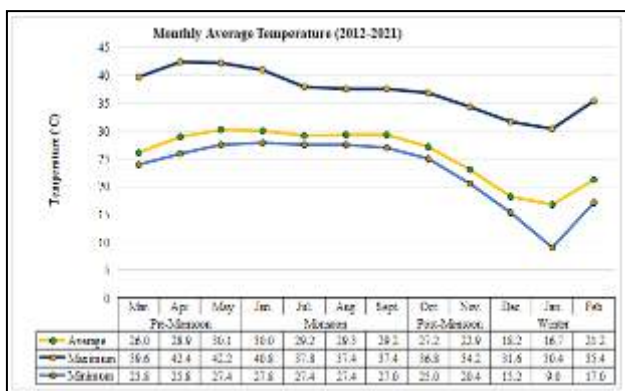


Figure 4-10: Temperature Variation in the Jashore Region from 2012 to 2021

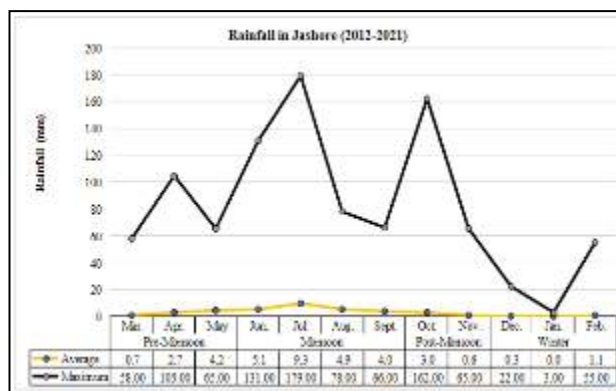


Figure 4-11: Average Rainfall Variation in the Jashore Region from 2012 to 2021

Source: Jashore Meteorological Station, Bangladesh Meteorological Department (BMD), 2021

4.4.4.4 HUMIDITY

125. As expected, humidity during the wet season is significantly higher than the other times of the year, as shown in **Figure 4-12**. The maximum average relative humidity for the project area is 93.9 percent in August, and the minimum relative humidity is 55.4 percent in March. Humidity is relatively dependent on temperature variations and fluctuates continuously based on the temperature of the project area. There has been a tremendous weather change observed in the project area over the last 10 to 20 years of meteorological data.

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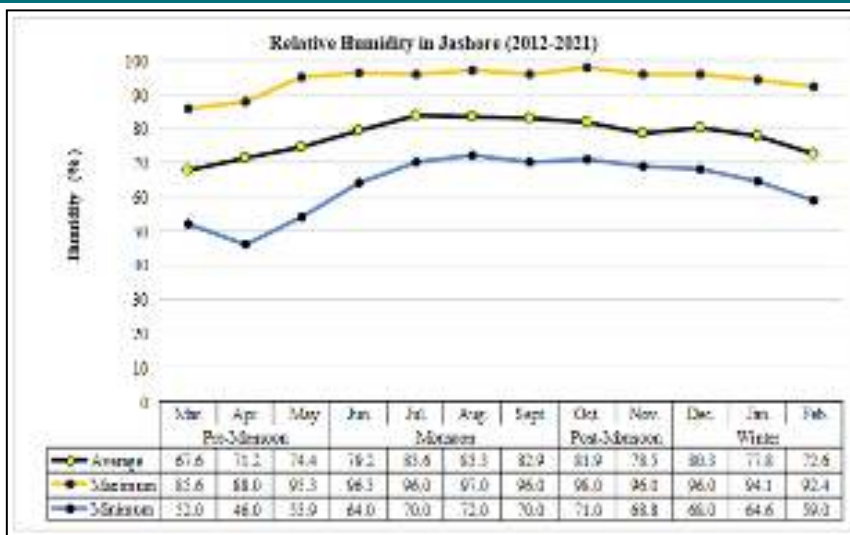


Figure 4-12: Relative Humidity Variation in Jashore Region from 2012 to 2021

Sources: Jashore Meteorological Station, Bangladesh Meteorological Department (BMD), 2021

4.4.4.5 WIND SPEED AND DIRECTION

126. Wind patterns are among the most significant and influential weather factors. Therefore, understanding both direction and velocity is crucial. The Wind Rose model is employed to illustrate prevailing wind conditions in the project area, taking seasonal variations into account. This model shows the number of hours per year that the wind blows from specific directions per year. According to the wind rose diagrams, the region predominantly experiences winds from the West, West-Southwest, North, and Northwest. Throughout the year, wind speeds primarily range from 0 to 4 knots, encompassing the entire wind speed spectrum.

127. Monsoonal climate variations influence the Wind direction in the project area. The southwesterly monsoon starts in mid-March and concludes around the end of September. During this period, winds predominantly blow from the south with consistent force. In January, winds shift to originate from the north and northeast. February experiences relatively calm conditions, often characterized by foggy mornings. Figure 0-5 presents the seasonal monthly maximum wind speed direction rose plot from 2012 to 2021.

Figure 4-13: Seasonal Variation of Wind Rose in Jashore during the Years of 2012-2021

Wind Rose of Pre-Monsoon in Jashore (2012-2021)

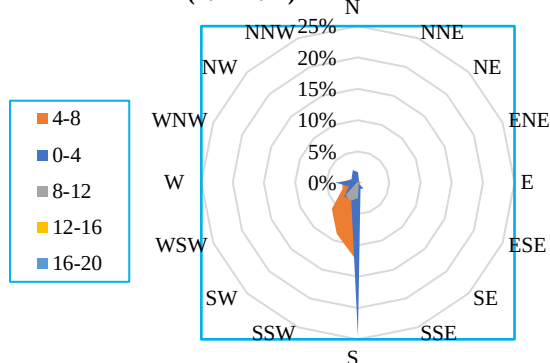
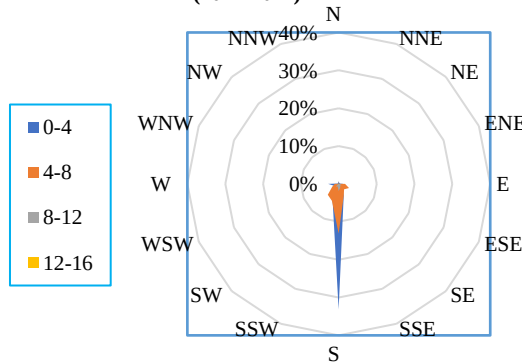


Figure 4-14: Seasonal Variation of Wind Rose in Jashore during the Years of 2012-2021

Wind Rose of Monsoon in Jashore (2012-2021)



4. Description of the Environmental and Social Baseline

Figure 4-13: Seasonal Variation of Wind Rose in Jashore during the Years of 2012-2021

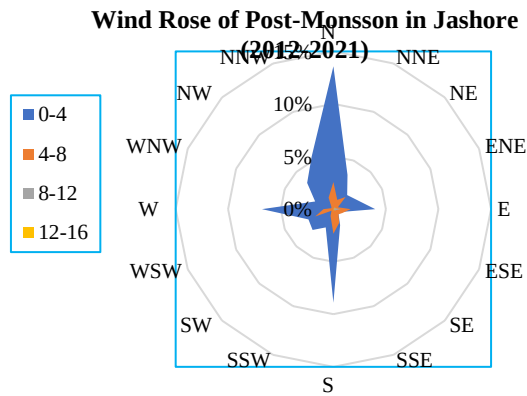
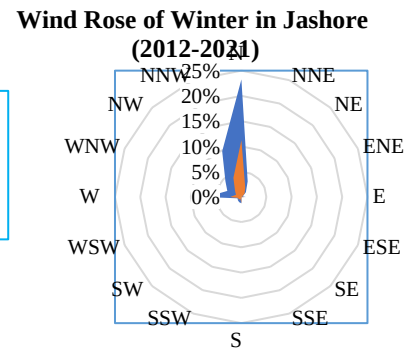


Figure 4-14: Seasonal Variation of Wind Rose in Jashore during the Years of 2012-2021



Source: Jashore Meteorological Station, Bangladesh Meteorological Department (BMD), 2021

4.5 ENVIRONMENTAL MONITORING

128. The environmental monitoring of vital environmental attributes such as ambient air quality, ambient noise level, vibration level monitoring, surface water quality, and groundwater quality was carried out along the road alignment, as shown in **Figure 4-15**. Exhibits in Annex 3.6 through Annex 3.10 shows the environmental monitoring and test report are shown in Annex 3.11 and Annex 3.14.

4. Description of the Environmental and Social Baseline

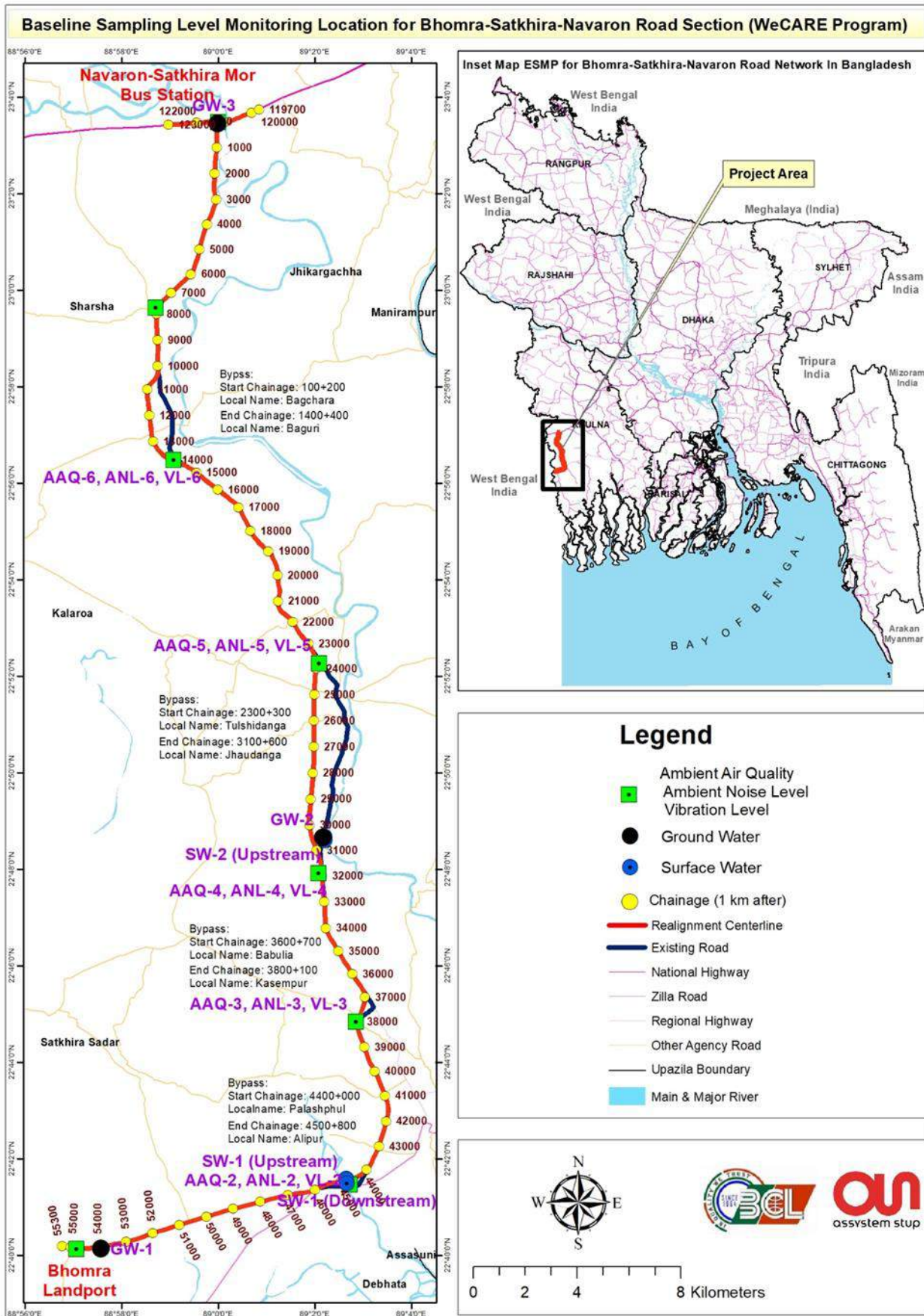


Figure 4-15: map showing location of Environmental monitoring during the field investigation along the project road

4. Description of the Environmental and Social Baseline

4.5.1 AMBIENT AIR QUALITY

129. Ambient air quality measurements were conducted at nine locations along the Project Road. The sampling sites were selected based on land use patterns such as commercial zones, residential neighborhoods, educational institutions, and mixed-use areas, where significant populations are present during the day and may be exposed to air pollution during road construction activities. The ambient air quality monitoring locations are detailed in Table 4-10.

Sl. No.	Code	Locations	Area Settings	Gps Coordinate	Date and Time
1.	AAQ1	Bhomra land port, Shatkhira	Commercial	22°40'8.14"N 88°56'59.20"E	25.12.2023 11:07:16 AM
2.	AAQ2	Infront of Doctor's quarter, Shatkhira Medical College, Shatkhira	Residential	22°41'27.70"N 89° 2'43.97"E	25.12.2023 02:38:52 PM
3.	AAQ3	Boro Jamtola, Kashempur, Shatkhira	Mixed	22°44'50.36"N 89° 2'51.08"E	26.12.2023 03:48:23 PM
4.	AAQ4	Infront of Masum Billah's house, Biharinagar, Jhaudanga, Satkhira	Residential	22°47'54.73"N 89° 2'4.92"E	26.12.2023 12:10:37 PM
5.	AAQ5	Shah Aanullah degree college, Tulshidanga, Kolaroa, Shatkhira	Residential	22°52'15.51"N 89° 2'5.49"E	26.12.2023 09:07:15 AM
6.	AAQ6	Infront of Abdur Rouf's house, Beltola Bazar, Jamtola Bazar, Sharsha, Jashore	Silent	22°56'28.75"N 88°59'4.53"E	24.12.2023 03:25:45 PM
7.	AAQ7	Jamtola Bazar, Sharsha, Jashore	Mixed	22°59'37.92"N 88°58'42.61"E	24.12.2023 12:05:32 PM
8.	AAQ8	Navaron Mor, Sharsha, Jashore	Commercial	23° 3'28.57"N 88°59'59.78"E	24.12.2023 09:14:24 AM

130. Standard procedures were adhered to monitor and analyze ambient air quality. Samples collected at each site were analyzed for key air quality indices, including Particulate Matter with diameters of 10 microns or less (PM₁₀), Particulate Matter with diameters of 2.5 microns or less (PM_{2.5}), and Suspended Particulate Matter encompassing both PM_{2.5} and PM₁₀ (SPM). Additionally, concentrations of Nitrogen Dioxide (NO₂), Sulfur Dioxide (SO₂), Ozone (O₃), Carbon Monoxide (CO), and Carbon Dioxide (CO₂) were assessed.

131. Among all the parameters of ambient air CO, CO₂ and O₃ had been converted for 8 hours and the rest of the parameters were transformed on a 24-hourly basis. Both particulate and gaseous samples were analyzed using the proper procedures.

4.5.1.1 RESULT AND DISCUSSION:

132. Analysis results of ambient air quality monitoring carried out along the road stretch are summarized in the following Table 4-11²⁸ These ambient air quality results are discussed in the following paragraphs

Sl. No.	Code	Concentrations (µg/m ³)					CO (ppm)	CO ₂ (ppm)
		PM _{2.5}	PM ₁₀	NO ₂	SO ₂	O ₃		
1.	AAQ1	36.8	64.8	11.9	94.6	23.8	0.67	130.6
2.	AAQ2	27.5	31.9	2.3	83.7	21.1	0.40	124.7
3.	AAQ3	40.8	68.9	26.6	84.6	39.8	0.62	130.9
4.	AAQ4	21.9	26.7	6.6	73.0	27.7	0.39	125.0
5.	AAQ5	33.5	42.6	14.3	60.6	25.3	0.60	321.5
6.	AAQ6	24.5	33.5	11.4	163.2	23.1	0.39	129.0
7.	AAQ7	49.3	55.7	13.0	178.3	21.9	0.60	137.1
8.	AAQ8	62.6	72.0	27.1	132.3	28.1	0.74	152.0
National Standard ²⁹		65	150	80	80	100	05	-

133. Ambient air quality in the study area has been monitored and compared with the applicable standard of Bangladesh considering Air Pollution (Control) Rules, 2022. According to the monitoring results, dust particles (particulate matter), e.g., PM_{2.5} and PM₁₀, have been observed below the national standard of Bangladesh. AAQ7 and AAQ8 showed comparatively high concentrations of particulate matter (PM 2.5 and PM 10) among all the sampling locations. Therefore, dust pollution is a common phenomenon in Bangladesh, including this

²⁸ Source: Primary Data Collection by the Environment Team of STUP-BCL JV, December 2023

²⁹ Air Pollution (Control) Rules, 2022

4. Description of the Environmental and Social Baseline

project area, due to a lot of vehicle movement, sand transportation, transportation, local construction, road dust, etc. Besides, the main reason for the abundance of dust or particulate matter is people's unconsciousness. All gaseous parameters are within permissible limits except SO₂. High-volume SO₂ was found in AAQ6, AAQ7, and AAQ8. The standard also exceeds AAQ1, AAQ2, and AAQ3. High concentrations of SO₂ may be caused by domestic heating by firewood, high volume of vehicles, etc. **Figure 4-16**³⁰ depicts recorded Air Quality Results with Standard Comparison.

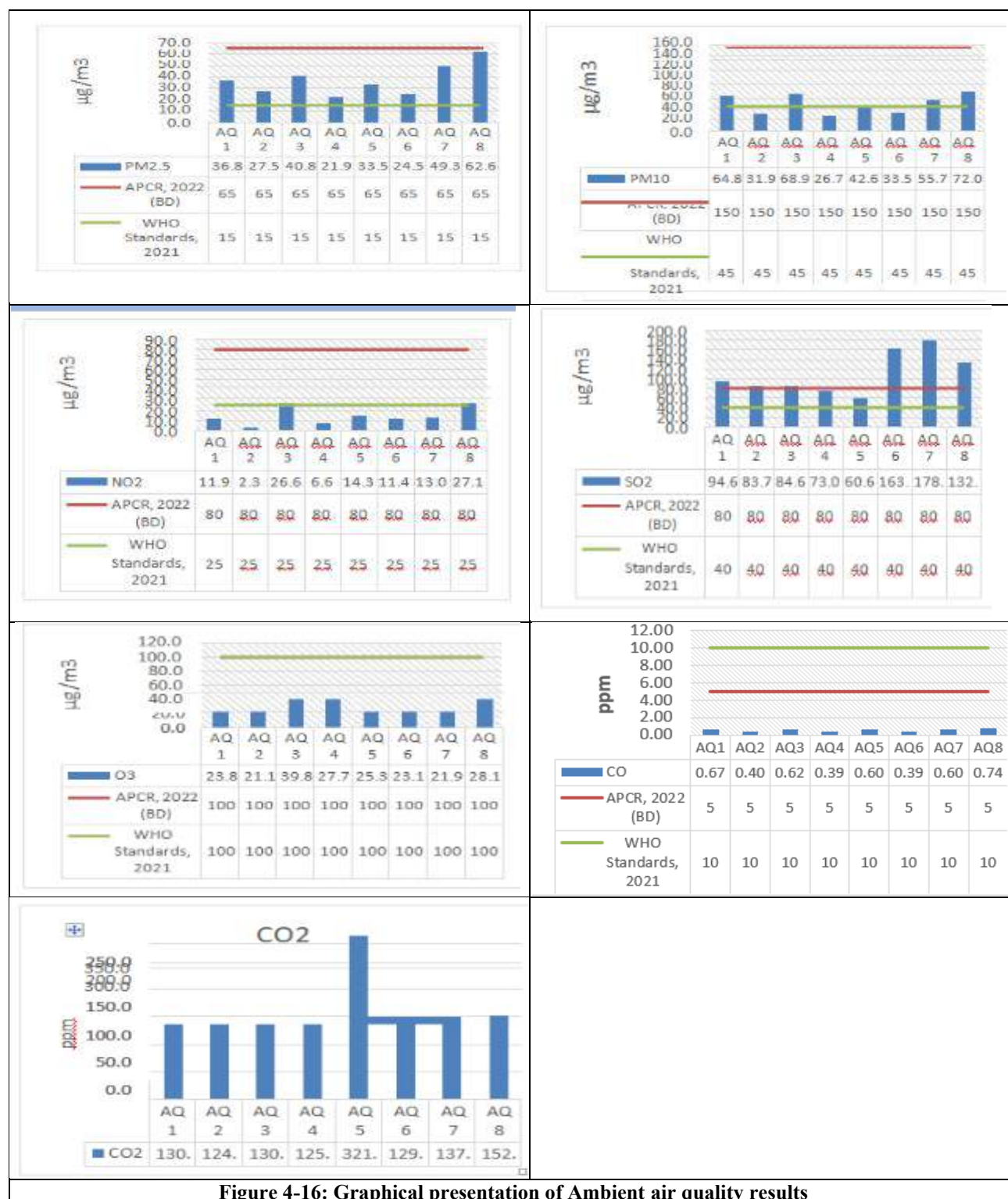


Figure 4-16: Graphical presentation of Ambient air quality results

4.5.2 AMBIENT NOISE LEVEL

134.24. Continuous high noise level is harmful for human health. According to the World Health Organization's Guidelines for Community Noise (1999), while ongoing exposure to sound pressure levels over 85 dB is usually

³⁰ Source: Primary Data Collection by the Environment Team of BCL JV, May 2023

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considered the critical level for temporary hearing damage. Two primary sources of noise have been identified in the project area:

- Road traffic is a primary noise source in the project area. The movement of numerous motorized vehicles on this roadway leads to noise along the road corridors.
- Commercial/Bazaar Areas: Markets and bazaars along the project's existing road are busy all day and generate significant noise.

135.To establish the baseline, eight (8) noise level stations were selected along the road, and these are the same locations where air quality monitoring was done during the field investigations. Noise levels have been recorded in the form of sound pressure levels using a digital sound level meter. Details of noise level sampling locations is given in **Table 4-12**³¹. The sound level is recorded as A-weighted equivalent continuous sound pressure level (Leq) values using A-weighted filters in the noise measuring instrument.

Sl. No.	Code	Locations	Area Settings	GPS Coordinate	Date
1.	ANL1	Bhomra land port, Shatkhirra	Commercial Zone	22°40'8.14"N 88°56'59.20"E	25.12.2023
2.	ANL2	Hospitals,,	Residential Zone	22°41'27.70"N 89° 2'43.97"E	25.12.2023
3.	ANL3	Boro Jamtola, Kashempur, Shatkhirra	Mixed Zone	22°44'50.36"N 89° 2'51.08"E	26.12.2023
4.	ANL4	, Biharinagar, Jhaudanga, Satkhira	Residential Zone	22°47'54.73"N 89° 2'4.92"E	26.12.2023
5.	ANL5	Shah Aanullah degree collage, , Kolaroa, Shatkhirra	Residential Zone	22°52'15.51"N 89° 2'5.49"E	26.12.2023
6.	ANL6	Infron of Abdur Rouf's house, Beltola Bazar,	Silent Zone	22°56'28.75"N 88°59'4.53"E	24.12.2023
7.	ANL7	Jamtola Bazar, Sharsha, Jashore	Mixed Zone	22°59'37.92"N 88°58'42.61"E	24.12.2023
8.	ANL8	Bhomra land port, Shatkhirra	Commercial Zone	22°40'8.14"N 88°56'59.20"E	24.12.2023

4.5.2.1 RESULTS AND DISCUSSION

136.An electronic and auto-recorded noise meter has been used to monitor ambient noise levels. The recorded noise level monitoring results are presented in **Table 4-13** and ³²

Sl. No.	Code	Noise Level (dBA)							*Standard (dBA)	
		Leqday	Leqnigh	L90	L10	L50	Lmax	Lmin	Day	Night
1.	ANL1	63.6	49.9	48.6	60.1	54.2	85.4	47.8	70	60
2.	ANL2	58.5	45.1	44.6	59.7	49.7	80.3	38.7	55	45
3.	ANL3	64.6	45.9	39.0	63.7	51.0	82.7	37.1	60	50
4.	ANL4	53.8	39.3	32.8	46.0	43.4	75.6	32.2	55	45
5.	ANL5	51.4	36.7	32.7	50.2	42.5	72.9	32.0	50	40
6.	ANL6	61.9	46.4	34.2	64.7	48.8	42.6	32.3	60	50
7.	ANL7	64.1	50.3	46.6	53.1	50.9	84.1	46.6	60	50
8.	ANL8	69.4	59.5	50.4	63.4	58.6	91.3	40.4	70	60

Note: *Noise Pollution (Control) Rules, 2006

137.According to the Noise Pollution Control Rules 2006, the project locations fall into four categories. Among these locations, ANL-2, ANL-3, ANL-5, ANL-6, and ANL-7 cross the national standard slightly because of the high noise from vehicles in the daytime. National and international standards and detailed results are shown in **Table 4-13** above, and a graphical presentation of ambient noise level monitoring results along with Standards is presented in **Figure 4-17**

³¹ Source: Primary Data Collection by the Environment Team of STUP-BCL JV, December 2023

³² Source: Primary Data Collection by the Environment Team of BCL JV, December 2023

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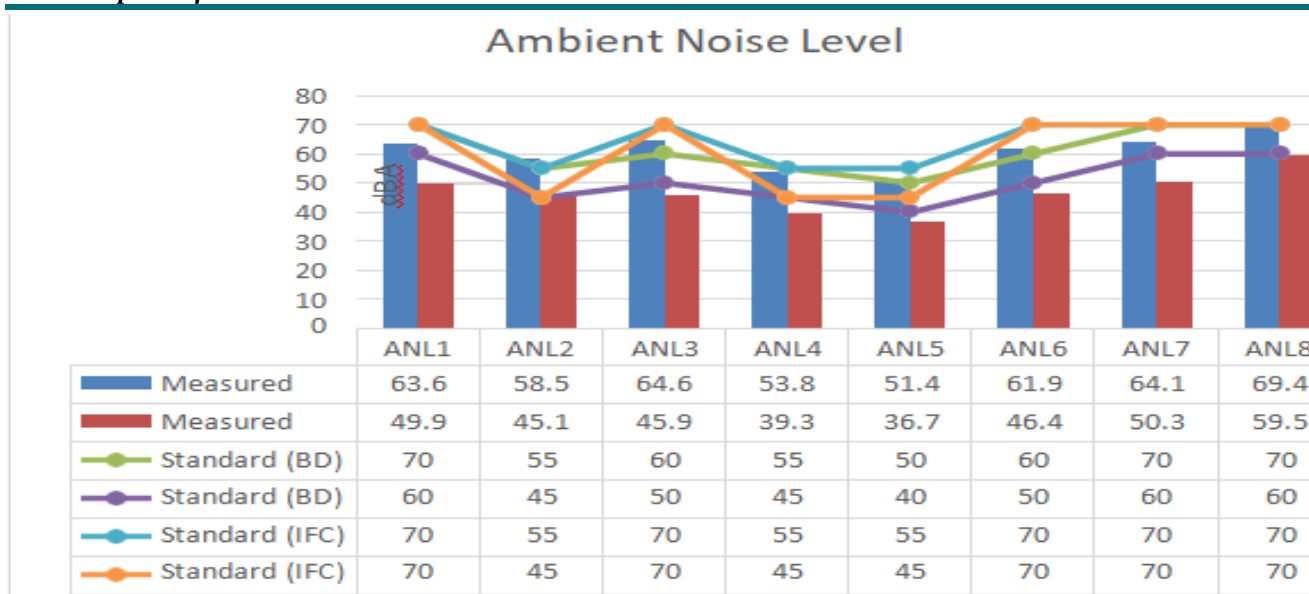


Figure 4-17: Noise Level Results

138. Vehicle movement, population gathering in local markets, and other noise-generating activities, such as loudspeakers, were the leading causes of noise in the project area.

4.5.3 AMBIENT VIBRATION LEVEL

139. Considering the movement of the heavy vehicle on the proposed road section, vibration levels were measured at eight locations and at same the locations where air and noise monitoring were carried out, presented in **Figure 4-10**³³. The ambient vibration monitoring locations shows **Table 4-14**³⁴. A digital vibration level meter records the vibration level at eight locations in the study area.

Table 4-14: Vibration Level Monitoring Locations					
Sl. No.	Code	Locations	Area Settings	GPS Coordinate	Date and Time
1.	VL1	Bhomra land port, Shatkhira	Commercial	22°40'8.14"N 88°56'59.20"E	25.12.2023
2.	VL2	Quarter, Shatkhira Medical College, Shatkhira	Residential	22°41'27.70"N 89° 2'43.97"E	25.12.2023
3.	VL3	Boro Jamtola, Kashempur, Shatkhira	Mixed	22°44'50.36"N 89° 2'51.08"E	26.12.2023
4.	VL4	Infront of Masum Billah's house, Biharinagar, Jhaudanga, Satkhira	Residential	22°47'54.73"N 89° 2'4.92"E	26.12.2023
5.	VL5	Shah Aanullah degree college, Tulshidanga, Kolaroa, Shatkhira	Residential	22°52'15.51"N 89° 2'5.49"E	26.12.2023
6.	VL6	Infron of Abdur Rouf's house, Beltola Bazar,	Silent	22°56'28.75"N 88°59'4.53"E	24.12.2023
7.	VL7	Jamtola Bazar, Sharsha, Jashore	Mixed	22°59'37.92"N 88°58'42.61"E	24.12.2023
8.	VL8	Bhomra land port, Shatkhira	Commercial	22°40'8.14"N 88°56'59.20"E	24.12.2023

4.5.3.1 RESULTS AND DISCUSSION

140. An electronic and auto-recorded vibration meter has been used to conduct the study. The recorded vibration levels summary monitoring results are shown in **Table 4-9**³⁵. The project area's vibration intensity is negligible. On the other hand, the vibration from traffic on a neighboring road is insignificant.

³³ Source: Primary Data Collection by the Environment Team of BCL JV, December 2023

³⁴ Source: Primary Data Collection by the Environment Team of BCL, December 2023

³⁵ Source: Primary Data Collection by the Environment Team of BCL JV, December 2023

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Table 4-15: Vibration Level Analysis Results					
Sl. No.	Code	Vibration Level (mm/s)			Standard (mm/s)
		Average	Maximum	Minimum	
1.	VL1	0.63	1.2	0.13	Not Set Yet for Bangladesh
2.	VL2	0.87	1.95	0.12	
3.	VL3	0.98	1.91	0.23	
4.	VL4	0.74	1.27	0.11	
5.	VL5	0.71	1.90	0.27	
6.	VL6	0.64	1.02	0.28	
7.	VL7	0.62	1.23	0.09	
8.	VL8	0.79	1.37	0.08	

141. Therefore, the average vibration level on the existing highway ranges from 0.63 to 0.98 mm/s (**Figure 4-18**). Many vehicles have been moving on this highway during both daytime and nighttime. The main sources of vibration generation in the study area are road traffic, local construction, heavy traffic, etc.

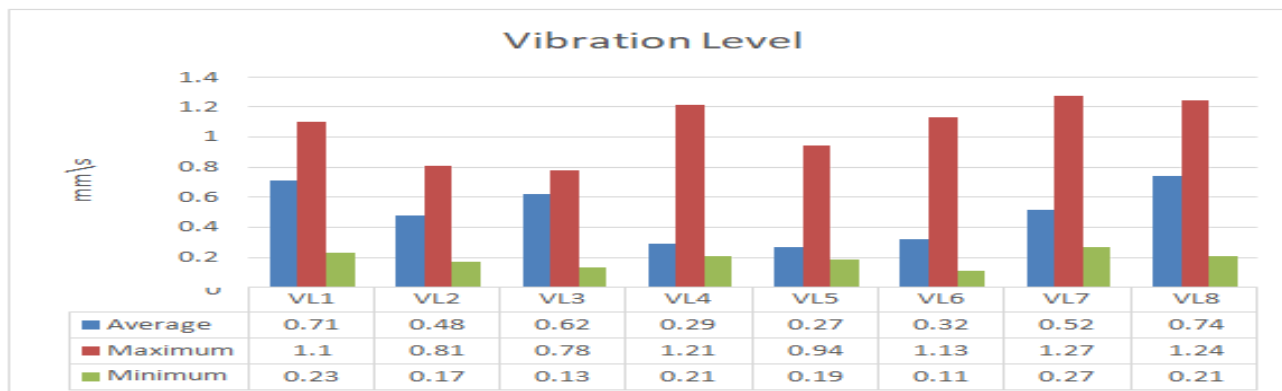


Figure 4-18: Vibration Monitoring Results

4.5.4 SURFACE WATER QUALITY

142. During the field survey, samples were collected from around the proposed highway's key rivers and canals (e.g., Betna River, Bakal Canal, and Noukhal Canal). Surface water samples were collected from the six selected locations given in Table 4-16. The consultant collected these samplings and testing is done by the Bangladesh Environmental Engineering Training and Lab Services Ltd. to test the water quality parameters. The water samples were analyzed for the bacteriological and physio-chemical parameters and compared to the national and international standards.

Table 4-16: Surface Water Sampling Details from River					
Water Type	Code	Source of water	Sampling location	Date and Time	Coordinates
Surface Water	SW-1 (Upstream)	Bakal Canal	Alipur, Shatkhirra	08/02/2024 7:05 AM	22°41'40.12"N 89° 2'36.34"E
	SW-1 (Downstream)			08/02/2024 7:15 AM	22°41'27.53"N 89° 2'39.68"E
Surface Water	SW-2 (Upstream)	Noukhal Canal	Brozobaksha Bazar, Kolaroa, Shatkhirra	08/02/2024 8:10 AM	22°53'22.22"N 89° 1'29.49"E
	SW-2 (Downstream)			08/02/2024 8:25 AM	22°53'4.31"N 89° 1'26.69"E
Surface Water	SW-3 (Upstream)	Betna River	Navaron, Jhikargacha, Jashore	08/02/2024 09:30 AM	23° 3'35.45"N 89° 0'9.07"E
	SW-3 (Downstream)			08/02/2024 09:50 AM	23° 3'24.38"N 89° 0'10.07"E

Source: Primary Data Collection by the Environment Team of BCL.

143. The surface water of the project area is analyzed using biological and physiochemical parameters. All of the parameters are compared with the national standard. The surface water analysis results compared to the standard are shown in **Table 4-1**. The test reports are in Annex 3.18.

144. Surface water parameters from the project road alignment's water bodies have been compared with the Environmental Conservation Rules (ECR), 1997. All the surface water parameters have been compared to schedule 2 accordingly. All parameters in all sampling locations are found within the standard.

4. Description of the Environmental and Social Baseline

Table 4-17 : Surface Water Analysis Results of River

Parameters	Unit	SW1 (Upstream)	SW1 (Downstream)	SW2 (Upstream)	SW2 (Downstream)	SW3 (Upstream)	SW3 (Downstream)	Bangladesh Standard ³⁶	Test Method (APHA)
TDS	mg/L	222	355	207	200	205	213	1000	APHA 23 rd EDN. 2017 (2540 C)
Turbidity	NTU	5.04	4.85	1.65	3.20	2.46	3.50	NYS	APHA 23 rd EDN. 2017 (2130 B)
pH	--	6.89	6.78	7.01	6.89	6.04	7.14	6-9	APHA 23 rd EDN. 2017 (4500 O)
DO	mg/L	6.02	6.08	6.97	7.01	6.80	6.14	≥5	APHA 23 rd EDN. 2017 (4500 O)
Phosphate (PO ₄ ³⁻)	mg/L	<1.0	<1.0	<1.0	<1.0	1.1	1.3	NYS	APHA 23 rd EDN. 2017 (4500 P)
Nitrate	mg/L	3.1	6.2	4.4	7.2	5.3	8.2	10	APHA 23 rd EDN. 2017 (4500 NO ₃ -)
Oil and Grease	mg/L	5.20	4.23	4.01	4.12	5.16	4.19	10	APHA 23 rd EDN. 2017 (5520 B)
TSS	mg/L	29.4	23.11	28.6	36.2	21.89	34.06	100	APHA 23 rd EDN. 2017 (2540 D)
TC	CFU/1000 ml	120	123	219	116	225	227	≤5000	APHA 23 rd EDN. 2017 (9222 B)
FC	CFU/1000 ml	17	20	15	14	21	23	NYS	APHA 23 rd EDN. 2017 (9222 D)
Temperature	°C	23	25	23	24	25	24	--	APHA 23 rd EDN. 2017 (2550 B)
BOD	mg/L	16.9	19.2	23.1	27.3	22.4	25.3	30	APHA 23 rd EDN. 2017 (5210 B)

Source: Laboratory Analysis by Bangladesh Environmental Engineering Training & Lab Service Ltd., February 2024

³⁶ Bangladesh Environment Conservation Rules, 2023- Schedule 2 (Standards for Inland Surface Water, Water Usable for Fisheries).

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4.5.5 GROUND WATER QUALITY

145. The aquifer in the project region is primarily recharged by deep percolation of rain and floodwater. The actual recharge appears far less than its potential, resulting in a significant drop in the seasonal water table. During the dry season, the groundwater level in the Project area decreases yearly. The combined consequences of decreasing rainfall, severe droughts, increasing warmth, and reduced river flow during the dry season are most likely the reasons for this loss. The project site is in a high land area, and water is available at 150-200 feet depth.

146. Groundwater samples were collected from the project site to analyze chemical parameters and obtain a primary idea regarding groundwater quality. Shallow tube wells in the project area were selected as groundwater sources. Details of the groundwater sampling locations are shown in **Tables 4-20**.

Water Type	Code	Source of water	Sampling location	Date and Time	Coordinates
Ground Water	GW-1	Tube well	Bhomra Landport road, Alipur Bazar, Shatkhira	08/02/2024 07:45 AM	22°41'13.03"N 89° 1'14.43"E
Ground Water	GW-2	Tube well	Khalsi, Heltola, Kolaroa, Shatkhira,	08/02/2024 8:50 AM	22°53'16.45"N 89° 1'29.17"E
Ground Water	GW-3	Tube well	Ramizuddin's house, Islampur, Navaron, Jashore	08/02/2024 10:05 AM	23° 3'34.04"N 89° 0'10.69"E

Source: Primary Data Collection by the Environment Team of BCL.

147. The ground water of the project area is analyzed on biological and physio-chemical parameters. All the parameters are compared with the national standard. The groundwater analysis results compared to the standard are shown in **Table 4-19**.

Parameters	Unit	GW1	GW2	GW3	Bangladesh Standard ³⁷	Test Method (APHA)
Fe	mg/L	0.67	0.77	0.54	0.3-1.10	APHA 23rd EDN. 2017 (3500- Fe)
Mn	mg/L	0.38	0.42	0.19	0.4	APHA 23rd EDN. 2017 (3500- Mn)
pH	--	6.77	7.09	6.92	6.5-8.5	APHA 23rd EDN. 2017 (4500 O)
As	mg/L	<0.002	<0.002	<0.002	0.05	APHA 23rd EDN. 2017 (3500- As)
Cl ⁻	mg/L	24	49	54	250	APHA 23rd EDN. 2017 (3500- Cl-)
PO ₄ ³⁻	mg/L	4.02	6.08	8.01	15	APHA 23rd EDN. 2017 (3500 P)
NO ₃ ⁻	mg/L	8	11	13	45	APHA 23rd EDN. 2017 (3500-NO ₃ -)
SO ₄ ²⁻	mg/L	<25	<25	<25	250	APHA 23rd EDN. 2017 (3500-SO ₄ ²⁻)
Temperature	°C	24	25	24	20-30	APHA 23rd EDN. 2017 (2500 B)
TC	CFU/1000 ml	21	29	34	0	APHA 23rd EDN. 2017 (9222 B)
FC	CFU/1000 ml	11	19	15	0	APHA 23rd EDN. 2017 (9222 D)

Source: Laboratory Analysis by Bangladesh Environmental Engineering Training & Lab Service Ltd., February 2024

148. Groundwater parameters of the existing sources have been compared to the best practices tools in Bangladesh called Environmental Conservation Rules (ECR), 1997, Schedule 3 (B) for understanding the baseline status of the parameter's quality. After a comparative study between the testing data and the standard, it's easy to understand that Manganese (Mn) for GW2 is slightly higher than the standard. Total and fecal coliform also exceed the standard, indicating that the samples' groundwater is biologically polluted. Besides these, other

³⁷ Bangladesh Environment Conservation Rules, 2023, Schedule-2(B).

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parameters are within the standard. Literature also shows that with frequent waterlogging, floods, and improper sanitation, water bodies in the country are getting contaminated with fecal coliform and various pathogenic bacteria (Sarker et al.2019; Rahman et al., 2014). Most of the cities of Bangladesh rely almost exclusively on groundwater for their water supply (Khan, 2019; Hasan et al., 1999; Zuthi et al., 2009).³⁸ This intensive water abstraction from the aquifer has induced rivers' recharge and enhanced vertical leakage from contaminated regions. Poor-quality water has invaded the aquifer from a polluted stretch of river (Rampley et al., 2020; Burgess, et al., 2011).³⁸ The SEA report Sundarbans reports that Arsenic contamination of drinking water is a serious issue in parts of the SW region and may be due to rice cultivation in the area.³⁹

4.6 HYDROLOGY AND WATER RESOURCES

4.6.1 GENERAL HYDROLOGY AND RIVER NETWORK

149. Rivers play a crucial role in shaping geopolitics and human culture. Several rivers are in the Jessore and Satkhira districts, and project roads either run parallel to some of them or cross at different locations.

150. The project area belongs to the Gangetic Plain. The water of the Ganga once inundated it through several small rivers. During the exploration by the ecology team in the project area, five canals, rivers, and a good number of ponds were detected. These are Brozobaksha canal, Pran Sayer canal, Satkhira canal, and Gangnia canal, crossing the project road at four different spots, and the Betna river does not cross the project road but rather moves parallel to the project road up to Satkhira town. The rivers and canals have now almost lost their navigation. Rivers and channels are essential habitats for many plants and animals. Aquatic plants, insects, aquatic birds, fish, reptiles, amphibians, and invertebrates live in the rivers and channels. They all find their food in the river. The river and canals connect different habitats and their value to plants and animals. Rivers, channels, and wetlands in the Satkhira district are sensitive issues related to commercial marine fish cultivation and waterlogging systems. Any impacts on the channels and rivers from development works may raise huge debates among the local people.

151. Betna River originates from India and enters Bangladesh along with the Benapole border of the greater Jashore district. The river moves towards the east along the Jashore road, finally crosses the road on the eastern side of Navaron, and moves towards the south along the Navaron – Satkhira Highway. Before crossing Navaron Road, the Betna River coiled many times in the Sarsha upazila, and blockages of many parts of the river created several Oxbow lakes. When the river reaches Khulna, it is called the Kalia River and forms a branch called the Dalua River. The Kalia River is a tributary of the Kobadak River. When it reaches the Sundarbans, the Betna River changes its name to the Arpangachhia River. The river changes its name again to the Malancha River before flowing into the Bay of Bengal. Upstream, the river is dissected into different ponds and used by the locals for fish cultivation. The Betna River flows during the rainy season and transports rainwater from the western part of Jassore district. During the dry season, the river lost its flow towards Shatkhiria. When the river lost its flow, it was occupied by several aquatic vegetation, including water hyacinths.

152. Brozobaksha channel is the natural distributary branch of the Betna River that originated from the Bikhali area near the north-eastern corner of Kalaroa upazila, crossed the Navaron-Satkhira road before Kalaroa upazila, and finally met in the Pransayer channel before Satkhira town at the bypass road. The water of this channel is mainly covered by aquatic vegetation, and an abundant one is water hyacinth with other associated aquatics. Some water-tolerant common tree species ornament both sides of the banks. Common insects, aquatic birds, fish, reptiles, amphibians, and invertebrates live in this channel.

153. Pran Sayer canal (manmade) is a downstream branch of the Brozobaksha channel; it started in the north of Satkhira Sadar, passed through Satkhira town, and finally met at the Satkhira channel in the southern part of the town. This canal is mainly created to drain water from the north part of Satkhira Sadar to the Satkhira canal at the south. Currently, this channel is polluted and sometimes logged by the solid pollutants from the town. The maximum area of canal water covered by aquatic vegetation, including water hyacinth. Some water-tolerant tree species are seen on both sides of the banks. Common pollutant-tolerant insects, aquatic birds, fish, reptiles, amphibians, and invertebrates live in this channel. Jhdjshjdhs.

154. Satkhira canal (upstream of the Marrichap River and called Bakalabadani channel) was created from the Morrichap River endpoint to facilitate water drainage from upstream and to provide water for the cultivation of commercial fisheries in the northern part of Satkhira Sadar Upazila. This canal crossed the project road near the medical college on the west side of Satkhira town. On the bank of Satkhira channel, the district administration established an eco-park using both land and mangrove plant species. The plantation program and related works

³⁸ Parvin, F., Haque, M. M., & Tareq, S. M. (2021). Recent status of water quality in Bangladesh: A systematic review, meta-analysis and health risk assessment. *Environmental Challenges*, 6, 100416. <https://doi.org/10.1016/j.envc.2021.10041>

³⁹ Updated Draft Final SEA Report, September 2021, Bangladesh Forest Department (BFD) of the Ministry of Environment, Forestry and Climate Change.

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at the park are not finished yet. Any development activities near this eco-park are sensitive to the park environment. The water surface of this channel is free from substantial aquatic vegetation. Many mangrove plant species, like Sundarban vegetation, ornament both banks. Common insects, aquatic birds, fish, reptiles, amphibians, and invertebrates live in this channel.

155. The Gangnia channel, a natural channel, started from the north-western part of the Satkhira district near the Indian border, crossed the road before the Bhomra landport moved south, and finally met the Labangabati River, where the Swish gate-controlled water flow. Currently, large-scale commercial marine fish farming is taking place in the upstream area of this channel. The water surface of this channel is free from huge aquatic vegetation. Several mangrove plant species, like Sundarban vegetation, ornament both banks. Common insects, aquatic birds, fish, reptiles, amphibians, and invertebrates live in this channel.

156. All rivers and canals usually lose their natural water flow due to siltation, encroachment, and fish cultivation wherever and whenever local people get the opportunity in the project area. These rivers and channels downstream are controlled by a SWISH gate to control water-logging upstream, where commercial cultivation of marine fish is practiced. Once Satkhira Sadar Upazila suffered permanent waterlogging, the water development board took the necessary steps to solve it by digging channels and making networks among the rivers and channels. In recent years, local entrepreneurs have subjected the water-logged area to marine fish cultivation. Such cultivation is enhanced by the water supply downstream. The water development board monitors all the channels. In some cases, water hyacinth is seen during the dry season.

157. The upgrade from a 2-lane to a 4-lane road won't significantly impact local or regional hydrology due to the area's southwest gradient. Existing east-west openings on the road embankment prevent drainage issues during monsoons. The construction will largely follow the current alignment, maintaining the number of hydrological structures but with larger water openings and additional cross-drainage structures to address hydrological and climate change considerations.

4.7 NATURAL HAZARDS

158. Bangladesh is almost 10% prone to seasonal floods and up to 24% vulnerable to flooding during wet years. Deadly tropical cyclones regularly hit it due to its unusual geographic location. When cyclones land, the funnel-shaped northern region of the Bay of Bengal creates tidal waves, affecting thousands of people along the shore. The project area is geographically elevated because Jashore is in Bangladesh's southwestern region and near the Bhairab River. It has a low risk of natural disasters such as floods, cyclones, and earthquakes.

4.7.1.1 FLOODING

159. The area has a moderate risk of natural disasters like cyclones and floods, as it is geographically low-lying. The start of the project road at Navaron has a higher elevation than the endpoint at Satkhira, which is low-lying.

160. Floods occur moderately in the project region but not regularly due to its geographic location. The classification is based on the BWDB's flood management database from 1998. Flood zones are shown in Annex 3.19. According to the BWDB, a moderate flood zone is where 1-5 feet of flooding occurred in 1998. Rapid landfilling by land developers has significantly altered the terrain of the surrounding area, and it is expected that rapid filling will gradually encroach on the floodplains of the Bhairab and Chitra rivers. Both rivers' water levels will rise due to the current landfilling tendency and future urbanization. The crest level of the road must be calculated because of rising water levels in adjacent rivers and unpredictable local high rainfall in a short period due to climate change. The water levels of the Periphery Rivers determine the drainage of the surrounding areas. As a result, the project region is safe from intensive flooding. According to flood records from 1988 and 1998, during the high flood, the project road communication was never hindered or damaged. This national roadway is elevated above the flood level. There is no submergence of the road due to flooding in the area, but waterlogging is a problem.

4.7.1.2 CYCLONE

161. Cyclones are most common in the Bay of Bengal between April and May and October and November. Bangladesh is frequently the landing ground of cyclones originating in the Bay of Bengal because of its funnel-shaped shoreline. From 1793 to May 2021, there were approximately 54 devastating cyclones in Bangladesh's coastal area. During this time, cyclones occurred around once every 4.5 years on average. These cyclones wreak havoc on the country's farms, crops, infrastructure, and the lives of coastal residents. The cyclone intensity around the project site is often lower than in other parts of the coastal belt. Deadly tropical cyclones regularly hit Bangladesh due to its unusual geographic location. When cyclones land, the funnel-shaped northern region of the Bay of Bengal creates tidal waves, affecting thousands of people along the shore. The project area is not located

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in a cyclone danger zone. The project area is geographically elevated because Jashore is in Bangladesh's southwestern region near the Bhairab River. It has a low risk of natural disasters like cyclones, floods, and earthquakes.

4.8 ECOLOGY AND BIOLOGY

162. To establish the baseline of ecology and biodiversity, field investigations have been carried out along the road alignment, and a study area has been defined. The study has been carried out from 21 May to 23 May 2024 and 20th September 2024.

4.8.1 STUDY AREA

163. The study area has been taken as a 55 km x 200 m area on the highway that extends from Navaron Point, Jessore, to Bhomra Land Port, Satkhira. The total length of the proposed highway (approximately 55 km) has been taken as the transect, and the width has been considered 200 m, i.e., 100 m from the center line of the proposed road on both sides (RHS and LHS), which formed the study area for carrying out the assessment. For the sampling, ten (10) square quadrats, each of area 200 m × 200 m, have been selected within the study area mentioned above. Moreover, four cross-canal sites have also been studied for carrying out aquatic surveys, especially for fish and aquatic fauna. If the quadrat has fallen in the market area (*bazaar*), the quadrat has been shifted before or after the bazaar for better representation of ecological assessment. The locations of these sampling stations are in **Table 4-20**. In addition to this survey, another survey was conducted to enumerate all trees that fall on both sides (RHS and LHS) of the road from the center and will be cut down during the road construction. These trees belong to RHD, Social Forestry, Zila Parishad, and private owners.

Sl no.	Sampling Spot	Location	Latitude	Longitude
1	Quadrat 1	Navaron Mor	23°03'29"N	88°59'56"E
2	Quadrat 2	Harikhali	23°00'18"N	88°59'24"E
3	Quadrat 3	Bagachra	22°57'15"N	88°59'02"E
4	Quadrat 4	Kazirhat	22°54'39"N	89°00'55"E
5	Quadrat 5	Kalaroa	22°51'42"N	89°01'59"E
6	Quadrat 6	Jhaudanga	22°48'24"N	89°02'01"E
7	Quadrat 7	Betla	22°45'19"N	89°03'03"E
8	Quadrat 8	Fariduler Mor	22°42'11"N	89°03'18"E
9	Quadrat 9	Daspara	22°40'56"N	89°00'14"E
10	Quadrat 10	Bhomra Land Port	22°40'09"N	88°56'53"E

164. The location map of the sampling as mentioned above sites is presented in Annex 3.16.

4.8.2 TERRESTRIAL ECOLOGY

Terrestrial habitats include roadsides, homesteads, and cultivated lands. A total of 119 woody plant species that include shrubs, trees, and climbers (excluding herbs) have been recorded from the terrestrial habitat of the study area. Among the recorded 119 species (Refer to **Figure 4-19** and **Figure 4-20**), 38% were represented by fruit-bearing tree species, followed by ornamental (25%), medicinal (24%), and timber-producing plants (13%). A detailed list of tree species is provided in Annex 3.17. From the assessment of terrestrial flora, species under the Red List categories of IUCN (Threatened, Endangered, Critically Endangered, Vulnerable, and so on), species protected by laws including CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), and species protected by the Wildlife Protection & Security Act, 2012 were not recorded. In addition, roadside flora, homestead flora, agricultural flora, and aquatic flora are briefly discussed in the following subsections.

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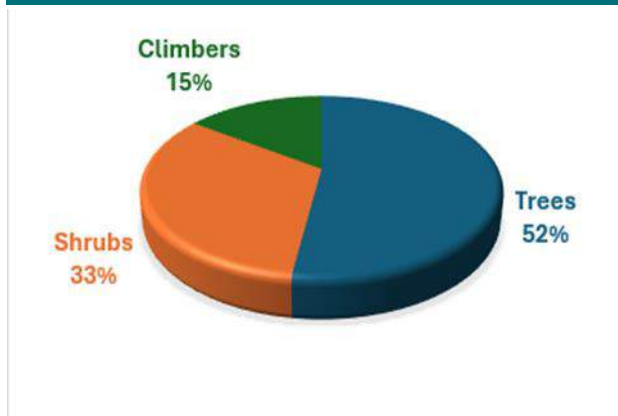


Figure 4-19: Habit groups of plant species

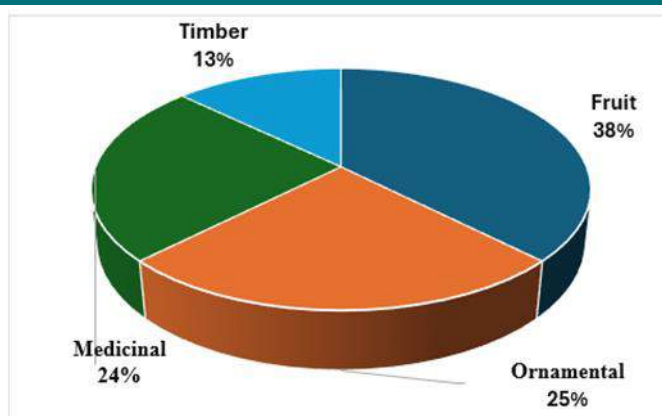


Figure 4-20: %age of terrestrial trees

4.8.2.1 ROADSIDE FLORA

165. The trees found in the road alignment were planted by RHD, Social Forestry Division, and Zila Parisad. Most common trees are *Samanea saman* (Rain tree), *Phoneix dactylifera* (Khejur), *Senna siamea* (Minjiri), *Terminalia arjuna* (Arjun), *Swietenia mahagoni* (Mahogoni), *Borassus flabellifer* (Taal), *Dalbergia sissoo* (Sishu Gach), *Ficus benghalensis* (Bot), *Ficus religiosa* (Ashwatha Bot), *Moringa oleifera* (Sajina), *Neolamarckia cadamba* (Kodom), *Pithocellobium dulce* (Khoiya Babla), *Mangifera indica* (Aam), *Artocarpus heterophyllus* (Kanthal), *Alibizia procera* (Sada Koroi), *Borassus flabellifer* (Taal), *Areca catechu* (Supari), and *Delonix regia* (Krishnachura). Some native bushy plants were also found on both sides of the road. The major species are *Calotropis gigantea* (Akanda), *Clerodendrum viscosum* (Vaati), *Ficus hispida* (Kak Dumur), *Glycosmis pentaphylla* (Motkila), and *Phyllanthus reticulatus* (Chitki). The ground has been covered by many herbaceous plants, particularly from the members of Poaceae, Cyperaceae, Asteraceae, Euphorbiaceae, Araceae, Vitaceae, and Fabaceae. *Parthenium hysterophorus*, an Invasive Alien Species (IAS) reported recently for its toxicity in different print and electronic media, is extant along the highway, even in the homestead and agricultural fields. Details are in Annex 3.18.

4.8.2.2 HOMESTEAD FLORA

166. As observed in the field, many tree species have been planted in each homestead, and it has the most diversity of plants of the total species collected. Many homesteads look like a segment of mini forest that includes many herbs, shrubs, semi-shrubs, and small or big trees.

167. The most common recorded tree species from the homestead part of the project site are *Mangifera indica* (Aam), *Moringa oleifera* (Shajna), *Lannea coromandelica* (Jiga), *Areca catechu* (Supari), *Psidium guajava* (Peyara), *Artocarpus heterophyllus* (Kanthal), *Azadirachta indica* (Neem), *Cocos nucifera* (Narikel), *Streblus asper* (Sheora), *Swietenia mahagoni* (Mahagani), *Murraya paniculata* (Kamini), *Zizuphus mauritiana* (Boroi), *Syzygium samarangense* (Jamrul), and *Litsea glutinosa*. Recorded common shrubs include *Carica papaya* (Pepe), *Clerodendrum viscosum* (Bhat), *Ficus hispida* (Kak Dumur), *Glycosmis pentaphylla* (Motkila), *Ocimum sanctum* (Tulshi), and *Bougainvillea spectabilis* (Baganbilash).

168. Besides, a good number of herbs have also been recorded from the area, including *Musa paradisiaca* (Kola), *Acalypha indica* (Muktajuri), *Ageratum conyzoides* (Fulkuri), *Amaranthus viridis* (Note Shak), *Eclipta alba*, *Euphorbia hirta* (Dudhia), *Agremone mexicana* (Shialkata), *Bambusa vulgaris* (Bash), *Centella asiatica* (Thankuni), *Enhydra fluctuans* (Helencha), *Heliotropium indicum* (Hatishur), *Cynodon dactylon* (Durba Ghas), *Nicotiana plumbaginifolia* (Bon Tamak), *Oxalis corniculata* (Amrul), *Lippia alba* (Sada Motmotia), *Senna sophora*, *Senna tora*, *Sida acuta*, *Synedrella nodiflora* (Synedrella), *Vernonia patula* (Vernonia), and many other species. As homestead plantations for edible purposes, vegetables like *Colocasia esculenta* (Kachu), *Alocasia macrorrhizos* (Man Kachu), *Basella alba* (Pui Shak), and *Amaranthus gangeticus* (Lal Shak) have been observed.

169. The local households are also abundant with climbers, especially if they contain backyard fallow lands. *Stephania japonica* (Akanodi), *Passiflora foetida* (Passion flower), *Cayratia trifolia* (Goale Lota), and *Mikania cordata* (Assam Lota) were common in those places. Besides, the tin-shed houses and their yards have also been found to contain vegetable climbers like *Benincasa hispida* (Chal Kumra), *Cucurbita maxima* (Misti Kumra), *Dioscorea alata* (Gach Alu), *Lablab purpureus* (Shim), *Lagenaria siceraria* (Lau), and *Momordica charantia* (Korla). Local people use the homestead species as sources of fruits, timber, firewood, medicines, and other household purposes.

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4.8.2.3 AGRICULTURAL LAND FLORA

170. The project area includes huge cultivated/agricultural land. In dry and rainy seasons, locals mostly use such lands for rice production. Some of the lands are used for winter and summer crops. Moreover, many *Mangifera indica* (Aam), *Carica papaya* (Pepe), *Areca catechu* (Supari), *Musa paradisiaca* (Kola), and *Alocasia macrorrhizos* (Man Kachu) gardens have been observed during the survey. Large mango gardens were seen in agricultural lands between Navaron and the beginning of the Satkhira bypass, in place of rice and other commercial crops. Local people also use some agricultural lands for woody plant cultivation, which includes *Swietenia mahagoni* (Mahagoni).

171. Besides *Oryza sativa* (Dhan) & *Triticum aestivum* (Gom), the agricultural lands of the project area are mainly used for *Allium cepa* (Peyaj), *Allium sativum* (Rasun), *Amaranthus gangeticus* (Lal Shak), *Lagenaria siceraria* (Lau), *Momordica quarantine* (Korola), *Vigna unguiculata* ssp. *sequepedalis* (Barbati), *Solanum melongena* (Begun), *Abelmoschus esculentus* (Dheros), *Cucumis sativus* (Shosa), *Basella alba* (Pui Shak), *Capsicum annum* (Morich), *Lablab purpureus* (Shim), *Benincasa hispida* (Chal Kumra), *Cucurbita maxima* (Misti Kumra), etc.

172. Commercial cultivation of *Cenchrus purpureus* (Napier Ghas), *Phoenix dactylifera* (Khejur), *Musa paradisiaca* (Kola), *Carica papaya* (Pepe), *Mangifera indica* (Aam), *Areca catechu* (Supari), *Swietenia mahagoni* (Mahagoni), and *Khaya anthotheca* (Lambu) trees were also found in the project area.

173. Mixed fruit cultivation has also been observed in some lands adjacent to households. Fruit trees like *Aegle marmelos* (Bel), *Annona squamosa* (Ata), *Areca catechu* (Supari), *Artocarpus heterophyllus* (Kanthal), *Mangifera indica* (Aam), *Averrhoa carambola* (Kamranga), *Citrus limon* (Lebu), *Citrus maxima* (Jambura), *Cocos nucifera* (Narikel), *Manilkara zapota* (Sofeda), *Neolamarckia cadamba* (Kadam), and *Limonia acidissima* (Kodbel) were common in these spaces.

Table 4-21: Girth Wise List of Major Tree Species

Girth Size in cm				
<30	30-80	81-120	120-180	>180 cm
<i>Artocarpus heterophyllus</i> (Khathal), <i>Neolamarckia cadamba</i> (Kodom), <i>Mangifera indica</i> (Aam), <i>Cocos nucifera</i> (Coconut), <i>Terminalia catappa</i> (Kathbadam), <i>Moringa oleifera</i> (Sajina), <i>Areca catechu</i> (Supari),	<i>Mimosa elengi</i> (Bakul), <i>Neolamarckia cadamba</i> (Kodom), <i>Swietenia mahagoni</i> (Mahogoni), <i>Mangifera indica</i> (Aam), <i>Moringa oleifera</i> (Sajina), <i>Cocos nucifera</i> (Coconut), <i>Samanea saman</i> (Raintree/Motakoroi), <i>Lannea coromandelica</i> (Jeol), <i>Tectona grandis</i> (Segun), <i>Manilkara zapota</i> (Sofeda),	<i>Samanea saman</i> (Raintree/Motakoroi), <i>Ficus benghalensis</i> (Bot), <i>Artocarpus heterophyllus</i> (Kanthal), <i>Swietenia mahagoni</i> (Mahogoni), <i>Mangifera indica</i> (Aam),	<i>Samanea saman</i> (Raintree/Motakoroi), <i>Mangifera indica</i> (Aam), <i>Swietenia mahagoni</i> (Mahogoni), <i>Dalbergia sissoo</i> (Sishu)	<i>Samanea saman</i> (Raintree/Motakoroi), <i>Swietenia mahagoni</i> (Mahogoni),

4.8.2.4 TERRESTRIAL FAUNA

174. A total of 80 fauna species were observed in the proposed corridor from Navaron, Jessore, to Bhomra, Satkhira. Among them, 6 (7.41%) were amphibians, 8 (9.88%) reptiles, 55 (67.90%) birds, and 11 (13.58%) mammals. The list of this status for all the wildlife present in the project site is given in Annex 3.19. Among them, 11 species were observed; those have an amphibious nature, and most of them are herpetofauna (amphibians and reptiles). Some reptiles, like *Varanus bengalensis* and *Calotes versicolor*, show arboreal nature. Almost 12 species of birds like *Pelargopsis capensis*, *Amaurornis phoenicurus*, *Nycticorax nycticorax*, *Bubulcus ibis*, *Alcedo atthis*, *Ardea alba*, *Ardeola grayii*, *Ardea intermedia*, *Dendrocygna javanica*, *Microcarbo niger*, *Egretta garzetta*, and *Halcyon smyrnensis* are highly dependent on water bodies for their food. Among the 80 species, only one species is regarded as a threatened species, and it is the fishing cat (*Prionailurus viverrinus*), considered an endangered (EN) species according to the IUCN Red List Bangladesh, 2015. Two species, the Bengal Monitor Lizard (*Varanus bengalensis*) and Binocellate Cobra (*Naja naja*), are regarded as Near Threatened (NT) species due to the destruction of their habitat. The remaining species are regarded as Least Concern (LC) species. All the avifauna and amphibians found in the study area are regarded as least concern (LC) species. The survey found no endemic and Critically Endangered (CR) species, keystone, flagship, or umbrella species. Among the recorded species, 14 species are protected by CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). *Varanus bengalensis* is under the CITES appendix I, and *Herpestes edwardsii* and *Paradoxurus hermaphroditus* are under appendix III. *Hoplobatrachus tigerinus*, *Ptyas mucosa*, *Naja naja*, *Athene brama*,

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Milvus migrans, *Elanus caeruleus*, *Ninox scutulata*, *Tyto alba*, *Felis chaus*, *Canis aureus*, and *Prionailurus viverrinus* are under CITES appendix II. Finally, all these species are protected by the Wildlife Protection & Security Act of 2012.

4.8.3 AQUATIC ECOLOGY

175. The aquatic flora and fauna are discussed in project area in the following subsections.

4.8.3.1 AQUATIC FLORA

176. In the highway corridor from Navaron (Jashore) to Bhomra Land Port (Satkhira), only a few natural wetlands/haors (locally called *bangor*) were found during the field survey. The *bangors* are named *Shamtar bangor* and *Belikhuri bangor*, situated near Jamtola. Moreover, locals have informed us that another baor named *Konida baor* is also present in Jamtola. These baors were once huge; however, gradual exploitation of the river and canals feeding the baor has reduced their size. Now the baors are fragmented and owned for commercial fish production by the local landlords.

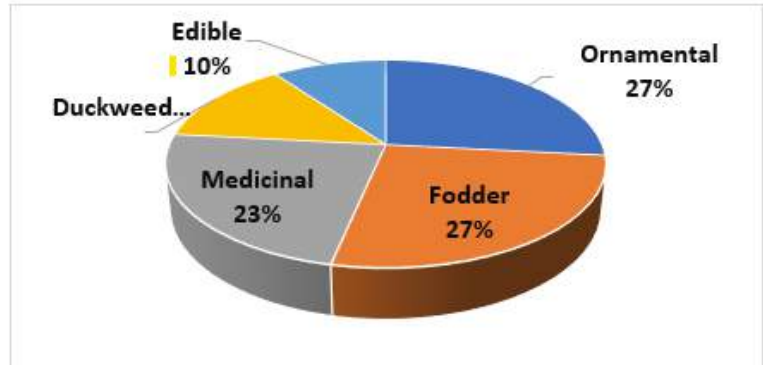


Figure 4-21: %age wise aquatic plants of the project site.

177. Besides, many man-made ponds, seasonal wetlands, and four small canals are present, sporadically supporting a non-luxurious growth of aquatic flora except by invasive alien species, including water hyacinth (*Eichhornia crassipes*). The water bodies also support many algal flora, though those are not counted and recorded in the study.

178. From the aquatic habitat assessment along the road alignment, 30 species have been recorded. Among the species, the maximum species are ornamental (27%) and used for fodder purposes (27%) followed by medicinal (23%), duckweed (13%), and edible (10%). From the assessment of aquatic flora, species under the Red List categories of IUCN (Threatened, Endangered, Critically Endangered, Vulnerable, and so on), species protected by laws including CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), and species protected by the Wildlife Protection & Security Act, 2012 were not recorded. Apart from the lists of both aquatic and terrestrial angiosperm flora, a non-significant growth of lower groups of flora, such as fungi, algae, moss, and ferns, was observed along the alignment. A detailed list of the recorded aquatic flora has been provided in Annex 3.20. In the aquatic habitat of the project site, the most common aquatic species are *Eichhornia crassipes* (Kachuri pana), *Enhydra fluctuans* (Helencha), *Alternanthera sessilis* (Sanchi), *Ludwigia adscendens* (Keshordam), *Ipomoea aquatica* (Kolmi), *Nymphaea nouchali* (Shapla), *Nymphoides hydrophylla* (Panchuli), *Utricularia* (Jhaji), *Pistia stratiotes* (Topapana), *Lemna minor* (Lemna), *Azolla* sp. (*Azolla*), *Ottelia alismoides* (Panikola), *Schoenoplectus articulatus* (Chechra), and *Cyperus rotundus* (Sedge). Apart from this, luxuriant growths of the members of grass and sedge families were observed on the edges of wetlands.

4.8.3.2 AQUATIC FAUNA INCLUDING FISH

179. Forty-nine (49) fish and crustaceans were identified through field study, visiting local fish markets, interviews, and discussions with local fishermen. These fish species are said to be caught from 4 river/canal sites that crisscross the proposed corridor. These are listed in Annex 3.20. The area covered several man-made ponds, approximately more than 150 in number, four rivers and small channels, and some seasonal ditches. During the dry season, all seasonal ditches become dry. During the rainy season, they became full of water and supported several native fish populations. In the case of ponds, some are commercially cultivated, and some are not. The rivers have adequate flow during rainy periods, but the water becomes almost stagnant in the summer or dry season. A total of 7 threatened fishes were recorded, including 4 endangered (EN) and 3 vulnerable (VU) species.

180. A good number of local fish were recorded during the catchment survey and market survey. The major fishes and crustaceans are *Amblypharyngodon mola* (Mola), *Putinus spp.* (Puti), *Channa punctatus* (Taki), *Channa striata* (Shoal), *Lepidocephalichthys guntea* (Gutum), *Channa gachua* (Chang), *Chanda nama* (Lomba Chanda), *Pseudambassis ranga* (Chanda), *Mystus tengara* (Bajari Tengra), *Clarias batrachus* (Magur), *Heteropneustes fossilis* (Shinghi), *Mastacembelus armatus* (Baim), *Trichogaster fasciata* (Kholisha), *Heteropneustes* (Shing), *Clarias batrachus* (Magur), *Anabus testudineus* (Koi), *Channa marulius* (Gojar), and *Macrobrachium rosenbergii* (Golda Chingri). Besides, 9 exotic species are also found in cultivated ponds, and they are:

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Oreochromis mossambicus (Telapia), *Cyprinus carpio* (Common Carp), *Pangasianodon hypophthalmus* (Pangas), *Ctenopharyngodon idella* (Grass Carp), *Hypophthalmichthys molitrix* (Silver Carp), *Cyprinus carpio* (Mirror Carp), *Barbonymus gonionotus* (Java Barb), *Mylopharyngodon piceus* (Black Carp), and *Oreochromis niloticus* (Nile Telapia). From the assessment of aquatic fauna, some species under the Red List categories of IUCN (Endangered, Critically Endangered, Vulnerable, and Least Concerned), species protected by laws including CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), and species protected by the Wildlife Protection & Security Act, 2012 were recorded. However, these fish species are also common in the greater adjacent part of the corridor.

4.8.4 ECOSYSTEM SERVICES

181. Ecosystem services are the direct or indirect benefits that ecosystems and their components provide to local communities. These services are generally classified into four categories: supporting, cultural, provisioning, and regulatory. In relation to the project corridor, no naturally sensitive, significant, or designated critical ecosystem areas are nearby. The Sundarbans, which is a notable ecosystem, is located 50 kilometers from the corridor, indicating that the project is unlikely to affect it.

182. However, project activities may have a temporary impact, potentially affecting local environmental components such as soil, water, air and tree cutting as discussed above. An environmental and social management plan is devised to minimize and mitigate potential impacts from the project implementation and operation phase. There are no legally protected species or ecosystems in the project area. Nevertheless, an ecosystem restoration plan has been included to ensure that any temporary disruptions are managed effectively.

4.8.5 CONCLUSION

183. From the assessment of both terrestrial and aquatic flora and aquatic fauna, some species under the Red List categories of IUCN (Threatened, Endangered, Critically Endangered, Vulnerable, and Least Concerned), species protected by laws including CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), and species protected by the Wildlife Protection & Security Act, 2012, were recorded in the project area. In the case of terrestrial fauna, the species observed in the project site belonging to the IUCN category were seen occasionally during the survey. Road alignment is not their permanent habitat. So, ultimately, these fauna species will not stay in the project site; rather, they will return to their original habitats. Moreover, no endemic species were found in the study area, and no genetic resource was recorded from the survey. Further, no flagship, umbrella or keystone species are found in the study area. Some faunal supporting species, such as *Ficus benghalensis* (Bot), *Bombax ceiba* (Shimul), *Ficus religiosa* (Ashwath), and *Madhuca longifolia* (Mohua), were found during the survey within the study area; however, these are also available outside the study area. Thus, removing these species will not cause any impact on faunal species due to the construction of the project road. No previously declared protected area/national park/wildlife sanctuary is located within the study area or along the project corridor except an eco-park at the bank of Satkhira Khal @ 1.74 Km from the proposed alignment.

4.9 SOCIOECONOMIC CONDITION

184. The present subsection described the existing socioeconomic condition along the project road alignment.

4.9.1 CENSUS AND INVENTORY OF LOSS SURVEY

185. The following tasks have been carried out during the field investigations to establish the baseline conditions within the Corridor of Impact (COI). The field investigation was conducted between October 15, 2023, and June 30, 2024.

- ▶ Census Survey
- ▶ Inventory of Loss (IOL) Survey,
- ▶ Socioeconomic survey,
- ▶ Stakeholder Consultation Meetings,
- ▶ Focus Group Discussion
- ▶ Key Informant Interviews as per the ESS1:

186. Environmental and social risks and impacts have been assessed using the corresponding outcomes of the tasks carried out in the field investigations.

187. The social baseline has gathered⁴⁰ disaggregated data on 'vulnerable households, disadvantaged, and marginalized groups/people. Relevant information will be presented later in this chapter in the ESMP and in the

⁴⁰ BCL Social Team

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updated RAP. Disaggregated data on the ‘vulnerable households, disadvantaged, and marginalized groups/peoples, anticipated risks and impacts of the project on them, and mitigation measures are presented in the ESMP and the Entitlement Matrix of the updated RAP.

188. The data analysis covers (a) the affected population by gender, (b) affected households, (c) age distribution, (d) dependency ratio, (e) household size, (f) religious demographics, (g) educational levels; (h) marital status; and (i) economic profiles including occupations, income, expenditures, vulnerable groups, and a list of CRPs.

4.9.2 ADMINISTRATIVE STRUCTURE

189. The implementation agency of the Bhomra-Satkhira-Navaron Road Section in Phase 3 of the WeCARE program is the RHD– through the World Bank Assistance. Local Government Institutes at different levels, from Union Parishad, Union Land Office, AC (Land) Office, Upazila Land Settlement Office, Upazila Parishad, UNO Office, Pouroshava, District Parishad, and Deputy Commissioner Offices have been playing necessary significant roles in land acquisition. They will also be involved in implementing the project and the RAP.

190. The proposed road extends between Satkhira and Jashore districts, affecting four upazilas. In the Jashore district, Jhikorgachha and Sharsha are impacted. In Satkhira district, Satkhira Sadar and Kalaroa are affected. **Table 4-22** below shows the distribution of length in km and the affected mouzas, Unions, upazilas, and Districts, along with their Administrative Structures.

Table 4-22: Lot Wise Affected Upazilas, Unions and Mouzas under the Project					
Lots	Chainage (Km)	District	Upazila	Union/Pourasabha	Mouza
Lot-1	120 +100 to 120+850	Jashore	Jhikorgachha	Navaron	Bade Navaron
	120 +850 to 123+000		Sharsha	Sharsha	Buruz Bagan, Jadabpur
	0+000 to 7 +200	Jashore		Ulashi	Khajura, Gilapol, Ulashi, Jadunathpur Bara Bari
Lot-2	7+201 to 9 +900	Jashore	Sharsha	Bagachra	Samta, Pipragachhi, Bagachra
	9+901 to 14+230	Jashore	Sharsha	Bagachra	Bagachra
	14+231 to 23+000 (B) Propose Bypass alignment of 15+470k	Satkhira	Kalaroa	Kayba	Rari Pukuria, Baguri
				Kelarkata	Kismat Ilishpur, Ilishpur, Putuni, Keralkata, Fazilkati. Nakila Kauria
				Helatala	Raghunathpur, Braja Baksa, Khalsi
Lot-3	23+001 to 31+240	Satkhira	Kalaroa	Helatala	Helatala, Tulsidanga, Jikra. Mahamudpur. Gopinathpur, Rudrapur
			Satkhira Sadar	Jhaudanga	Uaria. Gobindakati, Jhaudanga Beharinagar
	31+241 to 39+400	Satkhira	Satkhira Sadar	Jhaudanga	Beharinagar, Tujalpur, Baladanga Madhabkati
				Agardari	Jograjpur.. Bangshata, Babulia, Kasempur
Lot-4	39+401 to 52 +500	Satkhira	Satkhira Sadar	Agardari	Rasulpur, Palashpur
				Alipur	Aliplur, Mahmudpur
				Bhomra	Sreerampur, Nabatkati
	52 +501 to 55 +21	Satkhira	Satkhira Sadar	Bhomra	Bhomra, Lakshmidari

4.9.3 DEMOGRAPHY OF AFFECTED POPULATION

191. The total population of the Affected Persons (AP) in the corridor of impacts is 16126. The distribution of the population of AP is presented **Table 4-23**. The maximum population is affected in Lot 2, followed by lot, lot 4 and Lot 3. The minimum impact on lot 3 is due to proposed bypasses on the alignment. The Sex ration (Male to Female in project area is 1.04.

Table 4-23: Distribution of the population of affected perons														
Total Population of Affected Persons			Lot-1			Lot-2			Lot-3			Lot-4		
Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
8215	7911	16126	2389	2322	4711	2451	2416	4867	1046	1022	2068	2329	2151	4480

4.9.3.1 AGE-WISE DISTRIBUTION OF POPULATION

192. **Table 4-24** presents the age-wise distribution of affected persons (AP) of the affected households within each lot. It shows that out of the total AP, the maximum AP is in Lot 2 (4867), followed by Lot 1 (4711), lot 4 (4480), and Lot 3 (2068).

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Table 4-24: Age Composition of the Affected Population in each lot

Age of Affected Persons (Years)	Number of Affected Persons											
	Lot-1			Lot-2			Lot-3			Lot-4		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-4	172	146	318	165	166	331	80	67	147	177	170	347
May-14	382	361	743	401	388	789	138	178	316	368	341	709
15 to 45	1150	1239	2389	1216	1318	2534	522	537	1059	1180	1173	2353
46 to 64	494	405	899	497	411	908	231	196	427	451	364	815
65 and above	191	171	362	172	133	305	75	44	119	153	103	256
Total	2389	2322	4711	2451	2416	4867	1046	1022	2068	2329	2151	4480

Source: Field survey conducted by BCL and STUP, November 2023-February 2024

The tabulated data (Refer to **Table 4-24**) is analyzed further to assess how different age groups of affected persons are impacted in each lot through a graphical presentation of the distribution of AP by age group. The data (refer **Figure 4-22**) shows that the maximum number of individuals in the age group 15-45 are primarily affected in lot 2, followed by lot 1, lot 4 and lot 3. This analysis is carried further to assess which gender is affected age by age group of AP due the project.

193. The analysis reveals that 51.69% of affected persons belong to the age group of 15-45. This is followed by 18.91% in the age group of 46-64, 15.86% in the 4-15 age group, 7.09% in the 0-4 age group, and the lowest percentage, 6.46%, in the group above 65 years.

194. A graphical representation of this analysis is shown in the accompanying chart (Refer to **Figure 4-23**). The graph indicates that the highest number of affected individuals are females within the age group of 15-45

4.9.3.2 DEPENDENCY RATIO

195. The dependent population is divided into three age groups: a) 0 to 4 years, b) 5-14 and (ii) 65 years and older. In contrast, the active income-earning population comprises people of age groups: a) 15 to 45 years and b) 46 to 64 years. The data on the dependent population of AP is summarized in **Table 4-25**. The total population of AP is 16126. Out of this, the dependent population is 4742, and the active-earning population is 11384. The total dependency ratio is calculated by comparing the dependent population to the active-earning population, which comes out to be 42.2%.

Table 4-25: Dependent Population of the Affected Person

Age Group (Years)	Dependent Population of Affected Persons Lot Wise											
	Lot-1			Lot-2			Lot-3			Lot-4		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-04	172	146	318	165	166	331	80	67	147	177	170	347
05-14	382	361	743	401	388	789	138	178	316	368	341	709
>65	191	171	362	172	133	305	75	44	119	153	103	256

4.9.4 HOUSEHOLD CHARACTERISTICS

196. Household characteristics have been studied to gain a comprehensive understanding of the dynamics of a household—the number of people living in the house in a family and house head. These are discussed briefly in the following subsections.

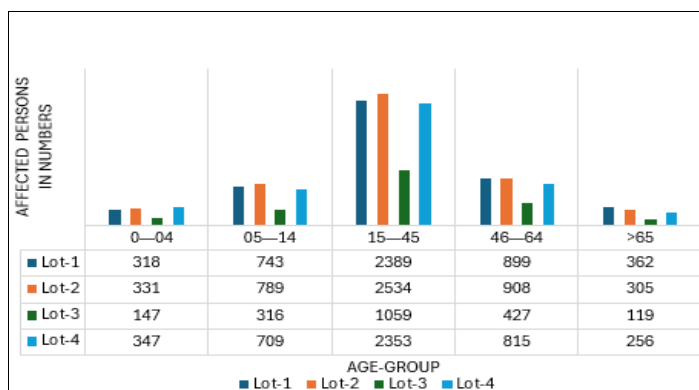


Figure 4-22: Distribution of AP by Age Group in Each Lot

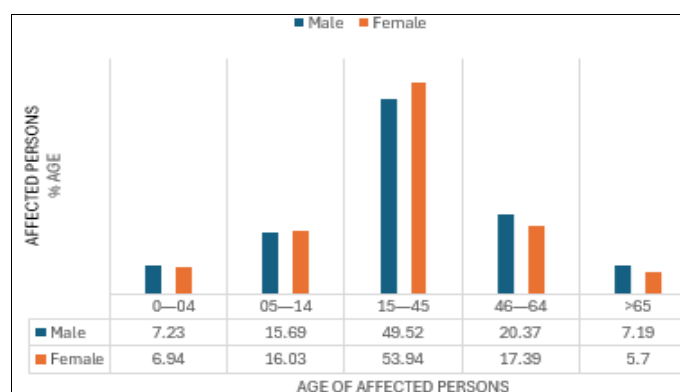


Figure 4-23: Distribution of AP by Age Group and Gender

4. Description of the Environmental and Social Baseline

4.9.4.1 HOUSEHOLD SIZE

197. The household size within the project area is 4.64. This is according to the national figure. The distribution of affected by size is given in Table 4-26. The data in the Table shows that 46.62% of affected households belong to 3-4 households, followed by 31.93% of affected households belonging to 5-6 household sizes. The lowest 1.12% of affected households belong to > 10 household sizes.

Table 4-26: DISTRIBUTION OF Affected Households by Household Size						
Household Size	No. of Affected Households					
	Lot-1	Lot-2	Lot-3	Lot-4	Total No. & % of HHs	
	No. of HH	No. of HH	No. of HH	No. of HH	No. of HH	%
1 to 2	93	141	62	149	445	12.11
3 to 4	444	545	239	485	1713	46.62
5 to 6	357	348	151	317	1173	31.93
7 to 8	79	61	23	67	230	6.26
9 to 10	23	25	5	19	72	1.96
> 10 (10 above)	19	7	5	10	41	1.12
Total	1015	1127	485	1047	3674	100
Household Size	3.62	3.26	7.6	3.5	4.4	-

Source: Field survey conducted by BCL and STUP, November 2023-February 2024

4.9.4.2 DISTRIBUTION OF HOUSEHOLDS BY SEX

198. Distribution of households headed by sex is summarized in Table 4-27. This summary table shows that 3,674 households will be affected by land acquisition for the project across Lots 1 to 4. Lot 1 has 1,015 affected households, Lot 2 has 1,127, Lot 3 has 485, and Lot 4 has 1,047. Among these, 87.56% are male-headed households, and 12.44% are female-headed. Lot 2 has the highest number of female-headed households at 154 (13.66%). This is followed by Lot 1 with 122 (12.02%), Lot 4 with 108 (10.32%), and Lot 3 with 73 (15.05%).

Table 4-27: Lot Wise Type of affected Households										
Details of Household	Lot-1		Lot-2		Lot-3		Lot-4		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Male Headed HHs	893	87.98	973	86.34	412	84.95	939	89.68	3217	87.56
Female-Headed HHs	122	12.02	154	13.66	73	15.05	108	10.32	457	12.44
Total	1015	100	1127	100	485	100	1047	100	3674	100

Source: Field survey conducted by BCL, November 2023-February 2024

4.9.5 RELIGION

199. The details of lot-wise AP by religion is presented in Table 4-28. Islam (95.40% followers) is the main religion, followed by Hinduism (4.37% followers) COI. According to the Bangladesh Population and Demographic Indicators, 88% of Bangladeshis are Muslims, and the remaining are of other religions.

Table 4-28: : Distribution of Affected Population by Religion among the Survey Population							
Religion	Distribution of affected Population by Religion						Total
	Lot-1	Lot-2	Lot-3	Lot-4	No.	%	
Islam	4631	4612	1982	4160	15385	95.40	
Hinduism	66	232	86	320	704	4.37	
Christian	14	23	0	0	37	0.23	
Indigenous peoples	0	0	0	0	0	0	
Total	4711	4867	2068	4480	16126	100	

Source: Field survey conducted by BCL and STUP, November 2023-February 2024

4.9.6 EDUCATION LEVEL

200. The literacy rate in Bangladesh is currently 75%. In the Satkhira district, the literacy rate for individuals aged seven and over is slightly higher at 75.32%, compared to the national average of 74.80%. During primary data collection, information regarding the education levels of affected individuals was collated and analyzed and is shown in Table 4-29.

Table 4-29: Distribution of Affected Population (7 Years and Above) by Education Level															
Sl. No.		Lot-1			Lot-2			Lot-3			Lot-4			Total	
		Mal	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
1	Just Literate*	173	190	363	191	236	427	72	96	168	156	182	338	592	704
2	Up to IV or Madrasah	304	341	645	304	294	598	104	127	231	275	269	544	987	1031

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Table 4-29: Distribution of Affected Population (7 Years and Above) by Education Level

Sl. No.	Education Level	Lot-1			Lot-2			Lot-3			Lot-4			Total	
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
3	Primary Certificate	242	218	460	255	239	494	130	129	259	305	258	563	932	844
4	Class VI-VII	134	144	278	170	208	378	67	78	145	181	190	371	552	620
5	JSC Exam	147	163	310	197	208	405	81	87	168	155	195	350	580	653
6	Class IX-X	242	178	420	171	216	387	59	72	131	139	151	290	611	617
7	SSC Exam or Equivalent/Dakhil	327	312	639	311	299	610	114	133	247	258	266	524	1010	1010
8	HSC Exam or Equivalent/Alim	192	215	407	235	202	437	122	89	211	207	145	352	756	651
9	B.A. or Equivalent/ Fazil	194	141	335	145	99	244	73	31	104	121	78	199	533	349
10	M.A. or Equivalent/Kamil Pass	161	96	257	134	80	214	72	33	105	156	64	220	523	273
11	Hafez	15	9	24	12	5	17	7	2	9	7	2	9	41	18
12	Dip. (Eng.).	18	5	23	18	5	23	6	1	7	3	2	5	45	13
13	BSc (Eng.).	31	6	37	14	2	16	4	0	4	7	2	9	56	10
14	MSc (Eng.).	7	3	10	3	1	4	1	1	2	1	1	2	12	6
15	Higher Education Degree (General)	7	11	18	8	4	12	1	2	3	0	0	0	16	17
16	Higher Education Degree (Eng.)	5	2	7	0	0	0	2	0	2	1	1	2	8	3
17	Other	4	3	7	2	3	5	4	3	7	4	4	8	14	13
18	Total Literate (sum of Row 1-17)	2203	2037	4240	2170	2101	4271	919	884	1803	1976	1810	3786	7268	6832
	Total Illiterate	41	68	109	36	64	100	22	34	56	83	98	181	182	264
19	Population below 7 years	244	217	461	245	251	496	105	104	209	171	243	414	765	815
20	Grand Total	2488	2322	4810	2451	2416	4867	1046	1022	2068	2230	2151	4381	8215	7911

Notes: *Just Literate means who can only read & write without any formal education. Total population is 16126.

201. The population under 7 years old has been excluded from calculating the literacy rate. As a result, the total number of literate individuals among the affected persons is 14100 (87.44%), while the illiterate population stands at 446. The type of education that the AP is having is shown in **Figure 4-24**.

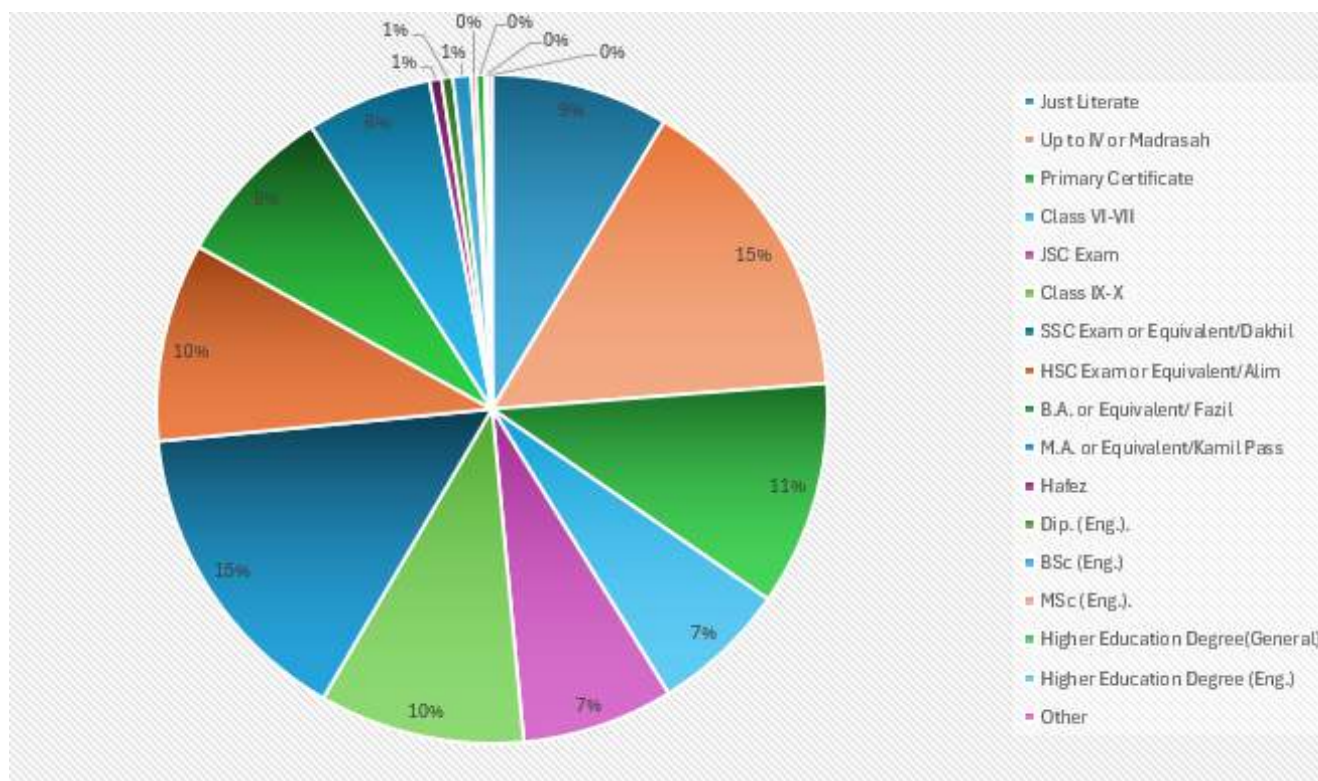


Figure 4-24: Spectrum of Type of Education among the Affected Persons

4.9.7 MARITAL STATUS

202. The marital status data has been collected during the socioeconomic survey. Collecting and analyzing marital status data is crucial for gaining a comprehensive understanding of the social landscape, guiding effective

4. Description of the Environmental and Social Baseline

policymaking, and addressing the population's diverse needs. It is to be noted that the legal age for the first marriage is 21 years for the male and 18 years for the female in Bangladesh. However, the Child Marriage Act 2017 allows girls under 18 to marry with the consent of their parents. The marital status among the surveyed population of AP shows that most marriage is solemnized above the marriageable age. The details of marital status in different Lots are presented in **Table 4-30**.

Table 4-30: Marital Status within the COI						
Marital Status Affected Population	Marital Status of AP within Marriageable and below marriageable age					
	Lot-1	Lot-2	Lot-3	Lot-4	Total Male & Female Population	
	Male & Female Population	Male & Female Population	Male & Female Population	Male & Female Population	Population	%
Married	2676	2838	1236	2651	9401	58.30
Unmarried	421	350	166	286	1223	7.58
Widow	193	187	69	142	591	3.66
Widower	18	19	3	26	66	0.41
Abandoned by Husband	5	8	0	13	26	0.16
Abandoned by Wife	4	4	2	5	15	0.09
Divorced Woman	3	1	1	8	13	0.08
Divorced Man	1	2	2	2	7	0.04
Population below 21 age for male & 18 age for female	1390	1458	589	1347	4784	29.67
Grand Total	4711	4867	2068	4480	16126	100

Source: Field survey conducted by BCL and STUP, November 2023-February 2024

4.9.8 OCCUPATIONAL PATTERN

203. The occupational pattern data analysis in socioeconomic impact assessment provides valuable insights into individuals' and households' economic activities and social status. The data on occupation pattern of AH is summarized in **Table 4-31**. It shows that the highest primary occupation of affected male household heads is businesses (male) for 1820 HHHs (49.54%). This is followed by housewife household heads (285/7.76%) whose occupation is service (employment) and skilled laborers (284/7.73%).

Table 4-31: Occupational Pattern within the COI							
Sl. No.	Primary Occupations	Primary Occupations of AH – Heads					
		Lot-1	Lot-2	Lot-3	Lot-4	Total	
						No.	%
1	Farmer	53	80	21	44	198	5.39
2	Teacher	34	37	11	24	106	2.89
3	Employed Abroad/Overseas	24	42	10	9	85	2.31
4	Employment or Service (Male)	85	87	38	74	284	7.73
5	Employment or Service (Female)	9	12	6	6	33	0.90
6	Housewife	76	102	50	57	285	7.76
7	Fisherman	0	2	0	0	2	0.05
8	Business (Male)	563	521	216	520	1820	49.54
9	Business (Female)	14	11	5	7	37	1.01
10	Daily Labor	33	51	33	144	261	7.10
11	Driver	14	47	33	39	133	3.62
12	Manson's Helper	2	4	2	1	9	0.24
13	Mason	10	14	10	16	50	1.36
14	Carpenter	4	2	1	2	9	0.24
15	Tailor	2	2	0	2	6	0.16
16	Doctor	6	11	5	9	31	0.84
17	Kabiraj	2	0	1	0	3	0.08
18	Boatman	0	0	0	0	0	0.00
19	Student	7	12	3	5	27	0.73
20	Rickshaw/Van Puller	10	34	21	38	103	2.80
21	Old Man	35	23	7	20	85	2.31
22	Old Woman	13	22	7	19	61	1.66
23	Maid Servant	1	1	0	0	2	0.05
24	Barber	0	2	0	2	4	0.11

4. Description of the Environmental and Social Baseline

Table 4-31: Occupational Pattern within the COI							
Sl. No.	Primary Occupations	Primary Occupations of AH – Heads					
		Lot-1	Lot-2	Lot-3	Lot-4	Total	
						No.	%
25	Renting House	8	0	0	0	8	0.22
26	Cobbler	1	0	0	0	1	0.03
27	Mechanic/Technician	4	4	4	5	17	0.46
28	Unemployed	5	3	1	3	12	0.33
29	Other	0	1	0	1	2	0.05
Total		1015	1127	485	1047	3674	100
*Note: Skilled laborers include (i) carpenter, (ii) mason, (iii) barber, (iv) blacksmith, (v) driver, (vi) mechanic, (vii) rickshaw driver, (viii) tailor, (ix) imam, (x) cobbler, (xi) kabiraj, etc.							

204. The primary occupation data of other members of AH is summarized in **Table 4-32**. It shows that the highest primary occupation of other active members of AHs is a housewife (33.11%) in the project areas, followed by students (32.55%) and unemployment (0.74%).

Table 4-32: Primary Occupations of Other Members of AH within COI						
Primary Occupations	Primary Occupations of Other Members of Affected Households					
	Lot-1	Lot-2	Lot-3	Lot-4	Total	
					No.	%
Farmer	35	33	8	0	76	0.83
Teacher	36	15	14	1	66	0.72
Employed Abroad/Overseas	71	101	31	1	204	2.22
Employment or Service (Male)	135	128	54	10	327	3.55
Employment or Service (Female)	24	38	8	4	74	0.80
Housewife	1167	1226	520	135	3048	33.11
Fisherman	0	1	0	0	1	0.01
Business (Male)	222	164	65	29	480	5.21
Business (Female)	22	19	5	3	49	0.53
Daily Labor	26	25	45	9	105	1.14
Driver	17	40	29	3	89	0.97
Manson's Helper	8	3	0	1	12	0.13
Mason	16	16	3	4	39	0.42
Carpenter	3	7	3	1	14	0.15
Tailor (Male)	4	0	0	0	4	0.04
Tailor (Female)	4	1	0	2	7	0.08
Doctor (Male)	6	6	0	1	13	0.14
Doctor (Female)	10	4	0	4	18	0.20
Kabiraj (Male)	2	0	1	0	3	0.03
Kabiraj (Female)	5	0	0	0	5	0.05
Boatman	0	0	0	0	0	0.00
Student (Male)	641	613	249	52	1555	16.89
Student (Female)	606	559	219	58	1442	15.66
Rickshaw/Van Puller	13	14	7	3	37	0.40
Old Man	69	52	17	7	145	1.58
Old Woman	171	140	43	10	364	3.95
Maid Servant	4	1	2	0	7	0.08
Barber	0	1	0	0	1	0.01
Renting House	0	0	0	0	0	0.00
Cobbler	0	0	0	0	0	0.00
Mechanic/Technician	7	18	2	2	29	0.32
Unemployed (Male)	18	21	9	2	50	0.54
Unemployed (Female)	6	4	7	1	18	0.20
Other (Male)	185	184	88	30	487	5.29
Other (Female)	160	182	73	22	437	4.75
Total	3693	3616	1502	395	9206	100

Source: Field survey conducted by BCL, November 2023-February 2024

4.9.9 INCOME AND EXPENDITURE

205. The highest number of affected households is 1,140 (31.03%), belonging to the BDT 135,001 to BDT 300,000 annual income range. This is followed by 1,028 households (27.98%) in the BDT 300,001 to BDT 500,000 range. The least affected are 37 households (1.01%) earning up to BDT 60,000. Table 4-36 shows that

4. Description of the Environmental and Social Baseline

188 affected households (37 and 151 HHs) fall within the income levels of up to BDT 60,000 and BDT 60,001 to BDT 135,000, with Lot 1 having a higher number of affected poor households than Lots 2, 3, and 4. Detailed information on the distribution of project-affected households by annual income ranges for Lots 1, 2, 3, and 4 is presented in **Table 4-33**.

Annual Income Level (BDT)	No. of HHs in Lot 1, Lot 2, Lot 3, and Lot 4				
	Lot 1	Lot 2	Lot 3	Lot 4	Total
Up to 60,000	8	7	8	14	371
60,001 to 135,000	27	42	24	58	151
135,001 to 300,000	234	306	180	420	1140
300,001 to 500,000	265	363	131	269	1028
500,001 to 1,000,000	279	298	90	169	836
1,000,001 and above	202	111	52	117	482

Source: Field survey conducted by BCL, November 2023-February 2024

206. The monthly expenditure data of AH is presented in **Table 4-34**. The data shows that the highest number of households is 1864 HHs (50.73%), which belong to the monthly expenditure range BDT 25001-83330. The second highest number of households is 1140 HHs (31.03%), whose monthly income range is between BDT 11251-25000. The lowest number of households is 37 HHs (1.01%), whose monthly income range is BDT up to 5000.

Expeniture (BDT)	No. of AHs in Lot 1, Lot 2, Lot 3, and Lot 4					Chart Showing Monthly expenditure of AH
	Lot 1	Lot 2	Lot 3	Lot 4	Total	
Up to 5000	8	7	8	14	37	
5001-11250	27	42	24	58	151	
11251-25000	234	306	180	420	1140	
25001-83330	544	661	221	438	1864	
>=83331	202	111	52	117	482	

Source: Field survey conducted by BCL November 2023-February 2024

4.9.10 VULNERABLE GROUPS

207. It is essential to identify the vulnerable households and groups that are likely affected by the project. The vulnerable households and groups include (i) woman-headed households, (ii) disabled woman-headed households, (iii) disabled man-headed households, (iv) elderly (>64 years) man-headed households, and (v) man-headed households under the poverty line (annual income BDT 135,000) and below. Nine hundred sixty-six (966) vulnerable households have been identified through the census and IOL survey. The highest vulnerable households are 454 (47.00%) woman-headed households, followed by 357 (36.96%) elderly (>64 years) man-headed households under the poverty line, further followed by 90 male-headed households under the poverty line (9.32%). Particular attention should be given to the affected vulnerable households and groups to ensure payment of assistance, allowances, and grants. The needs of affected vulnerable groups, such as the poor, woman-headed, landless persons, there are no indigenous peoples, ethnic minorities, the elderly, and disabled persons, will be adequately addressed. They had been identified through the census, IOL, and socio economic survey (Table 4-35).

Type of Vulnerable Households	of Affected Vulnerable Households in Under Lot 1, 2, and 4									
	Lot-1		Lot-2		Lot-3		Lot-4		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Woman headed households	121	44.32	152	50.00	73	52.52	108	43.2	454	47.00
Disabled woman-headed households	1	0.37	2	0.66	0	0.00	0	0	3	0.31
Disabled man-headed households	21	7.69	18	5.92	4	2.88	19	7.6	62	6.42
Elderly (>64 years) man-headed households	110	40.29	112	36.84	46	33.09	89	35.6	357	36.96

4. Description of the Environmental and Social Baseline

Table 4-35: Distribution of Vulnerable Households										
Type of Vulnerable Households	of Affected Vulnerable Households in Under Lot 1, 2, and 4									
	Lot-1		Lot-2		Lot-3		Lot-4		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Male-headed households under the poverty line (annual income BDT 135,000 and Below)	20	7.33	20	6.58	16	11.51	34	13.6	90	9.32
Total	273	100	304	100	139	100	250	100	966	100

Source: Field survey conducted by BCL and STUP, November 2023-February 2024

4.9.11 AFFECTED COMMON PROPERTY RESOURCES (CPRS)

208. According to the census and IOL survey findings, a total of 129 affected common property resources (CPRs) have been identified across four lots. These include 23 CPRs in Lot 1, 50 in Lot 2, 12 in Lot 3, and 44 in Lot 4.

209. The highest number of affected CPRs are graveyards, totaling 50, with 11 in Lot 1, 17 in Lot 2, 4 in Lot 3, and 18 in Lot 4. The second highest number of affected CPRs are schools, which amount to 37, distributed as follows: 7 in Lot 1, 15 in Lot 2, 3 in Lot 3, and 12 in Lot 4.

210. Additionally, there are 29 affected mosques, with 3 in Lot 1, 10 in Lot 2, 4 in Lot 3, and 12 in Lot 4. Lot 3 also contains three affected training institutes and training centers. Furthermore, three hospitals, clinics, health centers, and veterinary hospitals are affected, with one located in each of Lots 1 and 2. These are summarized in Table 4-36.

Table 4-36: Summary of Common Property Resources (CPRs)								
Lot No.	Different Types of CPRs							
	Mosque	School/Madrasah/College	Graveyard	Training Institute/Centre	Hospital/Clinic/Health Centre	Orphanage	Temple	Total
Lot-1	3	7	11	0	1	1	0	23
Lot-2	10	15	17	3	2	1	2	50
Lot-3	4	3	4	0	0	1	0	12
Lot-4	12	12	18	0	0	1	1	44
Total	29	37	50	3	3	4	3	129

Source: Field survey conducted by BCL and STUP, November 2023-February 2024

4.9.12 SANITATION AND WATER SUPPLY

4.9.12.1 SANITATION

211. It was reported that the affected businessmen and their employees who either stay or live at bazaars in urban areas utilize sanitary latrines in most cases. However, some businessmen in rural market areas use both sanitary and ring slab latrines. The affected households that have pucca structures utilize sanitary latrines attached to their pucca structures. However, some affected households have semi-pucca structures with ring slab latrines outside their structures. They utilized sanitary and ring slab latrines. Households losing tin-made houses and Katcha houses generally utilize the following types of latrines, which were found in the findings of the census. The IOL survey shows that 76.78% of such households utilize sanitary latrines, followed by ring slab latrines (22.01%) in the project-affected areas. Table 4-37.

Table 4-37: Distribution of Affected Households by Type of Latrine						
Type of Latrines	No. of Affected Households Utilize Latrines				Total	
	Lot-1	Lot-2	Lot-3	Lot-4	No.	%
Sanitary Latrine	824	983	387	782	2976	76.78
Ring Slab Latrines	242	207	113	291	853	22.01
Katcha Latrines	2	2	3	13	20	0.52
Pit Latrines	1	3	1	20	25	0.64
Other	0	1	0	1	2	0.05
Total	1069	1196	504	1107	3876	100

Source: Field survey conducted by BCL, November 2023-February 2024

4.9.12.2 WATER SUPPLY

212. Almost 100% of affected households use underground water for their drinking, domestic, bathing, washing, and other purposes in Lots 1, 2, 3, and 4. Groundwater is lifted with the deep, shallow, and hand tube wells. Commercial entities, including businessmen, factory owners, and CPRs, also use groundwater for drinking, washing, bathing, and other necessary purposes. Underground water is lifted with motor pumps and stored in the water tank in the ground and on the rooftop.

4. Description of the Environmental and Social Baseline

4.9.13 UTILIZATION OF ELECTRICITY

213. Almost 100% of affected households, commercial entities, and CPRs under Lots 1, 2, 3, and 4 use electricity for various purposes, such as various residential and commercial purposes, including light, fans, lifting water with motor pumps, cooking, etc.

4.9.14 HEALTH FACILITIES

214. Land acquisition affects a limited number of health facilities in Lot 2, specifically the Upazila Livestock Department and Veterinary Hospital at 12+700, and Kalaroa Diabetic Hospital at 22+750. (Refer Table 4-38)

Table 4-38: Affected Health Facilities in Lot 1 and 2			
Sl. No	Name of Affected Health Facilities	Chainage	Lot #
1.	Upazila Livestock Department and Veterinary Hospital signboard	12+700km	Lot-1
2.	Kolaroa Diabetic Hospital	22 + 750km	Lot-2

4.9.15 GENDER-BASED VIOLENCE (GBV) IN JASHORE AND SATKHIRA

215. The worst manifestation or existing form of GBV is child marriage, also known as early marriage. Child marriage and the dowry system put girls at particular risk of sexual, physical, and psychological violence throughout their lives. Bangladesh has one of the highest early marriage rates in the world, at 59 percent in 2018 (UNFPA, 2019).

216. Early marriage nearly always results in school dropouts or from pursuing higher education and early childbirth and is often used as a way for trafficking young girls. This is hazardous from a health perspective and hinders academic and economic development.

217. GBV services for host communities in RHD are limited to the One Crisis Center at District Sadar Hospital and one-stop cells in Jashore and Satkhira, part of the MSPVAW led by MOWCA in coordination with various ministries and agencies. The local population also faces serious GBV issues, highlighting the urgent need for additional services.

5. Analysis of Alternatives

5 ANALYSIS OF ALTERNATIVES

5.1 GENERAL

218. The proposed widening and strengthening of Bhomra – Satkhira – Navaron Road will enhance economic and social dynamism by reducing travel times, lowering vehicle costs, and improving access to markets, jobs, education, and health services. Some impacts are unavoidable, as listed below, due to the project's proximity to natural and social environments.

- ▶ Cutting of avenue trees and vegetation
- ▶ Impact on water bodies (ponds and channels)
- ▶ Social impacts due to land acquisition include loss of structures/land and relocation of residents and commercial entities.

219. There will be indirect impacts on the social environment due to livelihood disruptions, loss of familiar travel routes, and weakened community connections. The land use pattern along the existing road alignment is primarily agricultural, with built-up areas including townships, commercial spaces, major road intersections, parking facilities, and industrial zones. The project may have partial or complete effects on various structures, such as houses, offices, mosques, temples, graves, educational institutions, existing utilities, and the health and safety of workers during construction.

220. The right of way is insufficient for a four-lane service road, which could lead to significant land acquisition and resettlement challenges. Widening the carriageway will impact adjacent agricultural land, residential areas, markets, and institutions, which will need careful management during construction. Localized issues may arise due to the numerous settlements alongside the project road, necessitating management strategies to offset the intensity of impacts during the construction phase.

5.2 THE PROJECT FEATURES AND ALTERNATIVES

221. The proposed project involves a road with a design length of approximately 55 km, which will generally follow the existing alignment, except for three sections that will be realigned. These realignment sections were chosen to ensure social acceptability and to address community safety concerns while minimizing environmental impact.

222. During the design process, various environmental issues were considered when reviewing alternative alignments and structures to determine the best solution. Multiple options were evaluated closely with Environmental and Social (E&S) Consultants and the Engineering Design Team. The project has been divided into four lots:

- ▶ Lot 1: from Km 0+000 to Km 7+200 and from Km 119+700 to Km 123+000 (Bhanga-Benapole Road)
- ▶ Lot 2: from Km 7+200 to Km 23+000
- ▶ Lot 3: from Km 23+000 to Km 39+400
- ▶ Lot 4: from Km 39+400 to Km 55+245

223. Various structures have been proposed as alternatives for the existing alignment to ensure smooth traffic flow and enhance the roadway geometry. These structures include new bridges, new culverts alongside additional culverts, flyovers, railway overpasses (ROPs), vehicular overpasses (VOPs), light vehicular overpasses (LVOPs), pedestrian overpasses (POPs), foot over bridges (FOBs), and viaducts.

224. The construction of a four-lane road and improvement of junctions require land acquisition, which may lead to the demolition of residences and commercial areas. This process will impact local commercial activities and livelihoods, causing significant disturbances for the residents living near the road alignment. The government has already imposed a ban on using agricultural land to minimize losses. Consequently, there are limitations on acquiring excessive agricultural land for road expansion. Therefore, the proposed design aims to minimize land acquisition as much as possible.

5. Analysis of Alternatives

5.3 ROAD STRUCTURES AND CONCEPTUAL DESIGN

Certain alignment sections run through commercial areas, ribbon development, and congested locations. Widening and strengthening the road along the existing alignment will impact business activities due to the land acquisition required for the expansion if proper mitigation measures are not implemented. The ribbon development along the road will also cause increased risks for pedestrians and other road users. Thus, different types of structures and geometry improvement proposals of the existing alignment have been considered in the design for the smooth and safe free flow of traffic. Adopted measures for built-up areas, rural commercial areas, and road intersections adopted in the design are as follows:

- ▶ Structures include vehicular overpasses (VOP), pedestrian overpasses (POP), and foot overbridges (FOB),
- ▶ Geometry improvement proposals consist of intersection improvement, realignment, and bypass strategies

5.3.1 INTERSECTION AT NAVARON ON BHANGA – BENAPOL ROAD

225. The flyover will alleviate a bottleneck at the intersection of the project highway and the Bhanga—Benapole Road at Navaron. This intersection involves the Bhanga—Benapole Road, designated National Highway N7. It has become a crucial cross-border transit route following the opening of the Padma River Bridge in Bangladesh. Furthermore, the Bhomra – Satkhira – Navaron Road is anticipated to be upgraded to National Highway status due to its connectivity to the port.

226. Further, two major highways (N706 and Project Road) intersect at Navaron, and the project highway will be a controlled access road, necessitating a flyover at this location.

227. The following are the recommendations for the Navaron Intersection:

- ▶ To cater to the movement of all local traffic at the grade roundabout at the Navaron Intersection.
- ▶ Since Bhanga-Benapole is an important Trans Asian Highway, the flyover along Bhanga-Benapole is required and will significantly relieve the Navaron Intersection. Bhanga – Benapole Flyover will be at level 1.
- ▶ A Railway Overpass (ROP) is required over the Navaron—Benapole Railway Line and the movements from Bhomra to Jashore and Jashore to Bhomra are significant; ramps are also provided. Thus, a directional ramp at level 2 from Bhomra towards Jashore for right-turning traffic, a directional ramp from Jashore to Bhomra for left-turning traffic, and a directional ramp from Bhomra towards Benapole is also required for left-turning traffic are suggested.
- ▶ Traffic from Benapole to Bhomra will be turned through a U-loop provided at the Bhanga – Benapole Road. A U-loop for U-turns is provided for the Benapole to Bhomra traffic movement. This is provided after the Betna River and goes towards the Jashore side. This Loop will have a U-turn for traffic on the Level 1 flyover over at-grade Bhanga – Benapole Road.

5.3.2 REALIGNMENT OR BYPASS:

228. This is an option that will have a permanent impact on existing land use patterns from agricultural to paved roads. Land and farmers must be compensated per the Resettlement Action Plan (RAP). In this project, three realignments have been identified and evaluated, considering the alternatives analysis. These three alternatives have been studied as follows

- ▶ Proposed Realignment at Bagachra
- ▶ Satkhira Medical College
- ▶ Combined Realignment of Kalaroa & Jhaudanga

5.3.3 PROPOSED REALIGNMENT AT BAGACHRA

229. One of the Settlement areas along the Project Road is the Bagachra Urban Area. About 682 structures along the Existing Corridor will be impacted, and the Resettlement Cost would be about BDT.5396 Crores. The number of structures impacted along the realignment would be about 262, and the likely resettlement cost would be about 885 Crores. Therefore, a realignment of about 4.40 Km has been proposed, whereas the length of existing road alignment is about 4.025 Km. The Proposed Realignment for the Bagachra Settlement along the existing alignment is shown in Figure 5-1.

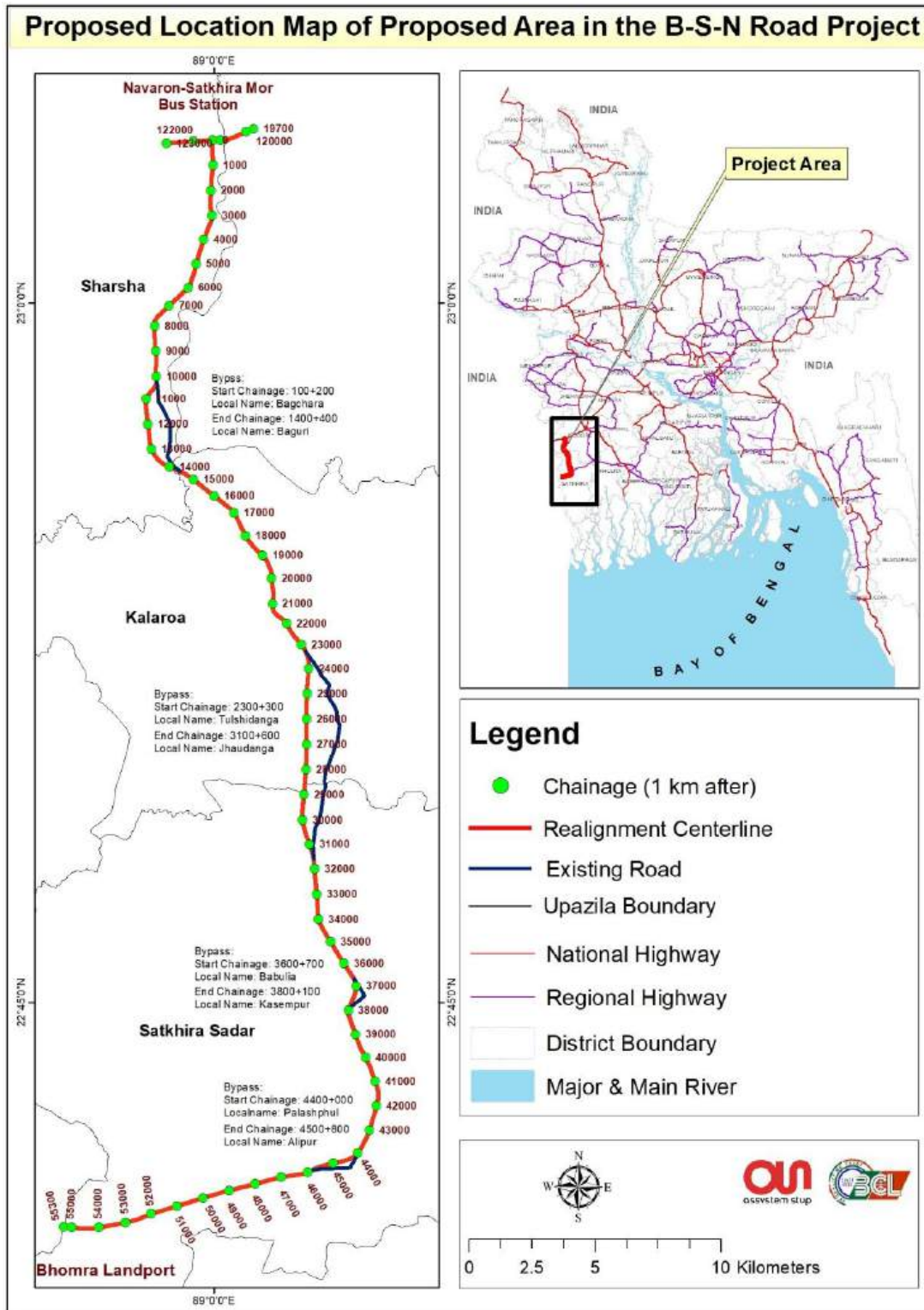


Figure 5-1: Existing and Proposed Realignment for Bagachhra Urban Area

5.3.3.1 SATKHIRA MEDICAL COLLEGE

230. The Realignment has been proposed for avoiding the Satkhira Medical College and other considerations given while proposing a bypass at this location are as follows:

5. Analysis of Alternatives

- ▶ The land for widening the existing road is unavailable. It will further impact the Medical College building on the left-hand side and the Hostel Buildings on the right-hand side of the road.
- ▶ Further, the curve along the current alignment is sharp and poses road safety issues.
- ▶ The only problem with the realignment is that the new alignment will be through the agricultural land, which will require land acquisition.

5.3.4 COMBINED REALIGNMENT OF KALAROA AND JHAUDANGA

231. Kalaroa and Jhaudanga are the major twin settlements on the Bhomra – Satkhira – Navaron Road Section are Kalaroa and Jhaudanga Township. The current highway improvement plan affects 1013 structures, while the proposed realignment impacts only 118. Land acquisition along the existing alignment is limited and costly, estimated at BDT 1830 crores, compared to BDT 209 crores for the realignment. Therefore, a combined Kalaroa & Jhaudanga realignment of approximately 8.250 km has been proposed instead of the existing 8.710 km route. **Figure 5-2** illustrates the proposed realignment.

232. In addition to the above, an Integration of the Highway and port Plan at Bhomra has been provided, with eight lanes in the Port Expansion Area to allow for Port operation near the Highway.

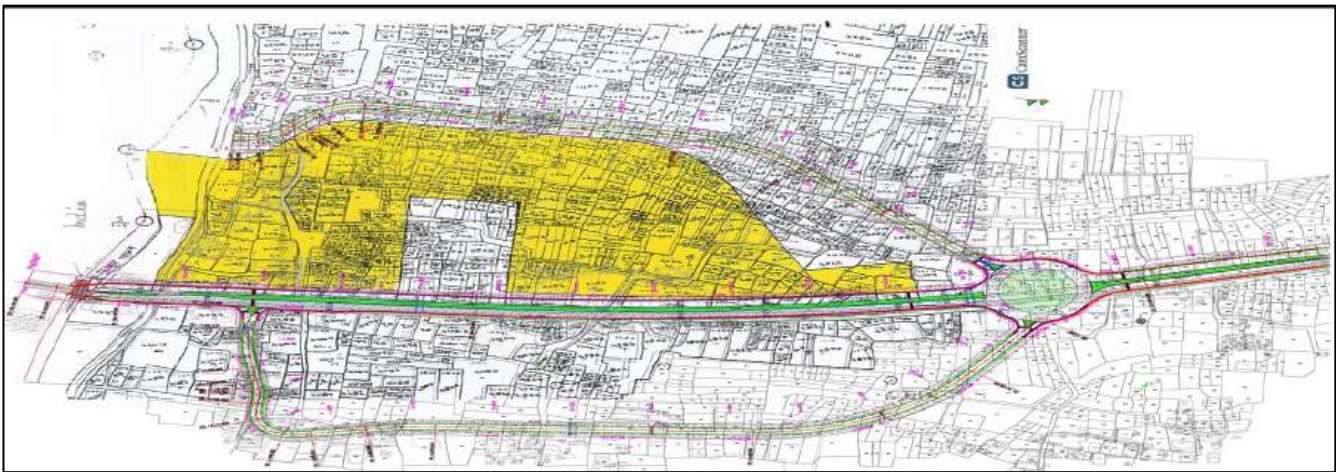


Figure 5-2 Proposed Expansion of the Bhomra Port

5.3.5 OPTIONS STUDY FOR THE BHOMRA – SATKHIRA – NAVARON ROAD

233. Based on the above, three options were considered for the Bhomra – Satkhira – Navaron Road. It is summarized as follows:

A. Option 1

234. As shown in **Figure 5-3**, Option 1 consists of the following:

5. Analysis of Alternatives

- ▶ Dual 2-lane with Service Road on both sides of the Highway throughout the length. The Length is about 55.374 Km.
- ▶ In this option, there are four major bridges and one RUP.
- ▶ The geometry of the proposed Road improvement will be as per the RHD Standard and the Design Speed of 80 Kmph.
- ▶ No Direct Junction with high-speed main carriageway.
- ▶ This Option will involve Maximum utilization of EROW.
- ▶ However, Implementing the proposed four-lane Service Road on both sides will involve resettlement issues in the congested towns of Bagachra, Kalaroa, and Jhaudanga.
- ▶ Due to the Provision of RUP, there is a chance of a Drainage issue at the Navaron Intersection.

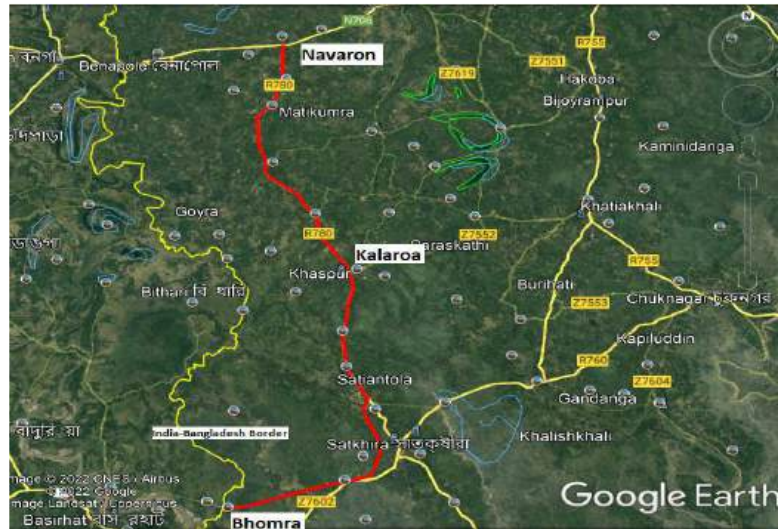


Figure 5-3: Alignment Option-1

B. Option 2

As shown in Figure 5-4, Option 2 consists of the following:

- ▶ Dual 2-lane with Service Road on both sides of the Highway throughout the length. The Length is about 55.164 km, and the total Number of Major Bridges is 2.
- ▶ In this option, there is one ROP cum Flyover for Trumpet on Bhomra – Satkhira – Navaron Road which will be on Level 2 as Service Road will be at Level 1. This means that the Bhanga-Benepole Flyover will be in level 3 which will be difficult to Construct.
- ▶ Geometry of Proposed road is improved as per RHD Standard for Design Speed of 80 Kmph.
- ▶ Kalaroa has dense built up and substandard Geometry. The Town has been realigned on the RHS because of River Betna on LHS. Very less resettlement Cost. Bagachra and Jhaudanga Flyovers with service roads underneath have been proposed to minimize the impact on settlements in Bagachra and Jhaudanga.

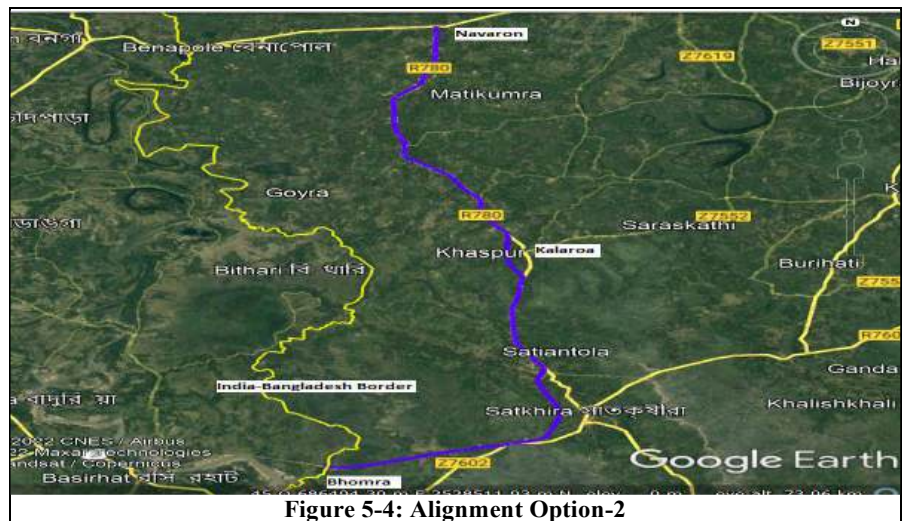


Figure 5-4: Alignment Option-2

C. Option 3

As shown in Figure 5-5, Option 3 consists of the following:

- ▶ In this option, the highway is 55.245km long, features two major bridges, and consists of dual lanes with service roads.
- ▶ One ROP cum Flyover for Trumpet on Bhomra – Satkhira – Navaron Road at Level 2 and Bhanga-Benapole will be at grade at Level 1 with Access Controlled. The Service Road will be routed through the Underpass at either end.

5. Analysis of Alternatives

- The geometry of the proposed Road is improved as per the RHD Standard for a Design Speed of 80 Km/h.
- Kalaroa and Jhaudanga are dense settlements, and road geometry is substandard. A realignment of 13 km on the RHS is proposed, resulting in less resettlement cost. Bypass has been provided in Bagachra area to minimize the impact on settlements in Bagachra Town.



Figure 5-5 : Alignment Option-3

235. The Comparative Study of the Alignment Options on some Key Indicators are tabulated below before the final option is recommended: (Refer to Table 5-1)

Indicators	Option 1	Option 2	Option 3	Overall Ranking
Length (Km)	55.374	55.164	55.245	With some trade-off Option 3 is best
Road Geometry (Km/hr)	80	80	80	Road Geometry is the same.
Land Acquisition	Higher Urban Land is involved.	Higher Urban Land is involved.	Lesser Urban Land Involved.	
No Major Bridges	05	05	05	
Navaron Intersection	Complete Grade Separation is not achieved.	Grade Separation is achieved. But Bhanga-Benapole at Level 3.	Grade Separation has to be provided for easy traffic movement	
Bagachra Urban Area	Bypass	Bypass	Bypass	
Kalaroa Settlement Area	At Grade (Major Settlement Impact)	Grade Separation (Flyover)	Realignment with less land Cost.	
Jhaudanga Settlement Area	At Grade (Major Settlement Impact)	Grade Separation (Flyover)	Realignment with less land Cost.	
Environmental Sensitivity	No Major Environmental Impact	No Major Environmental Impact	The land use pattern will be changed from natural state to paved road. Usually, this area is low laying area with 1/ 2 crops harvested in a year so no major environmental impact.	

236. Based on the Comparative Study of the Alignment Options, Option 3 is recommended.

5.4 NAVARON INTERSECTION

237. Three Options have been considered for the Navaron Intersection, which is described below:

► OPTION 1:

238. This option includes an underpass for the Main Carriage Way (MCW) at the railway line located at Km 0+260, extending to Bhanga – Benapole Road. Service roads will run alongside the MCW at ground level. The section of the MCW between the railway line and the roundabout will be open to the sky, while Bhanga Benapole Road will be elevated on a flyover. Service roads will be situated beneath the flyovers and will connect at a grade roundabout at zero point. A loop ramp arrangement is proposed to ensure smooth connectivity between these two major roads. Refer to Figure 5-6 for the layout of Option 1.

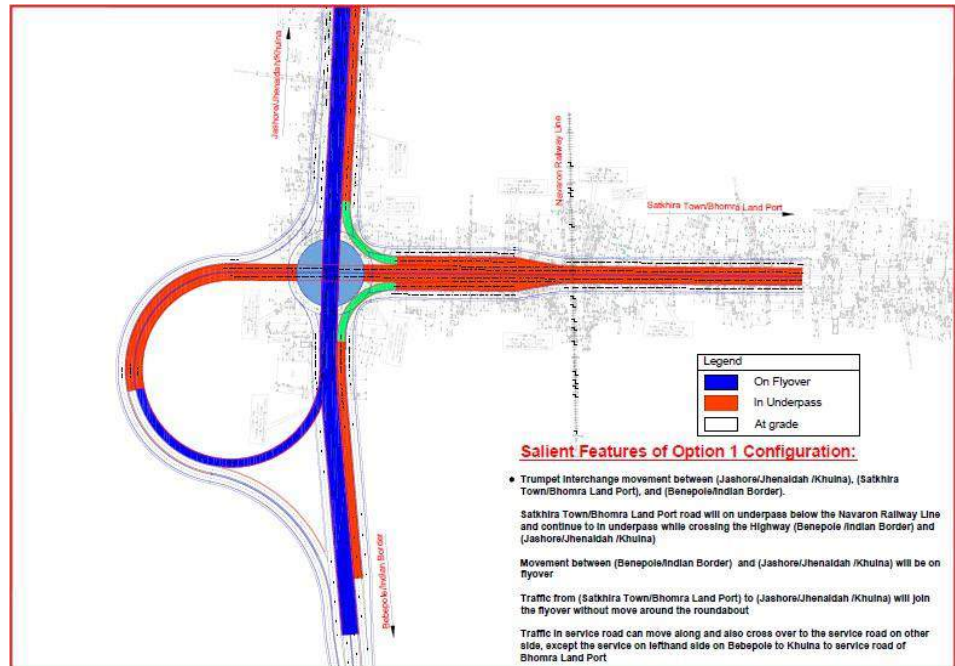


Figure 5-6 : Navaron Intersection Option-1

► OPTION 2:

239. In another alternative, Option-2, for Navaron Zero-point, a Railway overpass cum flyover has been proposed for the MCW of the project road. In contrast, Bhanga Benapole will be on Flyover, one level above the Railway overpass cum Flyover of Bhomra – Satkhira – Navaron Road. Service roads of both roads will meet at the at-grade roundabout at zero point underneath the flyovers. A loop ramp arrangement has been proposed to provide a smooth arrangement between the two Major roads. Option 2 arrangement is shown below in Figure 5-7.

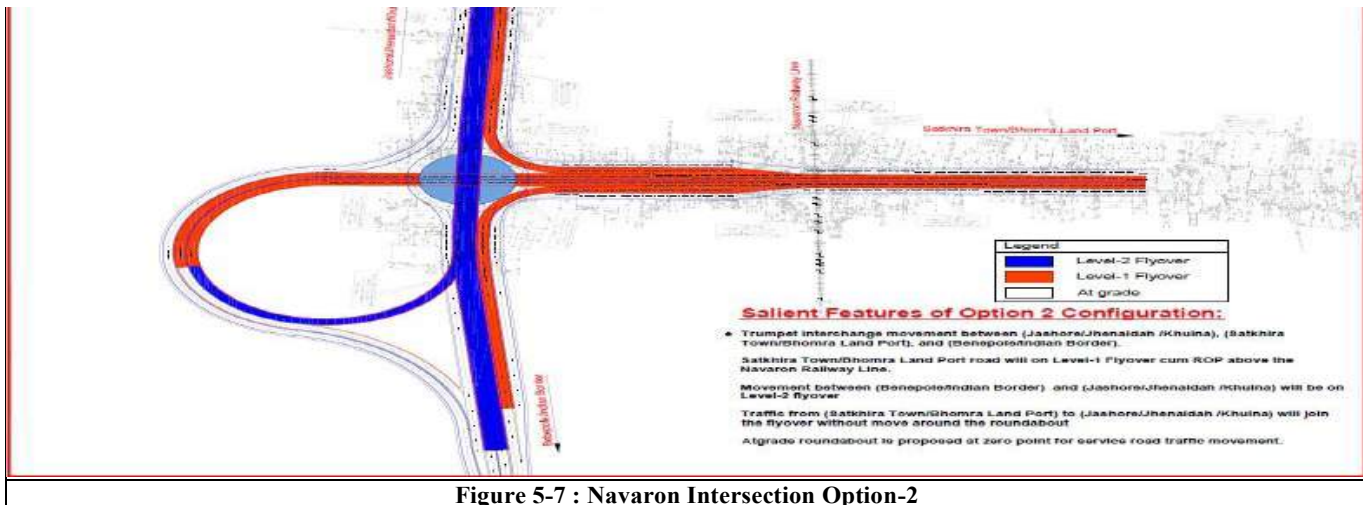


Figure 5-7 : Navaron Intersection Option-2

► Option 3:

240. In another alternative, Option-3, for Navaron Zero-point, Project Road is proposed with a Railway overpass cum flyover over the Railway line and Bhanga Benapole Road. Bhanga-Benapole Road will be access-controlled. Service roads on both highways will have connectivity at zero point through an underpass. To provide a smooth arrangement between the two Major roads, a loop ramp arrangement has been proposed. Loop and ramps will merge with the MCW of Bhanga-Benapole Road before the Bridge on Betna River. Option 3 arrangement is shown below in Figure 5-8.



- ▶ At the grade roundabout at the Navaron intersection.
- ▶ A flyover on Bhanga-Benapole is proposed at level 1.
- ▶ A railway overpass (ROP) is proposed on the Navaron-Benapole railway line





246. Alternative-1: The cutting of trees is more justified for the development of a new road corridor. The number of trees that will likely need to be cut is based on a preliminary assessment of the project site. An ecological survey was carried out as part of this study. Accordingly, about 58,321 trees of 90 species belonging to private land and 8903 trees of government trees belonging to 34 species have been identified that will likely need to be cut. The total of private and government trees likely to be cut is around 67,224. Of these, the trees that fall along the corridor that will need to be cut have been considered for compensatory plantation. In RHD, three saplings will be planted for each tree that will be cut; and planned to be replanted as compensation. For the remaining trees (primarily private), DC will pay compensation to titleholders, and RHD will disburse the compensation to the

5. Analysis of Alternatives

non-titleholders as per RAP. For the 90% survival of tree saplings, care will be provided up to six years along the road alignment.

247. **Alternative-2:** If the current design of the road alignment is changed by considering saving one or both sides of the trees alongside the road, then the RHD project cost will be increased as it requires further land acquisition for the new road alignment. Agricultural or homestead land will be lost. The land for agriculture is very demanding and scarce due to the country's population. Old and fragile trees will remain on the roadside, which may threaten vehicle and pedestrian movement. Trees on the roadside are primarily exotic and mainly used for yielding timber. If such trees remain, no scope will be created to transition to a polyculture plantation using indigenous and multipurpose trees along the roadside.

► Reasons to pursue Tree Cutting as a trade-off for Road Strengthening and Widening

248. Trees along the road are sometimes removed under the Social Forestry Plan, even if there is no expansion needed. These old and fragile trees pose risks, such as falling and breaking branches, leading to resource loss and potential harm to people.

249. Most exotic trees contribute little to local biodiversity, environmental health, or food security. Removing them allows for establishing polyculture plantations using Indigenous species, enhancing biodiversity, preserving local heritage, and improving the climate.

250. The project proposes a tree plantation plan featuring various indigenous species valued for timber, fruit, and medicinal uses. The comparison between tree cutting and no tree cutting is given in **Table 5-2**.

Table 5-2: Comparison of Two Alternatives	
Alternative-1 with trees Cutting	Alternative-2 without trees Cutting
► Tree cutting on existing roads will reduce project costs.	► To preserve existing trees on the roadside, additional land acquisition will have to be undertaken thus increasing the project cost.
► Trees are already marked to be cut according to the prepared plantation plan.	► If not cut by RHD for road extension, the social forestry division will cut the trees to share the benefits of tree plantation with local stakeholders.
► Pedestrians and vehicles will be safe from old and fragile trees falling during a disaster.	► Vehicles and pedestrians will be constantly threatened by trees falling during heavy winds or rain.
► Exotic monoculture trees will be removed, creating an opportunity to create a polyculture plantation using Indigenous multipurpose trees.	► Exotic trees will remain, and no opportunity will be created to make polyculture plantations.
► Local people need different products and services from trees. If existing trees are cut, new plantation plan will be executed using native trees of different purposes including timber, fruits, ornamental, medicinal and so on.	► Local people will be deprived of products and services of native trees.
► Thus, the preferred alternative is Alternative-1: With tree cutting.	

5.6 ENVIRONMENTAL IMPACT OF 'WITHOUT PROJECT' AND 'WITH PROJECT' ALTERNATIVES

251. The "With Project" scenario involves new investment in road development to meet future traffic demands. In contrast, the "Without Project" scenario would lead to negative outcomes, including traffic congestion, increased vehicle idling, and reduced speeds, resulting in carbon emission, noise, air pollution, and a rise in accidents due to poor road design. Although the "With Project" scenario will have environmental and social impacts, these can be mitigated with measures outlined in Chapter 10. Traffic will increase in the coming years, making the "Without Project" scenario more problematic.

- Crossing the road will become more dangerous
- Traffic congestion will increase

5. Analysis of Alternatives

- The economic disadvantages will be due to the idling of vehicles, increased travel time, and increased operating costs due to frequent wear and tear.

252. It is anticipated that the quality of the environment and social conditions will further deteriorate if the 'without project scenario' is adopted, given the current road conditions and future traffic demand.

5.6.1 CARBON SAVINGS DUE TO 'WITH PROJECT' SCENARIO

253. Bangladesh is highly vulnerable to climate change, making it essential for its development to be environmentally sustainable and economically viable. Reducing greenhouse gas emissions from vehicles is crucial, as this correlates with lower global warming. Ultimately, decreasing these emissions benefits the environment both nationally and globally.

254. An analysis of carbon reduction, presented in **Table 5-3**, indicates a positive difference between the 'with project' and 'without project' scenarios. Carbon emissions are higher in the 'without project' option. Notably, the gap between these scenarios has grown over the years, showing that emissions with the project will consistently be lower.

Year	CO ₂ Emissions (in Ton)		
	Existing Condition	After Improvement	Difference
2025	5,646	4,236	1,410
2026	5,988	4,492	1,496
2027	6,352	4,765	1,587
2028	6,736	5,053	1,683
2029	7,183	5,388	1,795
2030	7,663	5,748	1,915
2031	8,171	6,129	2,042
2032	8,713	6,536	2,177
2033	9,292	6,970	2,322
2034	9,951	7,464	2,487
2035	10,304	7,729	2,575
2036	11,038	8,280	2,758
2037	11,825	8,870	2,955
2038	12,670	9,503	3,167
2039	13,466	10,100	3,366
2040	14,310	10,734	3,576
2041	15,209	11,408	3,801
2042	16,165	12,125	4,040
2043	17,181	12,887	4,294
2044	18,030	13,524	4,506
2045	18,921	14,191	4,730
2046	19,856	14,893	4,963
2047	20,838	15,629	5,209
2048	21,868	16,402	5,466
2049	22,725	17,045	5,680
2050	23,617	17,714	5,903
Total Design Life	3,43,718	2,57,815	85,903

5.7 ENVIRONMENTAL IMPACT OF 'WITHOUT PROJECT' AND 'WITH PROJECT' ALTERNATIVES

255. The "With Project" scenario involves new road investment to meet future traffic demands, while the "Without Project" scenario would lead to negative consequences and could result in traffic congestion, increased noise and air pollution, and a rise in road accidents due to poor design. Although the "With Project" scenario will still have some environmental and social impacts, these can be mitigated through measures outlined in Chapter 7 of the report. A traffic analysis indicates that without the project, significant issues are expected to arise in the future.

5. Analysis of Alternatives

- ▶ Crossing the road will become more dangerous
- ▶ Traffic congestion will increase
- ▶ Economic disadvantages will result from vehicle idling, increased travel time, and increased operating costs due to frequent wear and tear.

5.7.1 COMPARISON SCENARIO MATRIX

256. The following matrix describes the comparison scenarios, including both environmental and social factors associated with the project. A comparison scenario of “with the project” and “without the project” is presented in **Table 5-4**.

5. Analysis of Alternatives

Table 5-4: Comparison Scenario Matrix of With and Without the Project			
Sl. No.	Factors	With the Project	Without the Project
1.	Connectivity & Economic Growth	This will facilitate faster, safer economic links, as connectivity will improve, and commute time will also be greatly reduced.	The current road system is insufficient for the increasing traffic, so it is congested and unable to provide adequate logistical support to the regional economy.
2.	Social and environmental conditions	Implementing this project will offer improved environmental and social conditions.	The existing road network is congested and insufficient to support the growing economic growth. It is burdening the existing environment and social conditions.
3.	Community health and safety	The new road will enhance safety and reduce travel time for the community, featuring safe crossings and foot over bridges.	The existing road is already congested with traffic and lacks proper public crossings, a foot-over bridge, etc.
4.	Flooding and drainage	The upgrade involves installing culverts, bridges, and drainage lines to enhance water flow during heavy rainfall, reducing waterlogging and flood risks.	The project area is sensitive to changes in rainfall patterns and sea-level rise, which can increase flooding and waterlogging.
5.	Traffic congestion	The proposed development will ensure free flow of traffic and help keep it organized.	The current roads are inadequate for the rising traffic volumes, leading to congestion and delays.
6.	Topography and soil	The project alignment will mostly pass through flat terrain, so there will be no major impact on the topography and soil.	There is no impact on the topography and landscape.
7.	Trees and vegetation	The project will involve cutting down older trees in the ROW, primarily those nearing the end of their lifespan. However, for each tree removed, three will be replanted, focusing on younger trees that will benefit the environment.	The project area has several mature, decaying trees that are rotting and broken, posing a threat to the community and risk of accidents.
8.	Wildlife and Aquatic Biology	No national reserved areas exist in the project area, so the project will not harm the existing wildlife and aquatic biology.	The existing road system faces traffic congestion and water logging, negatively impacting local fauna.
9.	Climate	There will be a decrease in greenhouse emissions from vehicles, thus positively impacting global warming.	The current road network is causing higher greenhouse gas emissions from vehicles.
10.	Noise pollution	The project will provide noise barriers (trees) at necessary locations to protect the community from pollution.	The roads are congested with traffic, causing frequent honking and h.
11.	Carbon emission	With project, a significant amount of decrease is anticipated in the carbon emission.	Without the project, rising traffic will lead to an increase in carbon emissions.

257. Overall, the quality of the environment and social conditions will deteriorate further if the ‘without project scenario’ is adopted with the present road condition. Thus, with project scenario is a better option.

6. Consultation, Public Participation, and Information Disclosure

6 CONSULTATION, PUBLIC PARTICIPATION, AND INFORMATION DISCLOSURE

6.1 INTRODUCTION

258. This section details consultation, information disclosure, and stakeholder participation. The Stakeholder Engagement and Information Disclosure (SEID) framework allows stakeholders to raise their concerns and offer suggestions during the project's design, planning, and implementation.

259. SEID meetings aim to identify potential stakeholders and PAPs, engage in beneficial discussions with them using a methodology, and assess their interest in the project to determine the social issues or valued environment component in the project region and to make sure that pertinent environmental and social information has been addressed and shared, and their opinions have been appropriately included in the project.

6.2 STAKEHOLDERS

260. The project's Primary stakeholders are affected people, including landowners, farmers, businessmen, structure owners, sharecroppers, poor, pro-poor, squatters, vulnerable persons and groups, women's groups, underprivileged groups, owners of commercial and business enterprises, vendors, small ethnic communities, wage earners, marginal workers, drivers, and transport workers.

261. The people who have a great influence on the project are the Secondary stakeholders, such as RHD and LGED, District Administration, District Forest Office (DFO), Department of the Environment (DoE), BWDB Local government representatives (Municipal Mayor, Councilor, and UP Chairmen, Members), Local Elites, influential personnel, and other people who have stakes in the project.

6.3 APPROACH AND METHODS

262. The consultation and participation process has been conducted following ARIPA 2017 and the Bank's ESSs. The strategy for discussing the possible environmental and social effects of land acquisition on the Bhomra-Satkhira-Navaron Road phase 3 and consulting with the assembled stakeholders involves enabling their active participation to obtain their concerns, opinions, suggestions, and pertinent inputs for minimizing the adverse impacts.

6.3.1 PUBLIC PARTICIPATION PROCESS

263. Various methods were used for carrying out SEID namely Stakeholder Consultation, Meetings (SCM), Focus Group Discussions (FGD), Key Informant Interviews (KII) and spot discussions during the census, and holding stakeholder consultation meetings with stakeholders and PAPs. To organize SCM and FGDs, and KIIs, separate checklists/questionnaire was developed to assess impacts and risks arises from Land Acquisition (LA) and Rehabilitation Action Plans (RAP), gender-based issues (Violence), and to devise mitigation measures for the preparation of Environmental and Social Management Plan (ESMP).

264. The alignment suggested by the design team engineers was used to identify the project's affected parties. The stakeholders were notified of the location, venues, date, and time through announcements, miking, leaflet distribution, etc.

6.3.2 IDENTIFICATION LOCATIONS AND SELECTION OF VENUES

265. Locations for stakeholder consultation meeting (SCM), Focus group Discussion FGD, and KII were chosen according to the design team's roadmap for the ESIA phase of the WeCARE program. Venues were selected in coordination with RHD officials and in line with the Bank's ESS requirements. Potential PAPs were notified about the venue, date, and time through announcements, leaflets, and local administration support. There are nine (9) SCMs, and ten (10) FGDs and twenty-eight (28) conducted in the project area between October 2023 and 27 April 2024 as summarized in **Table 6-1**.

6. Consultation, Public Participation, and Information Disclosure

Table 6-1: Summary of SEID tools used in the ESIA process

Sl. No.	Type of SEID	Number of Events	Period		Participants		
			Earliest Date	Latest Date	Male	Female	Total
1	Stakeholder Consultation Meets (SCM)	9	19.10.2023	27.04.2024	553	171	724
	Focused Group Discussion	10	17.12.2023	27.04.2024	134	70	204
	Key Informant Interview	28	03.09.2023	27.04.2024	25	4	29
	Total	47			712	245	957

Note: Details of Participant, venue and schedule of SEID events conducted between 03.09.2023 and 27.04.2024 are given in Annex 4.1

6.4 INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

266. The following information has been brought up during the stakeholder consultation process: relevant project-related information; project objectives and benefits; removal of trees for road section development; pollution from construction equipment and vehicle movement; and prevalent diseases along the road; pedestrian safety; labor influx during the construction phase. land acquisition (LA) and resettlement for the proposed development and LA process; utility relocation requirements; CPR requirements; gender-based violence issues; etc.

267. A total of **957** individuals participated in the discussion about the Bhomra- Satkhira- Navaron Road in WeCARE program . Male involvement in SEID for the Bhomra-Satkhira-Navaron road was **712**, while female participation was **245**. During the discussion, participants engaged in various environmental and social challenges, including the provision of underpasses, pedestrian overpasses, and foot-over bridges for pedestrians; realignments; road safety; culverts and bridges; tree removal and utility moving, among other topics.

268. Ten focus group discussions were conducted, targeting individuals who fell into a specific affected group due to their homogeneity. The focus was on the damage to property and/or livelihoods (eg, farmers, business owners, affected merchants, damaged residential structures, nearby neighbors, etc.). Additionally, from October 20, 2023, to April 27, 2024, twenty-eight (28) Key Informant Interviews (KIIs) were conducted. The consultant sought feedback from the parties involved regarding possible adverse effects and proposed remedies.

6.4.1 STAKEHOLDER CONSULTATION MEETING

269. The Environmental and Social Consultants team held several discussion meetings in Jashore and Satkhira districts following Upazila: Sharsha Upazila, Satkhira Sadar, and Kalaroa Upazila which are passing through the proposed Bhomra-Satkhira-Navaron road project. Implementation of Safe Corridor Demonstration Program (SCDP), to widen and strengthen this road to a four-lane highway with two service lanes for slow-moving vehicles (SMVT) on both sides of the highway, as well as laying optical fiber cable (OFC) and install Intelligent Traffic Signals (ITS), among other things, will require the acquisition of additional land. Passenger and freight travel costs and times will be shortened as a result. This road will play a big role in strengthening the country's regional economy. Several components of the WeCARE program will be jointly financed by the Asian Infrastructure Investment Bank (AIIB) and the World Bank (WB).

270. Participation of details of the SCM are given in Annex 4.2 through Annex 4.9.

271. To implement the Bhomra-Satkhira-Navaron road section under Phase-3, the participants were informed that approximately 941.2089 Acres of land, 479.7117 comprising Acres of private land, 157.5430 Acres of RHD land, and 146.4112 acres of land belonging to the government (DC as well as other government institutions), need to be acquired.

272. The meetings included detailed discussions regarding potential risks, impacts, and implications on social, environmental, and land-related issues. For example, land acquisition or requisition may lead to the loss of agricultural land, homesteads, ponds, and residential and commercial structures for potentially affected families. Permanent or temporary damage to residential and business units for Project Displaced Persons (PDP)/Project Displaced Households (PDH). Moreover, the acquisition of land will affect the wealth of common or community property. Temporary economic displacement of vendors and traders conducting their business along the RoW, damage to trees, crops, fisheries, etc.

Dissemination of Project Related Information in the Stakeholder Consultation Meeting and Outcome

273. The following information was disseminated in the consultation meeting:

6. Consultation, Public Participation, and Information Disclosure

- ▶ Importance of proposed development of Bhomra- Satkhira- Navaron Road section; In the following three Upazila which are Sharsha, Satkhira Sadar, and Kalaroa passing through the proposed Bhomra-Satkhira-Navaron road project.
- ▶ It is made them clear that this highway is very important as it has been linked with three land ports i.e. (i) Benapol, (ii) Bhomra, (iii) Darshona, and extensive road networks with different Districts and Upazila under Khulna, Barisal, and Rajshahi Divisions as well
- ▶ The ITS will provide the opportunity for authorities to take necessary action such as the availability of ambulances within shorter time gaps, police patrolling, etc.
- ▶ The number of accidents will decrease to a large extent
- ▶ The proposed Bhomra-Satkhira-Navaron road project passes through the three Upazila of Satkhira Sadar, Kalaroa, and Jashore Sadar. The Safe Corridor Demonstration Program will be put into place to fortify and expand this route, turning it into a four-lane highway with two service lanes for slow-moving vehicles (SMVT) on either side. Additionally, intelligent traffic signals (ITS) and optical fiber cables (OFC) will be installed
- ▶ Adequate drainage system (side drains culverts, minor bridges, major bridges), FOB, and POP will be constructed as per the requirement of the project
- ▶ It will bring a positive drive for social and economic development
- ▶ Land Acquisition Impacts and Issues including loss of structures, loss of livelihood, loss of fruit bearing trees, compensation etc.

Environmental Impact Assessment and Mitigation Measures

274. The Stakeholder Engagement Expert and E&S Consultants highlighted the environmental issues impacting the native villages and the project vicinity. Some exotic species will be removed due to project intervention. Some terrestrial and aquatic faunal resources such as frog, snake, squirrel, assorted birds, falcon, etc. will lose their habitats. During construction work, people may be affected by natural hazards like; dust, noise water, and air pollution which may cause health issues. Huge gathering of migrant people (labor influx) during the project's construction. The consultant has included the following environmental issues in the updated ESMP

275. (i) Steps to be taken to save the terrestrial flora and fauna and to uphold bio-diversity in the locality. (ii) Maintain occupational health and safety during pre-construction and construction period; (iii) Steps to be taken to mitigate environmental degradation.

- ▶ Construction activities such as crushing, piling, driving of construction vehicles, and moving machinery will increase noise pollution as well as dust pollution during construction work
- ▶ Labor influx during the construction of the project
- ▶ Construction work will be a cause of land and landslide erosion and water logging in agricultural land
- ▶ Necessary culverts, service roads, cross-sections, and poles have to be constructed
- ▶ An adequate number of foot over bridges, underpasses, overpasses for the movement of school and college-going students, markets, mosques, and temple worshipers, and animals, has to be constructed.

Mitigation Measures

- ▶ Avoiding adverse environmental impacts to save biodiversity resources
- ▶ Effective noise barriers will be built to reduce noise pollution at an acceptable level
- ▶ Regular water spraying will reduce dust pollution
- ▶ Preparation of a Biodiversity Management Plan and tree plantation plan against the tree-cutting
- ▶ Construction of drainage in the lower part of the road to maintain the rainwater to prevent water logging and saving the agricultural land from landslides
- ▶ Construction site should be established at a safe distance to avoid disturbance of native peoples' daily life and nature
- ▶ Maintaining the occupational health and safety (OHS) plan
- ▶ Environmental and Social Management Plan (ESMP)
- ▶ Preparation of a Traffic Management Plan (TMP)
- ▶ Various pedestrian overpass, vehicular overpass, and foot overpass project designs are included
- ▶ Alternative passage for everyday movement
- ▶ Preparation of Grievance Redress Mechanism to resolve conflict
- ▶ Monitoring

Social and Resettlement Impacts, Risks, and Mitigation Measures:

Joint Venture of



STUP Consultant Pvt. Ltd.
 On July 1st, 2021, STUP was acquired by Assystem and rebranded as Assystem STUP.



BCL Associates Limited, Bangladesh

6. Consultation, Public Participation, and Information Disclosure

276. Acquisition of land will affect persons, households, businesspersons and some other entities including Community/Common Property Resources (CPRs), such as mosques, madrasas, temples, schools, colleges, Compensation for affected land, homesteads, water-bodies including ponds, structures, trees, CPRs, etc. will be given as per the ARIPA 2017 & the project's RPF which has been prepared and approved as per WB's ESS5 and ESS10. Individual Consultant, RHD described the Regulatory Framework and Guidelines of the GoB and WB. As mentioned, the affected persons, households, and entities will be assisted and compensated for their losses due to land acquisition and the implementation of the project.

Resettlement & Rehabilitation Specialist of E&S Consultant Briefed about the Followings: Social impact and mitigation measure

277. Before the land acquisition process, all affected parties knew the steps they needed to take to prepare for relocation, resettlement, and economic rehabilitation. Each affected person must remove their structure from the affected land to implement the project. They were informed that the affected persons would be compensated at market value for the affected land and 200% premium as per ARIPA-2017; for structures, they will be compensated at the market price determined by the PWD and 100% premium; and more on relocation grants and restructuring grants. Affected persons shall be permitted to remove all salvageable housing materials from the damaged structure free of charge.

Social problem

- ▶ Loss of livelihood
- ▶ Loss of land, homestead, business structures
- ▶ Loss of rented-out commercial structures built on own land
- ▶ Damage to residential, commercial, and CPR structures
- ▶ Displacement from land, which may cause landlessness
- ▶ Damage to structures of squatters/occupiers/vendors
- ▶ Land acquisition can disrupt their daily life
- ▶ Loss of their social bonds
- ▶ Mental dissatisfaction
- ▶ Finding new land for relocation is uncertain
- ▶ Impeding the movement of people Unsafe movement
- ▶ Damage to trees, crops, fisheries, agricultural land
- ▶ Environmental degradation, etc.
- ▶ Regular traffic jams (due to narrow roads)
- ▶ People gathering from outside (labor influx) may cause social conflict
- ▶ Accidents occur regularly

Mitigation measure

- ▶ Preparation of Social and Environmental Impact Assessment and preparation and implementation of RAP
- ▶ Equitable and straightforward compensation
- ▶ Support for finding a new location
- ▶ Fair compensation for all kinds of losses
- ▶ Construction of recreational areas for recreation of local people
- ▶ Road safety measures to be adopted in the project.
- ▶ Construction of a sufficient number of FOB, POP, and VOP in a meaningful location
- ▶ Provide livelihood restoration support and training
- ▶ Preparation of an Environmental and Social Management Plan (ESMP)
- ▶ Development of a Grievance Redress Mechanism to resolve any project-related problem
- ▶ Road safety measures to be adopted in the project
- ▶ Widen the road
- ▶ Grievance Redress Mechanism

The outcome of Open Discussion:

278. The participant's insights on land acquisition procedures, compensation payment mechanisms, relocation requirements, negative and positive social and environmental impacts on the project, and alternative solutions were recorded. Women and other vulnerable groups were also consulted regarding specific project impacts and issues related to their livelihoods.

6. Consultation, Public Participation, and Information Disclosure

- ▶ Affected people will lose their agricultural land, habitations, water bodies, ponds, and residential and commercial structures for land acquisition
- ▶ 80% of people need a bypass, but 20% are against the use of agricultural land for bypass as food production will be disrupted
- ▶ It is crucial to provide fair compensation to the local small-scale retailers and markets
- ▶ People are worried about the potential negative environmental impact of cutting down 100-year-old trees to widen the road
- ▶ Many trees should be planted, and a mitigation plan should be developed to avoid negative impacts
- ▶ During the discussion, participants expressed concern about the potential effects of an influx of labor on the members of the community
- ▶ Participants expressed their concerns about land acquisition, physical displacement of residential and commercial structures due to the project
- ▶ The affected people have requested fair and adequate compensation, not only for loss of land and income but also for other assets
- ▶ The present market value of land is not sufficient to offset the existing mouza rate
- ▶ Anticipating compensation based on the current market value
- ▶ Considerations must be made for vulnerable PAPs, women's safety at work, and new skill development for vulnerable populations
- ▶ The participant raises their queries about potential different environmental and social pollution and impacts such as air pollution, sound pollution, water pollution, noise, loss of livelihood houses, and various diseases etc. due to the construction activities
- ▶ The safety of women workers and female members of the community must be ensured during the influx of laborers during project construction
- ▶ Participant requested to construct adequate numbers of underpasses and foot over bridges at appropriate locations (e.g., in vicinities of schools, madrassas, areas of bazaars and hats, etc.)
- ▶ A proper drainage system should be there to stop water logging, which will save crops and stop land sliding
- ▶ They raised points on environmental and social risks and impacts on the disadvantaged, marginal aged, and vulnerable groups. In response, they were informed that the disadvantaged, marginalized, and vulnerable groups would receive income restoration grants, special assistance of a one-time payment, and training along with their other entitlements'
- ▶ Labor Health and Safety (LHS) will be ensured
- ▶ If DC bases the compensation amount on the recorded category of land rather than the actual category of land, the participants expressed concern that they will not receive just and sufficient compensation.

6.4.2 FOCUS GROUP DISCUSSIONS (FGD)

279. A total of 10 (ten) focus group discussions (FGDs) were conducted during the study period from October 19, 2023, to April 27, 2024. One of these discussions, held in Tulshidanga, Kalaroa Upazila, Satkhira, included a larger-than-usual group of around 35 participants (refer to Annex 4.11). These FGDs focused on the Management Committees of Project Displaced Persons (PDP), Project Displaced Households (PDH), Community Property Resources (CPR), women's groups, and other stakeholders. Focus Group Discussions (FGD) aim to gather information from stakeholders, PAPs, and various programs affecting women, focusing on losses of properties and/or livelihoods of individuals belonging to a particular affected group based on homogeneity (such as bus/truck drivers, affected businessmen, affected residential structure losers, and nearness, neighbors, etc.). We polled women-headed households, housewives, students, community leaders, landowners, and vulnerable people for their thoughts, ideas, and suggestions. The project consultant developed a questionnaire on gender issues and other project aspects, a structured outline was followed and implemented so that the main outcomes of the FGDs could largely cover. The project will consider the comments/concerns and ideas of the FGDs while preparing the migration plan. The main concerns raised by PAPS are as follows:

Concerns:

- ▶ The project activity must not create water logging in their living areas
- ▶ It is better to avoid agricultural land for bypass
- ▶ Due to scarcity of land, new land is not available in this area (nobody sells)
- ▶ The safety and security of a female labor is to be ensured at the construction

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- ▶ yard during construction phase
- ▶ Toilet for male and female should be in opposite direction
- ▶ Skill training and credit support for the poor and restoration of livelihoods
- ▶ The participants demanded the construction of an overpass/underpass in a suitable location near the School and Bazar areas to avoid traffic accidents and easy crossing
- ▶ Adequate, proper, and hassle-free compensation demanded
- ▶ Implementation of Income and Livelihood Restoration Plan
- ▶ Current market value of the structure on GoB land demanded
- ▶ Notice for at least 3-4 months before relocation
- ▶ Payment of compensation before displacement
- ▶ Payment of moving/shifting allowance
- ▶ Employment opportunities for eligible female laborers during
- ▶ Occupational health and safety for labor
- ▶ Construction camp should be constructed far from the locality
- ▶ Equal wage for woman laborers during construction work was demanded
- ▶ Vulnerable HHs would have additional benefits
- ▶ Display adequate safety signs and diversion marks during construction
- ▶ especially in the location of schools, mosques, and Bazar
- ▶ Requested to stop the slow-moving vehicles (e.g., Alom Sadu and 3-wheelers) on the highway
- ▶ Raising a labor welfare fund to assist the injured drivers and their family
- ▶ Construction-related hazardous waste management should be in place

6.4.3 KEY INFORMANT INTERVIEWS (KII)

280. Twenty-eight Key Informant Interviews (KIIs) have been conducted with the secondary stakeholders such as public administrators, local government representatives (UP Chairmen, Members), Local influential personalities, and others who will play an important role in the project. The following are concerns, expectations, opinions expressed by the stakeholders'. Details are given in Annex 4.12):

Concerns:

- ▶ Land acquisition resettlement issues and compensation
- ▶ Problems related to road construction Air, Water, and Dust pollution
- ▶ Gender-Based Violence, Sexual Exploitation, and Abuse/Sexual Harassment
- ▶ Proper drainage system, waste management system
- ▶ Occupational Health & Safety
- ▶ Resting place and toilet facilities with the passenger shed
- ▶ Footpath and proper lighting system
- ▶ Selected place for vendors
- ▶ Time frame of construction work, quality control, and construction materials
- ▶ Compensation for the change of land classification, compensation for CC loan
- ▶ Loss of homestead and structures
- ▶ Loss of business centre
- ▶ Loss of livelihood
- ▶ Having no remaining alternative income source
- ▶ Loss of rented-out commercial structures built on own land
- ▶ Displacement from land, which may cause landlessness
- ▶ Road updating will affect the social and environmental conditions; people will lose land, structures, businesses, agricultural land, forests, fruit trees, ponds, schools, mosques, and other establishments
- ▶ A significant number of old trees are to be felled; enough trees should be planted to protect the environment
- ▶ Crops and land may be affected by water contamination
- ▶ Poor and vulnerable people lose their livelihood

Expectations:

- ▶ Fair/adequate compensation for loss of commercial land and structures
- ▶ Tree plantation
- ▶ Assistance to start the business at the alternative place and

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- ▶ Expectation of getting jobs
- ▶ Provide livelihood restoration /skill development training
- ▶ Encourage them to establish connections with government facilities
- ▶ Proper maintenance during construction work to avoid social and environmental issues
- ▶ Occupational Health and Safety measures should be providing
- ▶ Grievance Redress Mechanism should be in place
- ▶ Proper drainage system to stop water logging, save crops, and stop land

Opinions/suggestions:

- ▶ Suggests a pollution-safe and secured road
- ▶ Slow-moving Vehicle (SMV) shall have to be strictly prohibited from the highway, a separate land is required
- ▶ Less time and traffic jams will result from the road widening
- ▶ As much government land as possible should be used to widen the road instead of private property
- ▶ Keep provision for underpass or foot over bridge for crossing students and the people who come to prayer in the mosque regularly
- ▶ Suggestion for an effective drainage system and necessary bridge over the pool and culvert
- ▶ Simultaneously, a plantation will be needed. Local people are suffering from water logging; drainage systems need to be updated to save them. Sufficient underpass and overpasses are required

6.4.4 INFORMATION DISCLOSURE

281. For active involvement of Project Displaced Persons (PDPs), Project Displaced Households (PDHs), and other stakeholders, the project information was disseminated through meetings and personal contacts. The public communications policy of WB aims at enhancing stakeholders' trust in WB operations. The Policy among others promotes-

- ▶ Awareness and understanding of ESS5 of WB
- ▶ Activities, policies, strategies, objectives, and results among the public
- ▶ Participatory development, ensuring a greater two-way flow of information between WB and its stakeholders, including affected people; and
- ▶ Transparency and accountability in ESS5 of WB operations.

282. The Project design, benefits, and adverse environmental and social impacts were discussed with the displaced persons and their community. Stakeholders were asked for their views on the Project's overall compensation process. Women and other vulnerable groups were also consulted concerning the specific project impacts and their livelihood aspects. The provisions of the WB policy ESS1, ESS5, ESS10, and Government Act ARIPA 2017 on land acquisition were also disclosed. The exhibits of SCM, FGDs, KIIs and attendance sheets are presented in Annex 4.12 through Annex 4.15.

OCCUPATIONAL HEALTH AND SAFETY FOR LABOUR AND COMMUNITIES: COVERING ESS-2 & ESS-4

283. Ensuring fair treatment of workers and maintaining health and safety environments fosters positive workers' management relations and enhances a project development outcome. These ESS, emphasize fair treatment of workers, maintaining a safe environment, and mitigating risks to protect communities and workers. It involves monitoring potential traffic and road safety risks throughout the project life cycle and developing measures to address them.

284. During construction work, workers may suffer various types of permanent and temporary physical injuries, such as limb damage, hearing loss, vision loss, etc. Due to heavy equipment lifting, they can suffer from various physical problems like pressure and risk, chest pain, muscle pain, nerve damage, etc., which can have long-term effects on workers' health.

285. To protect against these incidental risks, concerned workers should be provided with occupational safety equipment and forced to use safety measures. It is a major concern that construction workers do not use health and safety equipment. It is thus essential to ensure health and safety training for day-labour construction workers and provide appropriate protective equipment.

GENDER, GENDER-BASED VIOLENCE, AND SEA/SH

6. Consultation, Public Participation, and Information Disclosure

286. WB has developed the "Gender Strategy (FY 2016-2023 FY)". For the WB to eradicate extreme poverty and promote coexistence for sustainable development, gender equity plays a core role.

287. The WB Gender Strategy focuses on four objectives:

- ▶ Improving human endowments.
- ▶ Removing constraints for more and better jobs.
- ▶ Removing barriers to women's ownership of, and control over assets; and
- ▶ Enhancing women's voices and agency, and engaging men and boys.

288. On the other hand, in line with the "Environmental and Social Framework" approved in August 2016, the said framework will be applied to all projects to be commenced in 2018. The framework will be used to protect people and the environment related to the project. To clarify the environmental and social risks and impacts related to the projects.

289. A key factor in identifying discrimination is gender. Impact planning for resettlement usually focuses on the family. Recognize failure Women are more prone to the negative effects of internal dynamics than men. Inherent societal biases are given by initiatives at the institutional and policy level that may deny women the opportunity to take advantage of their potential. Gender inequality that already exists in society and the family is exacerbated in times of social and economic stress. If concerns about equality and rights are not recognized, acknowledged, and taken seriously, gender issues in rehabilitation cannot be adequately addressed.

290. Gender discrimination embedded in social practices and traditions makes women vulnerable to violence and stress. Any situation of economic and social distress creates more opportunities for violence against women, increasing their vulnerability.

291. The worst manifestation or existing forms of SEA/SH is child marriage, also known as early marriage. Child marriage and the dowry system puts girls at particular risk of sexual, physical, and psychological violence throughout their lives. Bangladesh has one of the highest early marriage rates in the world at 59 percent in 2018 (UNFPA, 2019).

292. Early marriage nearly always results in school dropouts or from pursuing higher education and early childbirth and is often used as a way for trafficking young girls. This is hazardous from a health perspective and hinders academic and economic development.

293. Lack of land ownership and property rights also deprives women of access to compensation. Compensation and rehabilitation are based on legal ownership of land and property in most projects. In many societies, women may not have legal rights to land and property. Hence, it may seem they are not eligible for compensation and other benefits. To protect against Gender-based Violence, awareness is important. A Grievance Redress Mechanism has been developed in this project. A Gender-Based Violence Action Plan (GBV) has been prepared in Section 7. It was stated that equal rights and access would be ensured in the construction phase, following no discrimination gender-wise.

7 ENVIRONMENTAL AND SOCIAL IMPACTS, RISKS AND MITIGATION MEASURES

7.1 GENERAL

294. The chapter discusses the environmental and social impacts and risks arising from the Bhomra – Satkhira – Navaron Road project. Various environmental and social impacts during the construction and operation phases may be direct, indirect, short-term, long-term, adverse, or beneficial. These impacts were discussed with stakeholders and the engineering design team so that mitigation measures could be adopted during the early phase of the project.

7.2 IMPACTS AND RISK SCREENING

295. The environmental and social anticipated impacts are screened to determine their level of significance without mitigation during the project design and pre-construction phase, construction phase, and operation phase based on the baseline condition of the project area

7.2.1 METHODOLOGY

296. The methodology of assessing environmental impacts from the project includes identifying the environmental components that will be impacted, the type of impacts, the assessment area where the impacts will be felt, and defining the criteria for assessing the significance of each type of impact. After defining these aspects, a screening of project impacts during design and pre-construction, construction, and operation stages was carried out to identify the minor, moderate, and major impacts to guide the development of mitigation measures and ensure no residual impacts. A detailed environmental and social management guideline has been incorporated in the ESIA Chapter 10 (ESMP).

- ▶ **Identification of Impacts:** The significant Valued Environmental Components (VEC) or Important Environmental Components (IEC) of the physical, biological and social environments have been identified as are at risk of being impacted by the project. Type of Impact on the VECs: The type of impact can be described as:
 - Positive: - Improvement in the quality of the VECs because of the project,
 - Negative: - Degradation or reduction in the quality of the VECs because of the project and
 - Neutral: - No noticeable change in VECs
- ▶ **Area of Impact Assessment:** The area covered for assessing direct impacts is proposed RoW and 500 m Corridor of Impact (CoI) for assessing the indirect impact of the project This covers 250 m on either side of the centerline studied for direct impacts.

297. The significance of impacts is defined according to their severity, physical extent, and effect duration, as follows:

- ▶ **Impact Severity/Magnitude:** Understanding an impact's severity or seriousness entails understanding its consequences or risks. This is a subjective criterion, which is defined as major or high, moderate or medium, and minor or low.
 - Major = inability of the environment to recover from the damage, and degradation is permanent and fully degrading a habitat e.g., wetland filling, or clear cutting of trees/ Social permanent disruption
 - Moderate = recovery is slow with 40% recovery possible but taking >1 year
 - Minor = entire affected component recovers within one season/Social impact barely noticeable
- ▶ **Impact Physical Extent:** The area of impact entails the spatial scale of impact on one or more of the VECs. The terms limited, local, and regional describe the extent of impacts.
 - Major = negative impact can be measured at least 2 times the distance beyond the immediate COI boundary
 - Moderate= impact extends beyond the immediate project area, but recovery is expected once work is done within one growing season; or for the social component, once compensation is delivered
 - Low or Minor= localized effect, and recovery is very high
- ▶ **Impact Duration:** This indicates the time dimension of the impact on the VECs. The terms permanent, temporary, and short-lived describe the duration of impact.
 - Major or long-term impacts are felt throughout the life of the infrastructure. Highly destructive or extending through at least one life cycle if an indicator species is affected
 - Moderate= impact not extending to one Lifecycle and not impacting reproductive cycle or life necessity or very intermittent
 - Minor or Short Term= Short term or Temporary but measurable change
 - Negligible observed change but measurable impact lasts less than 24 hours, with impacts well within national standards or documented threshold for damage.

7. Environmental and Social Impacts, Risks and Mitigation Measures

7.3 IMPACTS AND MITIGATION DURING DESIGN PRE-CONSTRUCTION PHASE

7.3.1 IMPACTS ON DESIGN CONSIDERATION

298. The design stage requires surveys, field investigations, meetings, and desktop work for designing the project. Thus, no significant impacts on the existing environment are envisaged. Similarly, the pre-construction stage pertains to the mobilization of the Contractor, the Construction Supervision Consultant (CSC), the engagement of the NGOs to support RHD in the implementation of the Resettlement Action Plan (RAP), and Land acquisition work. However, before mobilization of the Contractor, RHD needs to undertake various activities to provide encumbrance-free alignment, which involves the demolition of structures, tree cutting, utility shifting, and compensation to be paid to the project-affected persons (PAPs), etc. Some of the activities do not require any specific mitigation, but some activities require mitigation measures.

299. Project Design Specifications: Design parameters and construction planning may negatively affect infrastructure operations, such as the degradation of natural systems like drainage, contamination caused by the mismanagement of construction waste, etc. Improper Project's geometrical improvement and pavement designs, realignment locations, siting of construction/labor camps and other associated infrastructures, not the least of them being human waste draining into the river, construction methods applied can have significant impacts on the biophysical, economic, and socio-cultural environments of the project area at Chachra Intersection. Natural hazards and climate change risks are also design concerns due to pavement damage, such as rutting, embrittling, softening road migration of liquid asphalt, thermal expansion in bridge joints, etc.

300. The project area's seismicity could significantly affect heavy infrastructures like VOP, POP, flyover, and drainage structures, particularly bridges. Therefore, the impact on the design considerations is significant.

Mitigation Measures

- ▶ Considering the area's hydrology, adequate drainage structure will be provided.
- ▶ Culverts of adequate spans have been provided to meet the requirement of animal crossing
- ▶ Issues about Pedestrian safety and road safety measures have been addressed by providing vehicular underpasses, pedestrian passes (POP), Flyovers, etc.
- ▶ Ensure road design, embankment height, and Pavement design to comply with the relevant international and national approved design manual of RHD Geometric Design Standards Manual (Revised-2005); AASHTO "A Policy on Geometric Design of Highway and Streets" 2001, etc.
- ▶ The Bangladesh National Building Code (BNBC) should be considered for designing of road infrastructures, particularly all building structures

7.3.2 ACQUISITION AND CLEARANCE OF PRIVATE STRUCTURES

301. The proposed development of this road section requires additional land to improve the geometry of the existing alignment.

Mitigation Measures

- ▶ Implement Land Acquisition Plan (LAP) and updated Resettlement Action Plan (RAP) of the Project prepared in compliance with the national Acquisition and Requisition of Immovable Property Act (ARIPA), 1982, amended ARIPA, 2017.
- ▶ DC will pay Cash Compensation under Law (CCL) to the PAPs to compensate for the impacts due to the loss of lands, structures, ponds, trees, standing crops, etc.
- ▶ Payment of compensation to Titled and Non-Titled households according to the entitlement matrix defined in the updated RAP by the RAP Implementing Non-Government Organization (INGO) on behalf of RHD
- ▶ Payment of Top UP (Replacement Value (RV)/Cost minus CCL where RV is higher than CCL) by RHD facilitated by INGO.
- ▶ Provide the resettlement benefits to the affected disadvantaged, marginalized, and vulnerable households to restore their livelihood by implementing the Livelihood Restoration Plan as documented in the updated RAP
- ▶ Proper compensation will be given for the loss of water bodies and trees by DC/RHD with assistance from INGO.
- ▶ Ensure adequate compensation is provided to the Project Affected Persons (PAPs) on time and without hassle.
- ▶ Affected HHs will be given cash compensation for the land and structures, as well as additional transfer grants for the relocation of each structure.
- ▶ Cash assistance for dismantling and reconstruction will be provided as per the assessed value.
- ▶ Vulnerable groups should be identified, and provisions made for social and economic development support, employment, and means of subsistence to improve their status/livelihoods.

7. Environmental and Social Impacts, Risks and Mitigation Measures

- ▶ The project's Grievance Redress Committees (GRCs) will ensure participation and speedy, out-of-court settlement of as many disputes as possible.

7.3.3 ISSUES FROM STAKEHOLDER CONSULTATIONS

302. Several consultation meetings were carried out in the project-affected areas in the Jashore district. Participants raised their concerns about the adverse impacts that may arise due to i) land acquisition, compensation, relocation options, cutting of trees, etc., and whether any provision of resettlement and special benefits for the disadvantaged, marginalized, and vulnerable households and groups of the project is there or not. ii) anticipated environmental pollution like dust and noise generation, water pollution, etc. due to construction works iii) expected community exposure to water-borne, water-based, water-related, and vector-borne diseases, and communicable and non-communicable diseases, which could result from project activities, iv) road safety at the major and minor roads intersections, bazar areas and sensitive structures, v) improper labor management, occupational health and safety, and their risks during construction works were the grave concerned.

303. In addition, the participants raised the adverse impacts on the communities residing alongside the project alignment due to sexual exploitation and Abuse (SEA), sexual harassment (SH), and Gender-Based Violence (GBV). Participants were concerned about women's safety on public buses if proper highway safety measures were not ensured.

Mitigation Measures

- ▶ The meetings have discussed various issues related to compensation for land acquisition, loss of structures and assets, resettlement and rehabilitation (R&R), etc., which are presented in detail in the RAP to be implemented in the projects.
- ▶ Compensation for infrastructure impacts was ensured per the Entitlement Matrix of the Resettlement Policy Framework (RPF).
- ▶ The Engineering Design Team ensured that the proper design of vehicle overpasses, pedestrian overpasses, foot overpasses, bus bays, etc., was considered based on the outcomes of the consultations regarding road safety.
- ▶ Mitigation measures for various impacts of the project shall be included in the CESMP, which will have but not limited to the following:
- ▶ Ensure the implementation of mitigation measures suggested in the ESMP at the site to control environmental pollution.
- ▶ Specific mitigation measures for risks and impacts that laborers may encounter.
- ▶ The Waste Management Plan will ensure a sound environment.
- ▶ Construction and Demolition waste, Liquid Waste Management Plan, and Hazardous Waste Management Plan shall be in place
- ▶ Workers' Camp Management Plan, Community Health and Safety Plan, Traffic Management Plan and Training schedule of staff shall be in place

7.3.4 COMMUNITY HEALTH AND SAFETY

- ▶ For community health and safety, the contractor shall plan activities in residential areas after discussing with the community
- ▶ Locals shall be informed about the activities the contractor is taking up in their areas.
- ▶ Excavated areas shall be adequately barricaded.
- ▶ Trespassing of construction sites/construction camps/labor camps shall be prohibited.
- ▶ OHS Plan: the prevention and management of HIV/AIDS and other STIs as suggested in B-22 of Chapter 10
- ▶ Contractors shall take all precautionary measures to prevent community exposure to water-borne, water-based, water-related, and vector-borne diseases and communicable and non-communicable diseases that could result from project activities.
- ▶ Control of accident
- ▶ Trained drivers with valid licenses shall be allowed to drive construction vehicles/heavy equipment.
- ▶ The speed and fitness of the construction vehicles/equipment shall be defined in the contractors' ESMP.
- ▶ Vehicles/construction equipment need to be maintained and inspected/tested regularly,
- ▶ Highway Patrol / Police should be adequately deployed, particularly at night, to prevent the harassment of women passengers in the public busses on the project road during the operation of the project
- ▶ Finally, regular consultation with the community will be conducted to determine the effectiveness of implementing mitigation measures at construction sites/camps.

7. Environmental and Social Impacts, Risks and Mitigation Measures

7.3.5 ISSUES OF THE CPRS

304. The Inventory of Losses (IoL) survey identified the CPRs alongside the existing road requiring relocation. Relocating or partially damaging these structures or their premises will cause community stress.

305. It is observed during the IOL study that no historical, cultural, or archeological resources are falling along the project road; however, during site clearing and grubbing, excavation, or digging for construction purposes, it may unearth chance artifacts. A rapid response procedure in assistance with officials of the Department of Archeology, Bangladesh, shall be prepared to protect and preserve artifacts if found by chance, minimizing the disruption to project activities.

Mitigation Measures

- ▶ CPRs, such as mosques, schools, temples, clubs, etc., fall within the corridor of impact and need to be properly shifted.
- ▶ Implementation NGO (I-NGO) has been engaged to assist PIU/RHD in the overall resettlement and relocation process as well as to facilitate the CPRs shifting
- ▶ Payment of Cash Compensation under Law (CCL) for affected structures by DC for relocation of the structures
- ▶ RHD, with assistance from INGO, pays the top-up (Replacement Value/Cost minus CCL where RV is higher than CCL) for structures.
- ▶ Compensation must be provided per guidelines specified in the RAP and mutual understanding between RHD and affected communities/committees.
- ▶ Affected CPRs must be rebuilt at the expense of RHD or payment of cash compensation in consultation with the affected communities.
- ▶ Affected communities will be given cash compensation for the land and structures and additional transfer grants according to the entitlement policy as defined in the RAP

7.3.6 UTILITIES SHIFTING

306. Electric poles are to be shifted. A discussion meeting has been conducted between the utility providers, the PIU, and E&S consultants to shift the utilities falling within the corridor of impact. Increased pollution in ambient air quality due to heavy equipment operation and increase in ambient noise Levels due to excavator operation, concrete mix, and traction of electric lines will be carried out. Unsafe to the public while working near the residential/commercial areas and shifting utilities like electric poles may require temporary power cuts, disturbing ordinary local people's commercial activities, and domestic life. However, the impact will be short-term and only in the daytime. Sometimes, underground cable faults may be anticipated during shifting, which will cause a dangerous situation in the locality. Generally, shifting optical fiber cables may create communication problems due to damage during relocation. In addition, shifting of utilities may block access to houses, business centers, and health centers. The erection of electric poles may cause inconvenience and block access to the residents, shopkeepers, students, and children. Possibilities of accidents and health hazards, if piled near houses on the roads, markets, schools and playgrounds, and parks without considering safety. Occupational and public safety issues of the workers, technicians, and residents are a serious concern during the shifting of the utilities.

Mitigation Measures

- ▶ The RAP details the mitigation measures for the risks mentioned above and the impacts associated with Utility shifting.
- ▶ Machines and equipment that are well-maintained and in good working condition and meet the pollution board requirement shall be deployed at the site during the erection of electrical poles.
- ▶ Warning signboards shall be placed at visible locations.
- ▶ Proper safety measures should be adopted during the implementation of utility shifting so that accidents of workers, technicians, and local people can be avoided. All workers and project personnel should use PPE at the site.
- ▶ The contractor will prepare a Utilities Shifting Plan in consultation with the responsible agencies, such as West Zone Power Distribution Company Limited (WZPDCL), Jashore Palli Bidyut Samity (JPBS), and Bangladesh Telecommunication Company (BTCL), for utilities' relocation to RHD. The concerned authorities, JPBS of Jashore, have already submitted a budget for utilities' shifting to RHD.
- ▶ Utility shifting shall be done as per the agreed Utility shifting plan
- ▶ The contractor, in consultation with the responsible agencies and RHD, will inform the local people about the schedule of the utility shifting before the start of the work
- ▶ Any grievance/complaint shall be recorded and resolved by the competent authority as soon as possible.

7. Environmental and Social Impacts, Risks and Mitigation Measures

- ▶ To reduce the impacts, shifting shall be carried out in phases
- ▶ Excavation/concreting for erecting the electric poles shall be planned so as not to disturb the movement of the local people and traffic.
- ▶ Installation of the electric poles and cable holders shall be done in such a way that it shall not disturb or be a concern of safety for the children playing in the park or going to schools
- ▶ Shifting shall not disturb access to religious places, community halls, municipal services, local water sources, or tourist locations/spots.
- ▶ No material shall be so placed which may pose a risk or cause inconvenience to any person or the public.

7.3.7 DRAINAGE IMPACTS-MITIGATION MEASURES

307. The natural drainage flow in the area needs to be maintained, as well as its interconnection with other natural drains in the area; the drainage flow should also maintain existing connectivity to any water body along the alignment.

308. Impacts due to drainage diversions must be mitigated by providing engineering measures such as box/pipe culverts, cross-drains, bridges, etc.

Mitigation Measures

- ▶ Provision of adequate side drains to evacuate the rainwater/stormwater from the roadway and to ensure minimum disturbance to the natural drainage of surface and subsurface water in the area
- ▶ The drainage canal must be constructed of an adequate size and with the necessary number of manholes to ensure an optimal level of stormwater and wastewater flow. The manholes will be periodically cleaned and maintained to ensure the drainage system's effectiveness and efficiency.
- ▶ Stormwater drains shall be effectively designed and constructed to carry and dissipate the stormwater without causing any unwanted collection of water/water stagnation
- ▶ Dumping of waste in the storm drains shall be prevented
- ▶ It shall be ensured that soil and muck do not choke the drains, making it ineffective; drains should be cleaned before and after monsoon to ensure their proper performance
- ▶ As part of the project design measures, the construction of the concrete drainage canal with manholes and effective, efficient, and timely maintenance is proposed
- ▶ Bridges and culverts of adequate capacity have been provided in the design
- ▶ In general, the project design intends to install necessary culverts, bridges, and drainage lines so that the natural flow of water is undisturbed. Also, it will decrease the chance of flooding as it will provide better water channels to support excess rainfall incidents.

7.3.8 ENVIRONMENTAL MONITORING FOR BASELINE ESTABLISHMENT

309. Air, noise, soil, and water have been monitored at different locations within the project area. This will serve as a benchmark for monitoring during the construction and operational phases.

7.3.9 ROAD SAFETY ISSUES

310. The major bottleneck areas identified based on social and engineering points of view in the project roads are the Navaron Intersection, Settlement on both sides of roads, and Satkhira Medical College. Thus, appropriate countermeasures are required in the design of the project road. Poor road geometry and mixed Traffic, like fast and slow-moving, will cause vehicular accidents, inconveniences to road users, and pedestrian health hazards. Vehicular and pedestrian overpasses must be provided based on traffic and pedestrian demand.

311. Many side roads will join the Service Road, and if entry is not properly controlled, these points become a bottleneck.

Mitigation Measures

312. Slow-moving vehicular traffic lanes, Bus bays, Vehicular Overpasses (VOP), foot over bridge (FOB), pedestrians overpass (POP), a pedestrian subway, and one elevated flyover along with a ramp are proposed. Compliance with International highway for curvature and grading and safety curve at all Grade, U-Turn, and bridge approaches

313. Sidewalks/pedestrian zones along the road near habitat areas, schools, hospitals, and religious places need to be included in the design, which the EPC contractor will further review

7. Environmental and Social Impacts, Risks and Mitigation Measures

7.3.10 PERMISSION AND CLEARANCES

314. Smooth and safe construction work requires permission from different authorities before the Contractor commences civil works. The project will be As few components/structures are added in the new design, DoE clearance is to be obtained incorporating these along with the cleared version of ESIA.

Mitigation Measures

- ▶ Contractor shall follow the Environmental Clearance Certification (ECC) requirement and mitigation measures suggested in ESMP while establishing the construction campsites, crusher units, hot mix plants, concrete batch mix plants, WMM plants, and workforce camps.
- ▶ Consent to establish and operate construction campsites, crusher units, hot mix plants, concrete batch mix plants, WMM plants, workforce camps, etc., need to be obtained.
- ▶ Permission to Establish Construction camps
- ▶ Permissions for extraction of Groundwater, if required
- ▶ Layout approval for construction camps/labor camps
- ▶ Permissions for sourcing of water for construction activities (Surface Water), if required
- ▶ Contractor shall follow standard procedures as per Bangladesh Labor Act 2006 for labor recruitment

7.3.11 ORIENTATION TO CONTRACTORS

315. If proper orientation and training on the Environmental Assessment, ESMP implementation, and safeguard process of national and funding institutions are not conducted for the contractors and RHD, then the compliances of ESMP provision cannot be realized efficiently and effectively and would be challenging to achieve.

Mitigation Measures

- ▶ The RHD/PIU will conduct the orientation program for the contractor after the appointment to meet the ESMP and ESS of WB requirements. The salient features of the program are as follows:
- ▶ The contractor will initiate no works until the site induction training of workers/staff is carried out
- ▶ Obligations under contract to submit the Contractor's Environmental and Social Management Plan
- ▶ Regulatory compliance requirements
- ▶ Grievance redress mechanism for both social and environmental issues
- ▶ Various plans required under C-ESMP related to Occupations Health & safety, traffic and road safety, community health and safety, hazardous and non-hazardous waste, campsite management, emergency response, blasting, borrow area, muck disposal, restoration, etc.
- ▶ Labor management procedures
- ▶ Community health & safety aspects at the workplace and Reporting requirements etc., under the project
- ▶ The Stakeholder Engagement Plan Contractor shall appoint one Environmental safety and health Officer, Social-cum-Community Liaison Officer, and one Health and Safety Officer, both of whom shall solely be responsible for the implementation of all ESMP provisions in close co-ordination/consultation with Environmental and Social Specialists in the RHD
- ▶ Training includes discussion and review of ESMP detailing how specific environmental risks associated with their scope of work, legal compliance, inspection and audits, and progress tracking and reporting
- ▶ Individual Environmental Consultants under the Project Implementing Unit of RHD will monitor and supervise all training sessions and provide training modules

7.3.12 IMPACTS AND MITIGATION DURING CONSTRUCTION PHASE

316. Construction stage activities require careful management to avoid environmental impacts. Activities that trigger the need for environmental measures to be followed include:

- ▶ Implementation of site-specific mitigation/management measures
- ▶ Monitoring the quality of the environment along the construction sites (as air, noise, water, and soil & Sediment)

317. Several other environmental issues have been addressed as part of good engineering practices, which have been accounted for in the engineering costs. They include roadside drainage improvement, soil erosion prevention measures, etc. Therefore, these mitigation measures shall be included in the contract document of the contractor for its implementation by the contractor and the sustainable development of the project

318. To implement it properly, it is suggested that non-compliance should be considered a major lapse from the contractor for which they need to be penalized. All lapses on the clearances/NOCs obtained by the contractor shall be deemed as major non-compliance. They must ensure all these approval/NOCs are valid throughout the construction stage/liability/maintenance period. The contractor needs to follow the conditions stipulated in the

7. Environmental and Social Impacts, Risks and Mitigation Measures

environmental clearance (EC), consent to establish (CTE), and consent to operate (CTO), as well as other approvals given by the regulatory authorities.

7.3.13 SITTING HOT MIX PLANT/WMM/BATCHING PLANT/CRUSHERS

319. Poor siting of Hot mix, Wet Mix Macadam (WMM), Batching Plant, and Crushers will cause (i) air pollution, (ii) fugitive Dust Emission, (iii) Noise Pollution, Surface water pollution in case nearby water body /water logging, (iv) drainage problem and (v) Safety Hazards for electrical and other safety risks for the workers. Thus, the contractor should take care of pre-requisite considerations and measures for siting the construction equipment.

Mitigation Measures

- ▶ For installing different plants, the constructor shall obtain the necessary permission from the competent authorities
- ▶ A hot mix plant shall be installed on the downwind side and 1000m from the residential area.
- ▶ Batching plants/WMM shall be installed 1000m from the residential area on the downwind side.
- ▶ These plants shall be 500m from the water bodies or rivers/canals.
- ▶ No batching plant /labor camp/construction camps shall be allowed to be established on the banks of the river/canal.
- ▶ To prevent water logging in the batching plant, drainage, and sump shall be provided and cleaned regularly.
- ▶ Hot mix plant shall be fitted with pollution control devices, Bag filters, etc.
- ▶ The stack height shall be at least 10m above the ground.
- ▶ The premises shall be enclosed, and trespassing shall not be allowed.
- ▶ The contractor shall submit the detailed layout plan for approval from the Engineer before getting into a formal agreement with landowners to set up such site.
- ▶ Actions by the Engineer and PIU against any non-compliance shall be borne by the Contractor at his own cost.

7.3.14 LABOR CAMP/CONSTRUCTION CAMPS

320. A code of conduct (CoC) and GBV Action Plan has been prepared separately with provisions to comply with the construction/labor camp management. A Labor-Management Plan (LMP) has been prepared to take necessary action when the construction and labor camps are established. A provisional aspect of GRMs is also incorporated in the labor-management plan and ESMP to construct a sustainable construction camp for the proposed project. Improper and poor layout of worker's camp may cause loss of agricultural produce if (i) visited on cultivable land, (ii) health hazard to workers and nearby community, (iii) surface water pollution in case sited near water bodies, (iv) local drainage problem (v) wear and tear to haul routes if material is transported via village roads, and (vi), fire, electrical and other safety risks. The camp siting for construction workers is important as they may significantly impact health and possible hazards on sensitive environmental receptors or existing infrastructures of nearby communities.

321. Though identification of the location and setting of the worker's camp, construction yard with machinery layout, storage of construction materials, and other facilities are in the scope of the Contractors' arrangement, the location, layout, and basic facility provision of each labor camp will be submitted to CSC and PIU before their construction.

Mitigation Measures

- ▶ Labor camps shall be located at least 500m away from residential areas and waterbodies, such as the River, wetlands, or any Beels or Baor.
- ▶ A detailed layout plan for all such sites shall be submitted for approval from the CSC.
- ▶ Contractors shall prefer the non-productive lands with access to the existing roads.
- ▶ The contractor must agree with the land parcel owner along with the photographs of the original land.
- ▶ Rooms of the labor camps must be properly ventilated.
- ▶ Hygienic conditions must be ensured in the labor camps
- ▶ To prevent soil erosion, the construction/labor camps shall not be established on the banks of rivers or water bodies.
- ▶ No timber or wood shall be used for cooking purposes
- ▶ No illegal tree-cutting shall be allowed.
- ▶ Mobile toilets or toilets with septic tanks shall be provided.
- ▶ Either a canteen facility or cooking gas shall be provided.
- ▶ Labor/construction camps shall be properly fenced, and an informatory board and project details shall be displayed at the entrance and exit of the camp.

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- ▶ Pre-requisite consideration and measures should be taken care of by the contractor for siting the camps and other facilities.

7.3.15 POTABLE WATER AND SANITATION FACILITIES

322. Inadequate potable water supply, unsanitary toilet facilities, and washing areas can lead to water-borne/Fecal disease outbreaks in the workers' camps. Poor sanitation may result in the transmission of communicable diseases among the workers and the host community. Unsafe potable water facilities and washing areas can also lead to water-borne disease outbreaks.

Mitigation Measures

- ▶ Potable water shall be provided by the contractor in the construction camps/labor camps/construction sites.
- ▶ Water quality shall be tested to check its portability to meet the requirement of drinking water quality standards
- ▶ Drains shall be provided.
- ▶ Proper lavatory facilities for male and female workers shall be provided per ESMP.
- ▶ Proper hygienic conditions must prevail in such facilities.
- ▶ The mobile toilet shall be periodically replenished with fresh water
- ▶ Wastewater from ablution purposes shall be emptied through suction tankers and carried to the nearest municipal sewage treatment facilities, or soak pits shall be provided.
- ▶ Untreated liquid waste shall not be allowed to be discharged into surface water bodies.

7.3.16 SOLID WASTE MANAGEMENT

323. A wide range of waste may be generated during construction, including gravel, concrete, miscellaneous structures such as poles and cables, steel, and organic materials. Construction camp wastes are often poorly managed, leading to chronic pollution of surface and groundwater and soil contamination. Construction work creates areas of water stagnation during monsoons or heavy rain. These places become ideal places for mosquitos to breed and cause malaria and dengue. This includes storage for outdoor equipment, empty construction material drums, and used tires.

Mitigation Measures

- ▶ The contractor shall make the necessary arrangements to segregate the waste at the source.
- ▶ Biological waste from labor camps, construction camps, or other contractor facilities shall be collected for composting and gardening.
- ▶ Intermingling of waste shall not be allowed.
- ▶ Municipal waste shall be disposed of at the approved landfill sites only, or the contractor shall make necessary arrangements with the municipalities/Zila Parishad.
- ▶ Construction and demolition (C&D) waste shall be disposed of at identified and approved locations.
- ▶ C&D waste shall not be dumped into the water bodies.
- ▶ About 40% of the sacrificed material shall be reused in the sub-base preparation. The contractor shall store the usable material properly impervious to prevent mixing with the earth.
- ▶ Contractor shall prepare a waste management plan
- ▶ Open burning of solid wastes, whether hazardous or nonhazardous, shall not be allowed.
- ▶ E-waste shall be appropriately collected and disposed of by approved vendors only.

7.3.17 HAZARDOUS MATERIAL MANAGEMENT

324. The potential sources of hazardous waste at the construction site are oil, fuel, grease, chemicals from plants, equipment, vehicle servicing, and construction camps. Poor management of these wastes is the potential source of surface water, groundwater, and soil contamination. The Contractor will adopt the following mitigation measures.

Mitigation Measures

- ▶ Oil/fuel shall be stored per the approved design and safety protocol applicable in the country, e.g., The Petroleum Act. 2016, The Petroleum Rules 2018, The Explosives Act. 1884, The Explosives Rules 2004
- ▶ If there is any spillage of hazardous waste, the contractor will sort it out immediately.
- ▶ An area shall be assigned for storing the oil/oily waste or any flammable material.
- ▶ Smoking shall be prohibited in such areas.
- ▶ Drip trays shall be provided at DG sets/below the nozzles to fuel the construction vehicles and equipment.

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- ▶ Used oil or hazardous /flammable material shall be collected in the drums and stored on the impervious platform sloped or beamed to contain a minimum of 25 percent of the total storage volume.
- ▶ It shall be disposed to the authorized/approved vendors per the DOE norms.
- ▶ Tires shall be appropriately stored under the shed and disposed of by approved vendors.
- ▶ The transfer of hazardous materials from vehicle tanks to storage shall be carried out on impervious surfaces to avoid environmental risk and impacts; the surface shall be sloped to a collection or containment structure. This shall not be connected to the municipal wastewater/stormwater collection system.
- ▶ To the extent feasible, secondary containment for components (tanks, pipes) of the hazardous material storage system shall be provided.
- ▶ Periodic (e.g., daily or weekly) reconciliation of tank contents and inspection of visible portions of tanks and piping for leaks shall be undertaken.
- ▶ Inform the employees about the hazards presented by their work
- ▶ Warning signboards shall be displayed at such locations.
- ▶ Awareness training shall be given to workers by the contractor's environmental safety health officer.
- ▶ Material Safety Data Sheets (MSDS) shall be compiled.
- ▶ Standard operating procedures (SOPs) for fueling/storing or other operations about the hazardous material shall be prepared
- ▶ Contractor shall prepare a Hazardous Waste Management Plan

7.3.18 WATER RESOURCES AND WATER QUALITY

325. Uncontrolled dumping of wastes, sewage, excavated materials, and accidental spillage of fuels and chemicals into the water bodies may greatly pollute them. Disposal of sewage and wastes from the construction camps to surface water bodies without treatment will deteriorate the water quality. The seasonal ponds are unlikely to be affected by construction activities. In addition, there will be spillage oils, fuel, grease, and chemicals from plants, equipment, and vehicle servicing. However, the pollution of perennial water bodies can adversely affect their aquatic population. The dumping of waste, sewage, and excavated materials should be done at a particular place, and accidental spillage from vehicles can be checked by maintaining active surveillance of vehicles in operation.

Mitigation Measures

- ▶ DC/RHD will give the proper compensation with assistance from INGO for the Loss of the water body.
- ▶ Contractors shall ensure that construction materials like earth, stone, and ash do not block the water flow of any watercourse and cross drainage channels.
- ▶ No waste shall be allowed to be dumped in ponds. Any accidental spillage shall be reported to the project authorities for necessary action, such as clearing and disposing of the spilled material safely
- ▶ Workers will not be allowed to pollute the water body.
- ▶ No illegal excavation shall be allowed from the bunds of water bodies.
- ▶ The water flow will be restored soon after completion of the work.
- ▶ No waste will be dumped into the water bodies.
- ▶ Oil and grease separators shall be provided near the vehicle washing area/maintenance workshop.
- ▶ Drains and soak pits shall be provided in labor camps, construction camps, workshops, and other contractors' facilities.
- ▶ Silt fencing at the mouth of the water body shall be provided.
- ▶ Waste, sewage, and excavated materials should be disposed of at an approved location. Accidental spillage from vehicles can also be checked by maintaining active surveillance of vehicles in operation.
- ▶ Waste shall not be allowed to be dumped in ponds. Any accidental spillage shall be reported to the project authorities for necessary action, such as safely clearing and disposing of the spilled material.
- ▶ Water Quality shall be monitored during the baseline survey. During construction activities, contractors will undertake water quality monitoring as per the environmental monitoring program.

7.3.19 CLEARING AND GRABBING

326. Clearing and grabbing at the project site will cause fugitive dust emissions and the removal of fertile topsoil. The top 12-15cm soil is usually rich in organic soil and microorganisms, a source of good fertility. The loss of organic matter can alter the soil's physical properties, especially soil density.

Mitigation Measures

- ▶ Clearing and grabbing shall be restricted to the working area within the toe line.
- ▶ Further activities shall be planned/ started immediately to prevent fugitive dust emission and soil erosion during monsoon.

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- ▶ The top (15cm) soil shall be preserved to redevelop the areas as required.
- ▶ Revegetation/turfing shall be started immediately after completion of the work.

7.3.20 BORROW AREAS

327. To procure the earth, borrow areas will be open during construction. The fertile soil will be removed from the agricultural cultivated lands, and the owners of the borrow pits area will be affected due to the loss of their produce. In addition, dust will be generated if the pits are dug at a shallow level. Erosion will occur, a risk to the nearby habitation, trees, and other vegetation.

Mitigation Measures

- ▶ Only identified and approved contractors shall use borrow areas
- ▶ Borrowing of earth from the cultivable land shall not be allowed.
- ▶ When borrowing the earth from the cultivable lands, the depth of the borrowed earth shall not be more than 45cm.
- ▶ The top 15cm of soil shall be removed and stored separately. Thereafter, excavation shall not exceed 30cm, and topsoil shall be spread over the land.
- ▶ Borrow areas shall be dug at least 800m from the habitation. If unavoidable, the depth should not be more than 30cm and should be adequately drained.
- ▶ Borrow pits shall not be dug continuously but should be dug according to the necessity of construction work.
- ▶ The borrowing of the earth shall be used only after having an agreement between the contractor and land parcel owner and must include photographs of the original land.
- ▶ The haulage of borrowed earth will be maintained dust-free by sprinkling water.
- ▶ The borrow areas shall be 500m away from the toe line of the road.
- ▶ If trees are there, they should be protected by providing slopes in 1:2 around them while borrowing the earth.
- ▶ Side slopes of 1:4 shall be maintained in the borrow areas.
- ▶ A redevelopment plan shall also be prepared and agreed to by the land parcel owner and approved by the CSC.
- ▶ To reduce earth requirements, the sacrificed material should be reused in the subbase material whenever possible.

7.3.21 LOSS OF TOPSOIL

Mitigation Measures

- ▶ The topsoil (15cm) shall be removed and preserved for reuse for redevelopment purpose.
- ▶ Topsoil shall be preserved outside drainage lines, and stockpiles should be protected from erosion by silt fencing and diversion channels.
- ▶ Use stripped topsoil to cover all disturbed areas along the proposed tree plantation sites.
- ▶ Limit equipment and vehicular movements within the approved construction zone.
- ▶ Topsoil shall be distributed free to local people who need it for their own purposes.
- ▶ The residuals shall be reused to form the ground around the interchanges, the areas along the road within the acquired land
- ▶ To recover the vegetation in some affected areas due to the road project.
- ▶ The material stockpile sites shall be 500m away from surface water bodies and areas prone to surface run-off.
- ▶ Loose materials shall be bagged and covered.
- ▶ An open ditch shall be built around the stockpile sites to intercept wastewater. If necessary, retarding basins shall be constructed to remove sand and other solids in the stormwater before it reaches the downstream rivers.
- ▶ During rainstorms, open stockpiles of construction materials (e.g., aggregates, sand, and fill material) of more than 50 m³ shall be covered with tarpaulin or similar fabric.
- ▶ Measures shall be taken to prevent the washing away of construction materials, soil, silt, or debris into any drainage system.
- ▶ At the start of site establishment, perimeter cut-off drains to direct off-site water around the site shall be constructed, and internal temporary drainage works and erosion and sediment control facilities shall be implemented

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7.3.22 SOIL EROSION

328. The project corridor is along relatively plain terrain. Soil erosion is not envisaged as a major concern in the development. However, as per the site requirements, depending on the soil types or composition of soil structure, different techniques will be applied for slope stabilization in the different parts of the project road, as found necessary. As needed, the contractor will prepare detailed stabilization techniques for various soils. Soil erosion may occur near cutting areas, at steep and un-compacted embankment slopes, bridge locations, and wherever vegetation is cleared. Soil erosion may have cumulative effects like siltation, embankment damage, bridge pier damage, drainage problems, etc. Soil loss due to runoff from earth stockpiles may also lead to siltation. Gully erosion along the exposed track slope during the rainy season may damage mother field crops in adjacent areas.

Mitigation Measures

- ▶ The contractor shall reuse excavated soil as much as possible unless the soil is considered unsuitable for filling.
- ▶ The Contractor shall plan his works as to minimize surface excavation works during the rainy season where practicable
- ▶ Immediately after work on bridges or high embankments is completed, slope stabilization measures such as turfing, etc., shall be taken.
- ▶ Excavation or similar activities will not be undertaken during the monsoon period.
- ▶ Construction and demolition waste shall not be stored near the bridge construction sites; it shall be disposed of at approved landfill sites.
- ▶ Ground clearance area shall be minimum
- ▶ Approach roads shall be provided in construction facilities to reduce soil erosion.
- ▶ Exposed earth areas shall be completed and revegetated as soon as possible after earthworks have been completed.
- ▶ If soil excavation is unavoidable during the rainy season or at any time of year when rainstorms are likely, exposed slope surfaces shall be protected by temporary drainage measures.
- ▶ The working area shall be marked to restrain the activity within the demarcation area only.
- ▶ Ensure that dredge materials do not contain heavy metals exceeding international standards by testing prior to use.

7.3.23 SOIL QUALITY

329. The soil may be compacted due to movement of construction vehicles, machineries and equipment, and due to siting of construction camps and workshops. Soil may get contaminated due to inappropriate disposal of liquid waste, like lubricant and fuel spills; washing effluent from vehicles and equipment) and solid waste (fuel filters, oily rags) likely to be generated from the repair and maintenance of transport vehicles, construction equipment, and machinery. Soil may also get contaminated due to inappropriate disposal of domestic solid waste and sewage from construction camps.

330. Subsoil contamination may also be attributed to scarified bitumen wastes, operation of the emulsion sprayer and laying of hot mix, storage and stockyards of bitumen and emulsion, excess production of hot mix, and rejected materials.

Mitigation Measures

- ▶ Fuel or other petroleum products shall be stored on the impervious platform.
- ▶ The movement of construction vehicles, machinery, and equipment shall be restricted to the corridor or identified route.
- ▶ Soil contamination by bitumen, fuel, and chemical storage shall be prevented by storing them on an impervious base
- ▶ Any spillage of hazardous material shall be removed and disposed of at identified and approved sites.
- ▶ Soil quality monitoring shall be undertaken as per ESMP

7.3.24 AIR POLLUTION

331. Dust emission is one of the issues in the construction phase of a road project. The dust emission/ air pollutant emissions due to movement of construction vehicles/plants during construction and the gaseous air pollutant emission from vehicular exhaust during operation phase will have impact on the existing air quality within the project area. The air quality of the area will be affected due to the transport of materials, quarry/borrow operations, movement of vehicles on haul roads/construction yards and fugitive emissions from the construction sites/plant sites. Construction activities that contribute to air pollution include land clearing, operation of diesel engines,

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demolition, loading and unloading of construction materials, movement of material transporting vehicles, and operation of hot mix plants. Construction sites generate dust emissions. Construction dust is classified as PM10 - particulate matter less than 10 microns in diameter. The construction phase impacts due to vehicle movement and operation of the hot mix plant have been worked out using mathematical equations in the following sub-sections.

Pollution from Hot Mix Plant Operations

332. The following assumptions have been made to work out the emission of air pollutants from Hot Mix Plant (HMP). Emissions rates of air pollutants from hot mix plant stack are as follows:

- ▶ PM10 emissions = 0.09 g/sec, (EPA, AP-42 methodology)
- ▶ CO Emissions = 3.8 g/sec (EPA, AP-42 methodology)
- ▶ NOx Emissions = 1.11 g/sec (EPA, AP-42 methodology)
- ▶ SO2 Emissions = 0.008 g/sec (IS Specifications)
- ▶ VOC Emissions = 0.00059 kg/sec = 0.59 g/sec (EPA, AP-42 methodology)

333. The following assumptions have been made to work out the pollution emission:

- ▶ Capacity of HMP = 75 tph (assumed)
- ▶ Bulk density of hot mix (Ref workbook) = 2.19 tones/m³
- ▶ Max duration of operation = 12 hrs.
- ▶ Height of Stack = 10m
- ▶ Efficiency of bag house filters/wet scrubbers = 99.5%
- ▶ Exit gas velocity = 15 m/sec
- ▶ HMP Stack diameter = 1.2 m
- ▶ S in Furnace oil = 50 mg/kg [Source: IS:1460-2005-Bharat Stage (IV)]
- ▶ Consumption of fuel oil (as per manufacturer literature) @ 350 liters per hour
- ▶ Using the above data and Screen 3 model of the Lakes environment was employed to determine the maximum concentration will be at the distance of 300m - 450m from the HMP. Thus, a safe distance of 500m away in downwind of from the residential areas has been recommended for establishing the HMP.
- ▶ Mitigation Measures
- ▶ The construction phase's environmental impacts on air pollution will be short-term and localized. These can be mitigated by adopting the following mitigation measures.
- ▶ HMP shall be installed on the downwind direction at 1500m away from the environmental/ecologically sensitive areas.
- ▶ HMP shall be installed at least 500m away from the nearest residential areas on the downwind side of the prevalent wind direction.
- ▶ Low-emission construction equipment, vehicles, and generator sets shall be used at the site.
- ▶ vehicles shall be covered by tarpaulin if required.
- ▶ Pollution control monitoring of construction vehicles shall be carried out and fit certification must be valid for all equipment and vehicles.
- ▶ By regularly sprinkling water on unpaved surfaces and covering raw material and hot mix-laden trucks with tarpaulin, the generation of fugitive particulates can be reduced by about 70%.
- ▶ Adequate dust suppression measures such as regular water sprinkling on unpaved haul roads and borrow area vulnerable areas of the construction sites. Special attention during the summer season shall be considered.
- ▶ The air pollution will also be greatly reduced by erecting windscreens of galvanized iron sheets cordoning off the construction sites to a height of about 5 meters from the ground surface.
- ▶ Wind shields shall be provided around the periphery of the HMP area to a height of 5m to reduce the impact of fugitive dust emissions.
- ▶ HMP shall be fitted with pollution control devices (Wet Scrubber for stack emission)
- ▶ Wind shields shall be provided around the wet mix macadam (WMM) plant, stock yard and batching plants to prevent fugitive dust emissions.
- ▶ Diesel generator shall be provided with proper stack height as per Department of Environment requirement.
- ▶ Ambient Air Quality Monitoring shall be carried out per the Environmental Monitoring Program suggested in the ESMP.
- ▶ The stack height of the Hot Mix Plant shall be at least 10m from the ground.
- ▶ Regular maintenance of construction vehicles and equipment/plants shall be undertaken.
- ▶ The construction vehicles/machinery/equipment shall use only designated routes.

⁴¹Technical Support Document for The Asphalt Plant (Portable and Stationary) General Order, Department of Ecology, State of Washington, 2011

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- ▶ DG sets shall comply with the requirements of the Department of Environment.
- ▶ The construction machinery/equipment shall be used only designated sites.
- ▶ Movement of Construction Vehicles (Air Pollution)

Impact due to Vehicle Movement

334. The impact on the air environment is due to the movement of hot mix laden trucks, raw materials such as cement, steel, fine and coarse aggregates, bitumen, and earth/burden soil carrying trucks and tippers. It further depends on various factors like haulage capacity, condition of haul roads, dust suppression measures adopted, duration of operation & maintenance of vehicles, and content of silt and fine dust on the unpaved and barren surfaces.

335. the road surface is assumed to be unpaved to work out dust emissions. The fugitive particulate generation due to vehicular wheels will be uncontrolled without adopting control measures on the unpaved haul roads.

- ▶ Movement of Construction Vehicles for transportation of construction materials
- ▶ The following assumptions have been made to work out emissions due to haulage of materials (wheel-based fugitive dust) on unpaved roads.
- ▶ Length of road for influence of fugitive dust = 20 km (10 +10)
- ▶ Total number of trucks in operation = 50 trucks per day
- ▶ Cumulative distance traveled by the trucks: 1000km (Assumed about 20km in a day)
- ▶ Emission Factor to be worked out using the following formula as per EPA, AP-422

$$E = \frac{K \times \left(\frac{S}{12}\right)^A \times \left(\frac{W}{3}\right)^B}{\left(\frac{M}{0.2}\right)^C}$$

- ▶ E= emission factor, lb/VMT (pounds per vehicle mile traveled); k=empirical constant 2.6 lbs/VMT for PM₁₀; A, B, C are empirical constants 0.8, 0.40, 0.3, S=Silt=5%, W=weight of vehicle=20 tones, M=moisture=0.75%

336. Based on the above, the emission factor from the movement of construction vehicles on the unpaved roads has been worked to be 0.713 lb/vmt, equal to 201.04 g/vkt. Fugitive dust generation = 201.04 x 1000 = 201040 g per day = 2.33 g/sec. It is further assumed that the maximum 10 number of construction vehicles in an hour will move over the unpaved haul roads. The particulate matter concentration from the movement of construction vehicles on the unpaved haul roads has been worked using Cal3QHC of CalRoads view of Lakes Environment, which is given in Table 7-1.

Table 7-1: PM10 Concentration due to movement of Construction Vehicles on Haul Roads

Sl. No	Distance from haul road in (m)	Increment Concentration (µg/m ³)
1.	50	123.8
2.	100	73.5
3.	200	40.5
4.	300	28.1

337. The Highest incremental concentration, 123.4 µg/m³, is near the road at 50m, but it is getting reduced; at 300m, the incremental concentration is 28.1 µg/m³. Thus, it is suggested that water sprinkling be routinely carried out on haul roads to keep the incremental concentration low.

Mitigation Measures

- ▶ Water sprinkling using sprays shall be done on the unmetallic haul roads
- ▶ Water sprinkling shall also be carried out on the construction sites where the earthwork is unattended for four (4) days, especially in the summer season
- ▶ Construction vehicles/equipment shall comply with national standards
- ▶ Routine maintenance of emissions to control the pollution
- ▶ Low-emission construction equipment, vehicles, and generator sets shall be used at the site.
- ▶ Only those construction vehicles shall be used shall be used.
- ▶ Vehicles transporting construction material shall be covered by the tarpaulin.
- ▶ Speed of construction vehicles will be identified in contractors ESMP, which will be approved by the CSC.

7.3.25 NOISE ENVIRONMENT

338. Noise associated with the construction phase is discussed in the following subsections.

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Construction Camps/Yards/Construction Site

339. Operation of equipment/machinery or other activities such as piling, excavation etc. at construction site/camp will be the main source of increased sound levels in and around the area. The noise levels from the construction equipment depends on different factors such as type of equipment, condition of equipment, the operation which are undertaken at site, duration of the operation of equipment and specific model of the equipment⁴². The equivalent sound level (Leq) of the construction activity also depends on the fraction of time that the equipment is operated over the time of construction. Diesel engines are the main source of noise from the equipment when used without protection. The construction equipment is expected to produce noise levels in the range of 74 - 101 dB (A) at construction site, as presented in **Table 7-2**.

Table 7-2: Typical Noise from Construction Equipment

Equipment	Typical Noise Level (dBA) 50 ft from Source	Equipment	Typical Noise Level (dBA) 50 ft from Source
Air Compressor	81	Pile-driver (Impact)	101
Backhoe	80	Pile-driver (Sonic)	96
Ballast Equalizer	82	Pneumatic Tool	85
Ballast Tamper	83	Pump	76
Compactor	82	Rail Saw	90
Concrete Mixer	85	Rock Drill	98
Concrete Pump	82	Roller	74
Concrete Vibrator	76	Saw	76
Crane, Derrick	88	Scarifier	83
Crane, Mobile	83	Scraper	89
Dozer	85	Shovel	82
Generator	81	Spike Driver	77
Grader	85	Tie Cutter	84
Impact Wrench	85	Tie Handler	80
Jack Hammer	88	Tie Insertor	85
Loader	85	Truck	88
Paver	89		

340. With a point source of a strength of 95 dB (A) at a reference distance of 2m, the noise produced will not exceed 45 dB (A) beyond 250 m from the boundary of the construction yard (the drop-off rate will be 6 dB (A) for doubling the receptor distance from a point source).

Mitigation Measures

341. The following mitigation measures shall be adopted to reduce the intensity of impacts.

- ▶ Construction camp/yard shall be located at least 500m from the inhabitant/sensitive areas.
- ▶ Silencers and mufflers shall be fitted and regularly maintained on construction equipment.
- ▶ All construction vehicles and machinery/plants shall be serviced regularly. During routine servicing, the effectiveness of exhaust silencers needs to be checked, and if found defective, shall be replaced immediately.
- ▶ Well-maintained vehicles and machinery/equipment shall be deployed at the site.
- ▶ Work shall be scheduled so that activities generating high noise levels are not done simultaneously, and such activities shall be restricted to daytime only.
- ▶ Use low noise-generating equipment or construction vehicles near sensitive receptors such as health centers/schools, etc.
- ▶ Contractors shall hold meetings with neighborhood champions/locals/school or college management before the start of high-noise-generating activities, such as piling, etc.
- ▶ Truck loading, unloading, and hauling operations shall be scheduled to minimize noise impact near sensitive locations and neighborhood communities.
- ▶ Placards shall be displayed near highly noisy areas.
- ▶ Earmuffs/Earplugs shall be made mandatory for workers working in high-noise areas
- ▶ Construction equipment and vehicles shall be maintained regularly.
- ▶ 'No honking' board shall be placed near sensitive receptors
- ▶ Noise quality monitoring as suggested in the Environmental Monitoring Plan as ESMP.
- ▶ The Contractor shall abide by the provisions of the Specifications of Contract regarding environmental protection and DoE regulations (≤ 60 dB levels at mosques, schools, populated areas, and other sensitive sites).

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- ▶ Noise-generating equipment/plants shall be provided with dampeners.
- ▶ No noisy construction activities will be permitted around educational institutions/health centers (silence zones) up to 100 m distance from the sensitive receptors
- ▶ Diesel Generating must be enclosed with soundproof acoustic enclosures to meet the Noise standards.
- ▶ Construction vehicles/equipment must be fitted with silencers
- ▶ Routine maintenance of equipment and construction vehicles shall be carried out.
- ▶ Low noise-generating equipment/construction vehicles shall be used.
- ▶ Noise monitoring shall be undertaken as per the Environmental Monitoring Program
- ▶ Workers working in noisy areas shall be provided with PPE, such as earplugs, and shall not be allowed to work near equipment generating more than 90 dB (A) noise for 8 hours continuously.
- ▶ Contractors' facilities will be sited away from the residential areas/sensitive receptors as mentioned above.
- ▶ Noise-generating activities in near-sensitive receptors such as schools, mosques, and hospitals shall be carried out after consultation with the management committee, or low-noise-generating equipment shall be used only.
- ▶ Noise-generating activities shall be prohibited in residential areas, hospitals, etc., and work shall be scheduled in consultation with neighborhood champions.
- ▶ Reducing construction vehicles through the residential area in consultation with the local champions
- ▶ Vegetative noise barriers in the sensitive receptor
- ▶ Any issue shall be resolved through a grievance redressal mechanism (GRM) developed by the contractor.

7.3.26 BIO-DIVERSITY AND LIVING NATURAL RESOURCES (ESS 6)

7.3.26.1 REMOVAL OF TREE-CUTTING

342. During the pre-construction period, about 108025 trees were identified as being removed due to the road development project. According to IoL, about 99122 are from privately owned land, and 8903 are roadside avenue trees. The trees include government and privately-owned trees, as given in **Table 7-3**.

343. The trees that must be cut have been considered for compensatory plantation. In RHD, three sapling trees will be planted for each tree; accordingly, 2800000 trees are proposed to be replanted as compensation. For the remaining trees (primarily private), DC will compensate titleholders, and RHD will disburse it to non-titleholders as per the RAP.

344. The loss of private trees affected by the cutting of giant trees and vegetation will cause psychological stress to the owners. The loss is of common species such as Rain trees, Mahagoni, Babul, Neem, Mango, Jackfruit, Debdaru, Deoa, Dumur, Gamari, Ipilipil, Jalpai, Jam, Kanthal, Khejure, etc. No endangered/threatened species are to be affected. The loss of nest/resting/feeding sites of birds is anticipated.

Table 7-3: Affected Trees within the Proposed RoW

Lot No	Number of Private Trees					Roadside Avenue Trees (Girth size wise Trees as per the survey)											
	Large	Medium	Small	Sapling	Total	Girth size (30-40) inch			Girth size (20-30) inch			Girth size (10-20) inch			Girth size (01-10) inch		
						Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total
Lot-1	3305	2981	2090	1718	10094	288	246	534	158	124	282	52	40	92	0	1	1
Lot-2	5391	5452	3870	4921	19634	1310	1070	2380	842	729	1571	177	32	209	0	0	0
Lot-3	3120	10622	9983	8683	32408	399	273	672	83	56	139	113	98	211	57	65	122
Lot-4	11091	12627	8633	4635	36986	520	446	966	218	193	411	302	355	657	322	334	656
Total	22907	31682	24576	19957	99122	2517	2035	4552	1301	1102	2403	644	525	1169	379	400	779

Mitigation Measures

- ▶ Necessary permission from the concerned agency shall be obtained before cutting the trees.
- ▶ Identified/marked trees shall be removed
- ▶ No trees will be cut beyond the toe lines, if possible
- ▶ The tree plantation will be undertaken during the construction phase instead of the avenue of tree removal.
- ▶ It will be carried out in a 1:3 ratio, i.e., three (3) saplings for one tree cutting.
- ▶ For private trees, DC will pay compensation to titleholders, and RHD will disburse to the non-titleholders
- ▶ A 95% survival rate shall be considered for the release of tree plantation.
- ▶ The contractor shall be responsible for six (6) years of maintenance of tree plantations.
- ▶ Shrubs Plantation on medians & its maintenance for six (6) years.
- ▶ Compensatory tree plantation shall be 40% done by PIU through a contractor and 60% done by the Forest Department under Social Forestation.

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- ▶ Proper safety measures should be adopted when cutting and removing trees during clearing sites to avoid accidents involving contractors, workers, and locals. All workers and project personnel should use the site's Personal Protective Equipment (PPE).

7.3.26.2 DECREASE IN CARBON SEQUESTRATION

345. Removal of the number of trees will cause a decrease in CO₂ sequestration. As a result, the amount of CO₂ in the atmosphere will increase, and the local temperature will rise. The reduction of O₂ generation from the tree's photosynthetic process will cause an imbalance in local climatic conditions for a short time.

Mitigation Measures

- ▶ The Forest Department will carry out tree plantation under social forestry and the Arboriculture Department of RHD.
- ▶ Watering of the tree plantation will be ensured.
- ▶ Necessary tree guards shall be provided to protect saplings.
- ▶ Cluster plantations need to be considered on community lands, such as ponds/mosques, or at other locations desired by the community.
- ▶ All realignments shall be enhanced with the tree plantation,
- ▶ Trees will be planted as an enhancement measure around the ponds or LGED link roads and vegetative noise barriers along the sensitive receptors in consultation with the stakeholders as required.
- ▶ Tree plantation around the monuments and other enhancement measures shall be undertaken.
- ▶ Fast-growing native trees will be planted to improve carbon sequestration
- ▶ The contractor shall take reasonable precautions to prevent his workmen or other persons from removing and damaging flora and fauna.
- ▶ While clearing vegetation, it must be ensured that no faunal species, such as mongooses, foxes, squirrels, etc., are injured and/or die.
- ▶ When the tree is removed, the work shall be stopped immediately if any endangered or endemic species is cited. The species' name, etc., must be reported to the nearest forest department through RHD.

7.3.27 IMPACT ON TERRESTRIAL FAUNA

346. A total of 80 species were observed in the proposed expressway, including six amphibians, eight reptiles, 55 birds, and 11 mammals. Among them, 11 species were observed; these are amphibious, and 12 birds depend on water bodies for food. Only one species is regarded as endangered, and two species are found to be near threatened, according to the IUCN Red List Bangladesh, 2015. The potential project activities will set up temporary or long-term camps and cause site clearance that might result in the potential entry of wildlife into the workers' camp, who, in turn, can prey on the workforce. Strict guidelines should be prepared so that no such event occurs. Though a few animals mentioned above are concerned, their original habitat is not the expressway. Instead, they either pass through the highway, temporarily go there for food searching, or cross the road to return to their habitat. So, the removal of the roadside flora and aquatic habitats will not cause any havoc to them. Potential impacts are summarized in **Table 7-4**.

Activities	Potential Impacts	Proposed Mitigation
Temporary or long-term camp preparation for the workforce, site clearance	May destroy their habitat.	The sites shall be well-bordered and protected to prevent the entry of wild fauna.
Tree cutting and falling	It may hamper their daily activities like mating, breeding, feeding, foraging, etc.	Immense roadside tree plantation program
Fill up the roadside aquatic resources.	Human-Wildlife conflict	No killing and torturing of wildlife animals by road constructors.
Conducting heavy machine	Increase roadkill and habitat fragmentation.	▶ Make underpasses, overpasses, or animal corridors for habitat connectivity and minimize roadkill. ▶ No disturbance should be caused to them while passing through the road. ▶ Workers shall remain calm and quiet and should silently pass them in case of their sighting.

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Table 7-4: Potential impact on wildlife and proposed mitigation measures		
Activities	Potential Impacts	Proposed Mitigation
	Decrease of animal population	Make a speed limitation notice board where necessary.
	Less gene flow or inbreeding.	▶ Strict guidelines regarding the treatment of wildlife by the authorities should be made. ▶ Hunting, trapping, and poaching shall be strictly prohibited during constructed works. ▶ The nearby Wildlife Office of the Forest Department shall be informed in case of rescuing any wildlife. ▶ An awareness program shall be undertaken to sensitize the workers and other relevant stakeholders to the importance of wildlife, such as birds, mammals, amphibians, etc. Posters and animal image signs shall be hung along the road alignments to raise awareness.

7.3.28 IMPACT ON AQUATIC FLORA

347. The project area consists of different seasonal and permanent aquatic bodies. Five canals/small rivers crisscross the highway. Besides some *bangors*, large ponds and many seasonal aquatic bodies and ditches were observed along the road. Aquatic vegetation of the rivers was dominated by water hyacinth and many more aquatic or semi-aquatic plants like *Enhydra fluctuans* (Helencha), *Alternanthera sessilis*, *A. philoxeroides*, *Ludwigia adscendens* (Molsi), *Ipomoea aquatica* (Kolmi), *Nymphaea nouchali* (Shapla), *Sagittaria vaginalis*, *Sagittaria sagittalis* (Nukha), etc. Luxurious growth of grass and sedge families was observed in the wetlands during the rainy period of the year. These aquatic bodies, along with the aquatic flora, will be impacted due to highway construction activities. Besides, the primary producers of the aquatic habitats might not get enough elements to sustain them due to pollution that might occur because of the construction process. Still, the activities will not pose such problems that might result in biodiversity loss, as many aquatic bodies containing the mentioned aquatic flora are outside the highway, nearer or distant. However, some mitigation measures are suggested below, along with the potential activities and impacts that, if taken, shall help restore the damaged ecosystem. The potential impacts of aquatic flora are summarized in Table 7-5

Table 7-5: Potential impacts on aquatic flora and proposed mitigation measures		
Activities	Potential Impacts	Proposed Mitigation Measures
Filling of the seasonal wetlands and ponds along the roadside.	▶ Common aquatic vegetation will be removed, and as it is present outside the project area, removing it will not harm the environment. ▶ Water will be polluted due to project activities.	▶ If possible, they will be relocated to the nearest wetlands. ▶ Enhancement plantation of aquatic species such as <i>Nymphaea nouchali</i>, <i>N. stellata</i>, <i>Ottelia alismoides</i> shall be done in the nearest suitable wetlands. ▶ Creation of artificial water bodies, if space is available. The aquatic species can be relocated there. ▶ Both solid and liquid pollutants shall be purified before discharging in the aquatic habitat. ▶ Invasive Alien Species (IAS), such as water hyacinths, shall be eradicated.
Bridge construction, piling, riverbank training	▶ Flow can be damaged, pollution may occur, and sound and vibration will be produced. ▶ Production by primary producers may be hampered due to pollution.	▶ Without treatment, no pollutants shall be discharged into the water. ▶ No blockage to the flow shall be created. ▶ Solid and liquid debris shall not be discharged into the water. ▶ Muddy water formed during piling shall be assigned to a designated place instead of flowing it to the river water directly.
Bridge construction, piling, riverbank training	Flow to the local <i>bangors</i> may be hampered, resulting in the loss of commercial fish production in the area.	▶ The flow must be maintained with proper bridge construction. ▶ Pollution discharge in aquatic bodies without treatment must be strongly avoided.

7.3.29 IMPACT ON FISHERIES

348. Forty-nine fish species and crustaceans were identified through field study, visiting local fish markets, interviews, and discussions with local fishermen. A total of 7 threatened fishes were recorded, including four

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endangered (EN) and three vulnerable (VU) species. The area was not an actual habitat for these threatened species. Occasionally, they appeared here in the project area. The project area includes over 150 man-made ponds, four rivers, and many small ditches. Most natural aquatic bodies are seasonal except for the rivers and commercial ponds. The major fishes and crustaceans are *Amblypharyngodon mola* (Mola), *Putinus spp.* (Puti), *Channa punctatus* (Taki), *Channa striata* (Shoal), *Lepidocephalichthys guntea* (Gutum), *Channa gachua* (Chang), *Chanda nama* (Lomba Chanda), *Pseudambassis ranga* (Chanda), *Mystus tengara* (Bajari Tengra), *Clarias batrachus* (Magur), *Heteropneustes fossilis* (Shinghi), *Mastacembelus armatus* (Baim), *Trichogaster fasciata* (Kholisha), *Heteropneustes* (Shing), *Clarias batrachus* (Magur), *Anabus testudineus* (Koi), *Channa marulius* (Gojar), *Macrobrachium rosenbergii* (Golda Chingri) and so on. Besides, nine exotic species are also found in cultivated ponds. A detailed list of these fishes is given in Appendices 1-4. The construction work on the highway might cause some potential impacts, such as erosion, riverbank development, high noise and vibration, and pollution. Potential impact and mitigation measures are given in **Table 7-6**.

Table 7-6: Potential impact on wildlife and proposed mitigation measures		
Activities	Potential Impacts	Proposed Mitigation
Construction work Construction of a protection wall along the riverbank	▶ Erosion due to construction at the river site ▶ Vibration and noise will be produced.	▶ Erosion and siltation must be prevented. ▶ Mufflers shall be used with the instruments to reduce vibration and sound pollution.
	River training and construction of embankment	▶ The flow of water through the river shouldn't be blocked completely. ▶ All the holes along the banks of the rivers should be checked, and the safe passage and exits of fish and other aquatic animals from them should be ensured. ▶ Bridges and culverts should be made to maintain the proper water flow.
	Catchment of fish by the road workers	Catchment of fish should be prohibited.
	Dumping of wastes in the river site or canals or any aquatic body	▶ Strict guidelines must be maintained, and no such dumping should be done in seasonal and perennial aquatic habitats. ▶ The waste shall be discharged only after being treated. ▶ Artificial water bodies can be created to enhance the fish population.

7.3.30 SOCIOECONOMIC ENVIRONMENT

7.3.30.1 COMMUNITY HEALTH AND SAFETY

349. The risks and adverse impacts on the community's health and safety are expected during construction activities like excavation, earth working, dismantling the existing structures, pavement works, sitting of construction camps/labor camps, water logging, accidents, etc. at residential and commercial areas alongside the project roads.

Mitigation Measures

- ▶ The contractor shall plan activities in residential areas after discussing them with the community for community health and safety.
- ▶ Local shall be kept informed about the activities which the contractor is taking up in their areas.
- ▶ Excavated areas shall be properly barricaded.
- ▶ Trespassing of construction sites/construction camps/labor camps shall be prohibited.
- ▶ Occupational Health and Safety Plan as well as Community Health and Safety (CHS) Plan shall be prepared
- ▶ The prevention and management of HIV/AIDS and other STIs as suggested below in B-22 of Chapter 10.
- ▶ Contractors shall take all precautionary measures to prevent community exposure to water-borne, water-based, water-related, and vector-borne diseases, as well as communicable and non-communicable diseases that could result from project activities.
- ▶ Water logging shall not be allowed at the construction site. To prevent vector-borne diseases such as malaria, areas of standing water must be minimized by providing effective drainage in construction areas.
- ▶ Trained drivers with valid licenses shall be allowed to drive construction vehicles/heavy equipment.
- ▶ Speed of the construction vehicles/equipment shall be defined by the contractor in the contractors' ESMP.
- ▶ Vehicles/construction equipment need to be maintained and inspected/tested regularly,
- ▶ Drivers must have appropriate government licensing or certification and be provided with proper training.
- ▶ Finally, regular consultation with the community to know the effectiveness of the implementation of mitigation measures at construction sites/camps

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7.3.30.2 INFLUX OF LABOR

350. It is expected that around 200-250 skilled/non-skilled laborers will be engaged during the peak period, and primarily, locals will be encouraged to engage in the project. There are certain social and environmental impacts due to the influx of outside population/workforce at the project site, such as social conflicts, illicit behavior, and crime, the influx of additional population, communicable diseases, inflation of prices, pressure on accommodation and rents, unhygienic conditions, waste discharge, etc. It has already been mentioned in public consultations that matters and issues related to the anticipated project impacts on Sexual Exploitation and Abuse (SEA)/Sexual Harassment (SH) and Gender Based Violence (GBV), Labor Health and Safety; Occupation Health and Safety, are grave concern due to influx of labor. There would be impacts on local economy like, such as an increase of rented houses/accommodations, significant increase in demand for goods and services due to labor influx, which may lead to local price hikes and/or crowding out of community consumers.

Mitigation Measures

- ▶ Trespassing to the contractors' facilities/construction camps/labor camps will be strictly prohibited.
- ▶ Contractor camps/construction camps/facilities will be located 500m away from residential areas.
- ▶ Any issue shall be resolved through a grievance redressal mechanism (GRM) developed by the contractor.
- ▶ Contractors shall be encouraged to recruit local skilled/unskilled workers.
- ▶ The Labor Management Procedure is given in Chapter 8.
- ▶ Install a generator for power supply to meet the emergency power requirement.
- ▶ Contractor will arrange either canteen facilities or gas for cooking to prevent illicit cutting of the trees;
- ▶ Arrange purchase of commodities from the district-level market or set up special shops for labor;
- ▶ Contractor will prepare a labor-management plan in C-ESMP as per the proposed ESMP of the ESIA.

7.3.30.3 CHILD LABOR

351. The contractor should follow the code of conduct or term of reference for hiring or recruiting the workforce into the project. In keeping with internationally recognized standards, the project will make a distinction between child labor and young workers. The project will not tolerate child labor under any circumstances. The employment of young workers, i.e., minors aged from full 15 years to under 18 years who have reached the minimum age of employment and completed compulsory schooling, will be allowed under strict conditions and in compliance with requirements of internationally recognized standards and local relevant laws and regulations. The risk of child labor will be mitigated through the Certification of laborers and will be confirmed by using legally recognized documents such as the National Identification Card and Birth Certificate.

Mitigation Measures

- ▶ Bangladesh Labor Act 2006 section 34 prohibits the engagement of child labor in any activity of the project.
- ▶ According to Section 44, anyone under 14 is considered a child, and anyone between 14 and 18 is considered an adolescent.
- ▶ It is recommended that people under 16 years of age should not be employed in any type of work and shall be encouraged to go to schools.
- ▶ People between 16 and 18 years of age can be employed for lighter work/office work for 6 hours only with prior approval.
- ▶ Company policy on labor engagement rules shall be displayed at prominent locations, such as contractor camps, labor camps, contractor offices, etc.
- ▶ Between 16- and 18 years of age, the child shall not be deployed to any hazardous works such as painting/or other construction activity.
- ▶ To ensure the age, the contractor must refer to the Certification of laborers' age, the National Identification Card, the birth Certificate, etc.

7.3.30.4 PUBLIC SAFETY AND ACCESS

352. Temporary access and diversion, with proper drainage facilities

Mitigation Measures

- ▶ The contractor shall provide adequate warning signboards in the local and English languages.
- ▶ Flagmen shall be deployed to control the traffic during tree felling or removal/erection of electric poles.
- ▶ Locals shall be kept informed about the activities which the contractor is taking up in the residential areas.
- ▶ The contractor shall provide temporary access to the local religious place, schools, or nursing home in consultation with the local champions.
- ▶ Excavated areas shall be properly barricaded.

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- ▶ Trespassing on the construction site shall be prohibited.
- ▶ A traffic management plan will be prepared according to the activity schedules and approved by CSC/RHD.
- ▶ Trained drivers having a valid license shall be allowed to drive construction vehicles/heavy equipment.
- ▶ Speed of the construction vehicles/equipment shall be defined by the contractor in the contractors' ESMP.
- ▶ A grievance redressal mechanism shall be adopted at the site, which needs to be approved by the CSC, to address the issue at the site.

7.3.30.5 HIV AND STD

353. Due to the influx of workers in the Project area, AIDS/HIV may spread in the local community. Different types of diseases related to communicable diseases need to be controlled.

Mitigation Measures

- ▶ Awareness campaigns on HIV/AIDS/STD
- ▶ HIV/STD voluntary counseling, testing, and treatment.
- ▶ Ensuring that construction workers have access to condoms
- ▶ Provision of vending machines at the identified location
- ▶ Monitoring of outcomes in collaboration with National HIV/AIDS Authorities

7.3.30.6 LABOR MANAGEMENT

354. GRM with GRCs related to (i) Labor Health and Safety will facilitate smooth labor management through redressing any complaint/grievance raised by laborers/against any laborer, (ii) Gender Based Violence (GBV) related grievances will be redressed by GRC related to Sexual Exploitation and Abuse/Sexual Harassment (SH). The roles and functions of these GRCs are presented in section 7.6.1 in this ESIA.

Mitigation Measures

- ▶ Contractor shall follow the national legislation
- ▶ The contractor shall obtain the Labor License from the Department of Inspection and Factories Establishment (DIFE) under MoLE.
- ▶ The contractor shall follow the conditions stipulated in the license regarding labor management, workplace safety and health, and protection.
- ▶ Pooled transportation facilities, as may be required, shall be provided by the contractor.
- ▶ Contractors' company policy on prohibiting Child Labor shall be displayed at the construction camps/labor camps, etc.
- ▶ All basic facilities shall be provided within the labor camp, such as water supply, cooking gas, sanitation facilities, and a mobile toilet (of adequate capacity for men and women separately).
- ▶ Crèche for female works to be made.
- ▶ Compensation, leave, working schedules, etc. for different types of workers will be ensured following the Bangladesh Labor Rules 2015 and other related laws.
- ▶ A specific chapter (Chapter 8) of this ESIA has been induced on Labor Management Procedures (LMP) to clarify every aspect of labor management and their facilities.

7.3.30.7 OCCUPATIONAL HEALTH AND SAFETY ASPECTS

355. Without Occupational Health and Safety (OHS) procedures, workers risk temporary and sometimes permanent physical injuries such as hearing and sight loss, damage to limbs, etc. Due to continuous exposure to activities like lifting heavy tools and tackles, construction equipment, and cabling of electrical wires, the workers may suffer from various physical problems, stresses, and risks, such as carpal tunnel syndrome, tendonitis, back pain, muscle soreness and nerve damage, chest pains, etc. These risks could create long-term impacts on the health and safety of the construction workforce.

- ▶ Lack of safety training by contractors can lead to accidents and lost productivity. Construction workers need training on general health and safety matters and on specific hazards of their work.
- ▶ Personal Safety
- ▶ The contractor shall follow safe work systems and administrative or institutional control measures.
- ▶ Measures such as job rotation, training safe work procedures, lock-out and tag-out, workplace monitoring, limiting exposure or work duration, etc., shall be adopted.
- ▶ No employee shall be exposed to a noise level greater than 85 dB(A) for more than 8 hours per day without hearing protection.
- ▶ In addition, no unprotected ear shall be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C). Workers working in noisy areas shall be provided with earmuffs

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- ▶ Exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc., shall be provided per CSC's direction.
- ▶ The Contractor shall always take all reasonable precautions to maintain the health and safety of the contractor's personnel
- ▶ The contractor shall, in collaboration with local health authorities, ensure that medical staff, first aid facilities, and ambulance service are always available at the site.
- ▶ Workers shall wear protective footwear such as safety boots/gumboots, helmets, and protective goggles.
- ▶ Welders shall use protective eye shields or safety goggles, all-electric wire must have proper insulation
- ▶ The workers and flagmen shall use lifesaving jackets.
- ▶ Fall prevention and protection measures shall be implemented for workers at more than 2m height.
- ▶ Safety belts shall be provided and used by workers working at heights (more than 2m), and trained workers shall use ladders and scaffolds.
- ▶ Necessary lighting, which has proper illumination, shall be provided if required at the work site during nighttime.
- ▶ Potable water supplies to the workers and water supplied to areas of food preparation or for the purpose of personal hygiene (washing or bathing) shall meet drinking water quality standards
- ▶ Induction training to the workers and subsequent training on safety aspects.
- ▶ Trained workers will be deployed at hot mix plants, batching plants, and wet Mix Macadam (WMM).
- ▶ Toolbox training for the workers
- ▶ Workers working in the dusty area shall be provided with nose masks.
- ▶ Sufficient fresh air shall be supplied for construction camps/labor rooms and confined workspaces.
- ▶ Construction/labor camps must receive natural light and be supplemented with sufficient artificial illumination if required.
- ▶ Emergency lightening arrangement of proper illumination shall be installed at identified locations
- ▶ Eating areas such as the canteen must be cleaned, and kitchen waste must be collected as suggested above.
- ▶ Hand, knee, and foot railings shall be provided on stairs, fixed ladders, platforms, ramps or loading bays etc.
- ▶ Covers should, if feasible, be installed to protect against falling items.
- ▶ First aid boxes shall be provided at identified locations.
- ▶ Tie-ups with local hospitals shall be maintained, and ambulance facility shall be reserved for emergency purposes only.
- ▶ The contractor shall arrange OHS training for all new workers and refresher training for the old workers/drivers.
- ▶ Regular health check-ups will be undertaken at construction camps/labor camps, etc.
- ▶ Visitors such as CSC engineers or employer officials visiting the construction sites/camps shall wear helmets of approved color.
- ▶ Fire extinguishing devices shall be installed in the identified areas.
- ▶ Arrangements with the local firefighting department shall be made.
- ▶ The contractor shall prepare and approve an emergency response plan and shall provide training to workers accordingly.
- ▶ Measures For Labor, Materials Handling, Painting Etc.
- ▶ The use of chemicals (e.g., paint, thinner, and solvents) in the fabrication and finishing of the Bridge may be carcinogenic or detrimental in other ways, e.g., the use of industrial solvents can cause anemia, liver and kidney damage, cardiovascular diseases and neurological disorder. Benzene, phenols, and carbon tetrachloride are examples of products widely used, but which are also dangerous to health. Other health problems can be caused by inhalation of exhaust gases from vehicles and machinery, which can impact the lungs, eyes, and skin, etc.

Mitigation Measures

- ▶ The Contractor shall always take all reasonable precautions to maintain the health and safety of the contractor's personnel
- ▶ The contractor shall ensure that medical staff, first aid facilities, and ambulance service are always available at the site in collaboration with local health authorities.
- ▶ Induction training on construction material handling and storing to the workers and subsequent training on safety aspects.
- ▶ Trained workers will be deployed at hot mix plants, batching plants, and wet Mix Macadam (WMM).
- ▶ Toolbox training to the workers
- ▶ The contractor shall arrange OHS training for all new workers and refresher training for the old workers/drivers.

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7.3.30.8 GENDER-BASED VIOLENCE (GBV)

356. The gender-based violence (GBV) and sexual exploitation and abuse/Sexual Harassment (SH) risks may increase to some extent within local communities when there are large influxes of male workers from outside the area. In addition, the new risks (outlined in the SEA/SH mitigation plan) with activities under the project may compound the broader contextual risks present at the community level. The gender disparity can be attributed to structural barriers, including women's domestic burden, employer discrimination, restricted mobility, limited access to training, lack of female-friendly facilities at sites, sexual harassment at work, and limited childcare provisions. Generally, female employment tends to be more concentrated in low-paid and low-productivity occupations. Increasing women's labor force participation and improving the quality of female employment will require more significant support for women's access to employment opportunities and high-quality skills development programs.

357. Usually, the outsider workers come without their families and have large disposable incomes relative to the local community and can pose a risk in terms of sexual harassment, violence and exploitative transactional relationships. The risks will be higher when workers come into close contact with the local community, for example, on access routes or when living together in remote areas. During the construction phase, female workers are also vulnerable to various forms of harassment, indiscriminate wage rate exploitation and abuse, aggravated by traditionally male working environments. Mostly, labor hiring companies do not have proper training on the code of conduct and company policy regarding the GBV-free work environment for all workers, including skilled and non-skilled workers. Moreover, the contractors lack experience in the management of GBV issues, and there is currently limited awareness-raising programs on GBV/SEA/SH in the communication sector in Bangladesh.

358. In addition, gender-based violence may occur during payment of the compensation money and resettlement benefits of this project due to i) discrimination in sharing of compensated money between male and woman shareholders (usually brothers are continually depriving their sisters of parents' property), ii) widow of the PAP sometime will not get actual share of compensation cash and resettlement benefits, iii) Female HHs may get exploitation and harassment to get compensation by middleman / Brokers during collecting money from DD offices and RHD, etc.

Mitigation Measures

- ▶ The contractor, RHD-PD Office, PIU site offices, and concerned safety regulatory organizations shall maintain the implementation of a GBV-free work environment.
- ▶ A Gender-Based Violence Preventive Plan should be followed as presented in Annex 7.1. This action plan aims to identify the issues, stakeholders, and possible service providers and assess their capacity to aid in accessing Grievance Redressal. The action plan has action, activities, indicators, responsibilities, and risk management focus on some corresponding mitigation measures, sensitizing the communities and other stakeholders, strengthening the institutional capacities to mitigate project-related potential risk of GBV in the project-affected population
- ▶ Gender-based discrimination shall be strictly prohibited and monitored.
- ▶ Any sexual harassment shall be dealt with strictly as per the local law of the country, and the employee shall be terminated immediately from his duties.
- ▶ All workers, including skilled and non-skilled workers, shall receive training on the code of conduct and company policy on a GBV-free work environment.
- ▶ It shall be ensured that all workers, including managers/engineers and others, have attended the training mentioned above.
- ▶ Code of Conduct Preventing Gender-Based Violence and Violence against Children/Female Workers shall be signed by the workers/managers/other staff. A sample Labor Code of Conduct (CoC) of the contractor covering the GBV/SEA/SH-related risks during the construction period is presented in Annex 7-3.
- ▶ A signed copy of the code of conduct shall be documented physically, and a scanned version shall be stored in a computer.
- ▶ The company policy on a GBV-free work environment and the code of conduct signed by the worker shall be displayed at labor camps/canteens and other contractor facilities.
- ▶ During the recruitment process, the contractor's HSE Specialist must diligently check candidates' references with a documented history of prohibited conduct.
- ▶ A Labor Management Procedure (LMP) shall be followed at the site as presented in Chapter 8 of this ESIA to control the risks.
- ▶ Staff shall be encouraged to report suspected or actual GBV.

7. Environmental and Social Impacts, Risks and Mitigation Measures

- ▶ A grievance redressal mechanism shall be established at the site to address the issues immediately for GBV related to getting the compensation money and resettlement benefit
- ▶ During the construction period of the Chachra Intersection project, the ESMP is expected to be effectively followed, which will ensure a low-risk environment for Gender-Based Violence (GBV) affecting community members, workers, service users, and any other relevant sections of the public.

7.3.30.9 GRIEVANCE REDRESS MECHANISM (GRM)

359. PIU, RHD will establish two separate Grievance Redress Committees, such as GRCs, related to (i) Sexual Exploitation and Abuse/Sexual Harassment (SH) and (ii) Labor Health Safety. Details are presented in the Updated RAP. The GRC of SEA/SH has been presented in the following **Table 7-7**.

Sl. No.	GRC Composition at the Field Level	Members of the GRC
1.	Concern Project Manager (PM), WeCARE: Phase-1	Convener
2.	Resident Engineer of construction supervision consultant	Member
3.	Gander and SEA/SH Specialist in the PIU	Member Secretary
4.	Project Manager of the contractor	Member
5.	Concern Deputy Project Manager, WeCARE: Phase-1	Member

The Scope of Work and the Terms of Reference (Tor) for the GRC Related to SEA/SH

- ▶ The GRC shall review, consider and resolve grievances related to SEA/SH issues received from the various stakeholders of WeCARE: Phase-1 and ensure confidentiality
- ▶ Pay attention to the grievance of the victim
- ▶ Register his/her allegation
- ▶ Ensure the victim that GRC is the right place to get a remedy
- ▶ The GRC will attend cases where the perpetrator and the victim are associated with the project work. In other cases, they will be advised/assisted to complain to the concerned competent authority
- ▶ All complaints will be resolved following the “survivor-centric approach,” giving priority to the victim’s opinions
- ▶ The RHD/PIU will ensure strict confidentiality of the victim’s identity and related information
- ▶ The GRC/PIU will designate a SEA/SH focal person, and all related grievances will be received by him/her. The focal person will (i) verify and investigate the matter, (ii) provide support to the survivor, if necessary, by drawing support from external sources such as police, qualified NGOs for psycho-social counseling, specialized health experts/establishments for treatment of SEA/SH victims, etc. (iii) investigate the genuine of the allegation (iv) implement sanction to the perpetrator (v) And finally solve the matter
- ▶ GRC will monitor and evaluate the total scenario and report it to the PIU

Steps to be followed

- ▶ Allegations may be received from the survivor/Kin/others orally, over the phone, or in writing.
- ▶ Follow the “survivor-centric approach,” giving priority to the opinions of the victims.
- ▶ Maintain strict confidentiality of the identity and other related information of the victims
- ▶ Register the allegation/case with detailed information
- ▶ Ranking the case as major or minor
- ▶ Depending on the nature of the case, sending the victim to a nearby medical center or to a law enforcing agency as soon as possible
- ▶ Assistance should be reached to the victim/s within 24 hours
- ▶ Decision should be taken up within 7 days, through an internal committee meeting
- ▶ Collection of necessary evidence within 10 days
- ▶ Legal assistance if required
- ▶ Final settlement of the case within 15 days
- ▶ ESS2 on labor and working conditions requires the setting up of a complaints and grievance mechanism for project workers separate from the project-wide grievance redress mechanism (GRM). The GRC of SEA/SH has been presented in the following Table 7-8.

Sl. No.	GRC Composition at the Field Level	Members of the GRC
1.	Concern Project Manager (PM), WeCARE: Phase-1	Convener
2.	Resident Engineer of construction supervision consultant	Member
3.	Individual Labor Safety & Health Expert from PIU	Member
4.	Project Manager of the construction contractor	Member
5.	Concern Deputy Project Manager, WeCARE: Phase-1	Member Secretary

7. Environmental and Social Impacts, Risks and Mitigation Measures

360. The Objectives of ESS2

- ▶ To promote safety and health at work
- ▶ To promote the fair treatment, non-discrimination, and equal opportunity of project workers
- ▶ To protect workers, which includes vulnerable workers such as women, persons with disabilities, migrant workers, contracted workers, community workers, and workers through contract supplier
- ▶ To prevent the use of all forms of forced labor and child labor
- ▶ All types of legitimate demands of the workers will be fulfilled, and their grievances will be addressed as per the prevailing national labor law
- ▶ Steps to be Followed for the Implementation
- ▶ To ensure workers' awareness of Labor Health and Safety (LHS) aspects, these will be explained both at the labor camp and the work site.
- ▶ Enforce the worker's Code of Conduct as adopted in the contractor's ESMP (C-ESMP). This is prepared about the project ESIA/ESMP, LMP, and SEA/SH Action Plan.
- ▶ Be aware of health and safety issues and the precautionary measures to be taken by laborers to uphold a congenial and healthy atmosphere at the site.
- ▶ Ensure the availability of a "First Aid Box" at the labor camp and work site. Inform and keep the laborer acquainted with its use, as and when required. Emergency drugs, gauges, bandages, etc., must be available in this "First Aid Box."
- ▶ Firstly, the availability of PPE is to be ensured. The laborer will be made acquainted with its use.
- ▶ A proper demonstration of the PPE technique will be held at work.
- ▶ Through regular monitoring, ensure the availability of separate latrines for male and female workers, potable water, a waste disposal system, and a well-ventilated and well-illuminated labor camp.

Mitigation Measures

- ▶ Implementation of a GBV-free work environment shall be maintained by the PIU/RHD and the contractor. The role and functions of GRM have been mentioned above, which will ensure mitigation measures as per ESMP
- ▶ Gender-based discrimination shall be strictly prohibited and monitored
- ▶ Any sexual harassment shall be dealt strictly with as per local law of the country, and the employee shall be terminated immediately from his duties
- ▶ Training on the code of conduct and company policy on the GBV-free work environment shall be organized for all workers, including skilled and non-skilled workers
- ▶ It shall be ensured that the training mentioned above has been attended by all, including managers/engineers and other workers
- ▶ Code of Conduct Preventing Gender-Based Violence and Violence against Children/female workers shall be signed by the workers/managers/other staff
- ▶ The code of conduct needs to be get signed by each worker every six months
- ▶ A signed copy of the code of conduct shall be documented physically and as scanned version shall be stored in the computer
- ▶ Company policy on GBV free work environment and code of conduct, which the worker signed, shall be displayed at labor camps/canteen and other contractor facilities
- ▶ Staff shall be encouraged to report suspected or actual GBV
- ▶ A grievance redressal mechanism shall be established at site to address the issues immediately

7.3.31 TRAFFIC DIVERSION AND DETOURING

361. Traffic generated by project-related activities can significantly inconvenience or disturb the local community who reside near the areas adjacent to construction works. The movement of heavy vehicles to carry construction materials and equipment will add congestion to existing traffic and increase the risk of traffic accidents. Disruption of access to infrastructure or social resources due to construction activity will cause nuisance. It will also pose a risk of accidents for drivers at night if these blockages and disruptions are not demarcated. In addition, there are serious accident risks for pedestrians crossing the road at sensitive receptors, like schools, mosques, temples, hospitals, etc., and other CPRs.

Mitigation Measures

- ▶ To avoid disruption of the existing traffic due to construction activities, a comprehensive Traffic Management Plan (TMP) will be drawn up by the contractor and submitted to the CSC for approval before the commencement of construction
- ▶ The traffic control plans shall contain details of diversions, traffic safety arrangements during construction, safety measures for nighttime traffic

7. Environmental and Social Impacts, Risks and Mitigation Measures

- ▶ Temporary diversions shall be provided as per the requirement
- ▶ Detailed “Traffic and Road Safety Management Plans” shall be prepared by the Contractor and submitted to CSC for approval
- ▶ The traffic management and control plans shall contain details of temporary diversions, traffic safety arrangements for construction under traffic, details of traffic arrangements after cessation of work each day, Safety measures for night-time traffic and precautions for transportation of hazardous materials and arrangement of flagmen

7.4 IMPACTS AND MITIGATION DURING OPERATION PHASE

362. Periodic environmental monitoring of terrestrial ecology, water resources, water quality, air, noise, etc. shall be undertaken. The client will monitor and evaluate the effectiveness of the ESMP/RAP through PIU during the project tenure and onward through the Environmental and Social Division of RHD.

7.4.1 LAND USE PATTERN

363. Additional land will be required to widen and strengthen the proposed road development, permanently impacting the existing land use pattern by changing it from agricultural or rural residential/commercial to paved roads. However, considering this, optimization is required in the design. In this project's road development, land acquisition has been reduced from 946 acres to 758 acres.

364. Road projects often lead to increased urbanization around the project area. This can result in converting agricultural or undeveloped land into residential, commercial, or industrial areas. Due to increased accessibility, land prices along the road will also soar in nearby places.

365. The mitigation measure to prevent ribbon development is to restrict land by placing concrete pillars by RHD, and master planning /zoning must be taken by the concerned authority. Integrated planning is crucial to address these impacts.⁴³ Coordinating land use and transportation planning is must to ensure that new developments are sustainable and beneficial to the community.

7.4.2 TERRESTRIAL ECOLOGY

366. The shrubs and trees to be planted on the median and along the road are to be maintained and trimmed regularly.

7.4.3 WATER RESOURCES AND WATER QUALITY

367. Side drains will be regularly cleaned before the monsoon onset, and water quality will be monitored.

7.4.4 IMPACTS ON AIR ENVIRONMENT DURING OPERATION PHASE

368. During operation, the activity of the proposed development will be only vehicular movements on the newly developed flyover/bridge infrastructure. Vehicular emissions will be the principal source of pollution during the operation stage. However, this development will provide a mode to decongest traffic in the project area. As such, the proposed development is not envisaged to impact air quality during the operation adversely. Hence, the proposed development can be seen as a measure to help reduce pollution issues, and the corridor will help decongest existing traffic and provide better riding conditions for road users.

7.4.4.1 AIR POLLUTION MODELLING

369. Traffic analysis report shows that the Bhomra Land Port is one of the prominent ports for bilateral trade between India and Bangladesh, along with the Benapole Land Port. Bhomra Land Port typically experiences less truck congestion than Benapole Land Port, enabling faster processing of exports from Bangladesh to India and thus becoming a preferred alternate for trade moving along the Dhaka–Kolkata route. Therefore, with the improvement of the Bhomra- Satkhira- Navaron road section, there is a high possibility of traffic being diverted to the project road from the surrounding network.

370. The composition of traffic was worked out from the traffic volume count data collected from various locations in the road network. The share of passenger vehicles in all locations varies from 53% to 63%, while the share of goods vehicles varies from 10% to 16%. Furthermore, the share of non-motorized vehicles varies from 27% to 32%. Table 5 shows the mode-wise composition of total traffic for the survey locations on the project network. The traffic composition on the different survey location is presented in **Table 7-9**⁴⁴.

⁴³ Analyzing the Impact of Land Use and Roadside Informal Activity on Transportation System: A Case Study in Rajshahi City Corporation, Bangladesh, Mahamudul Hasan et.al.

⁴⁴ Feasibility Study, Detailed Design of Bhomra-Satkhira-Navaron Road Section (Phase - 3), RHD, 2024

7. Environmental and Social Impacts, Risks and Mitigation Measures

Table 7-9: Average Percentage Composition of Traffic (%)

Car / Jeep / Utility Van	TVC 1, Near Kazihat College, R780	TVC-2, Near Maa Durga Rice Mills, Alipur Bazar, Satkhira-Bhomra Highway	TVCS 1, Near Vairab Nagar Jame masjid, R760	TVCS 2, Godkhali Bazar, N706
Car/ Jeep/ Utility Van	3%	1%	2%	7%
Auto Rickshaw	17%	16%	20%	7%
Motor Cycle	33%	36%	39%	35%
Mini Bus/Micro Bus	3%	0%	1%	3%
Large Bus	1%	0%	1%	2%
Small Truck	7%	3%	4%	4%
Medium Truck	8%	9%	5%	12%
Heavy Truck	1%	3%	1%	1%
MAV	0%	0%	0%	0%
Non-Motorised	27%	32%	27%	27%

371. Considering different traffic aspects, the feasibility and detailed design study for the proposed road section development has the recommended growth rates which are given in **Table 7-10**.

Table 7-10: Estimated and Recommended Growth Rate

Vehicle Category	Years					
	2022-2027	2027-2032	2032-2037	2037-2042	2042-2047	Beyond 2047
Car	7.00%	7.50%	8.00%	6.80%	5.50%	4.50%
Bus / Mini bus	5.20%	6.00%	6.50%	5.60%	4.50%	3.60%
Three Wheelers	5.00%	5.50%	6.00%	5.50%	4.00%	3.00%
Two Wheelers	7.00%	7.70%	8.00%	6.90%	5.60%	4.50%
Small Truck	6.00%	6.50%	7.00%	6.00%	4.80%	3.90%
2 Axle	6.00%	6.50%	7.00%	6.00%	4.80%	3.90%
> 3 Axle	7.00%	7.50%	8.00%	6.80%	5.50%	4.50%
MAV	7.00%	7.50%	8.00%	6.80%	5.50%	4.50%

372. The total motorized traffic in different years is presented as follows in **Table 7-11**⁴⁴.

Table 7-11: Projected Traffic

Base Year	Construction Period		Operation Year				
2022-2023	2023-2024	2024-2025	2025-2026	2030-2031	2037-2038	2047-2048	2052-2053
6508	6911	7341	7798	13328	21565	36778	44919

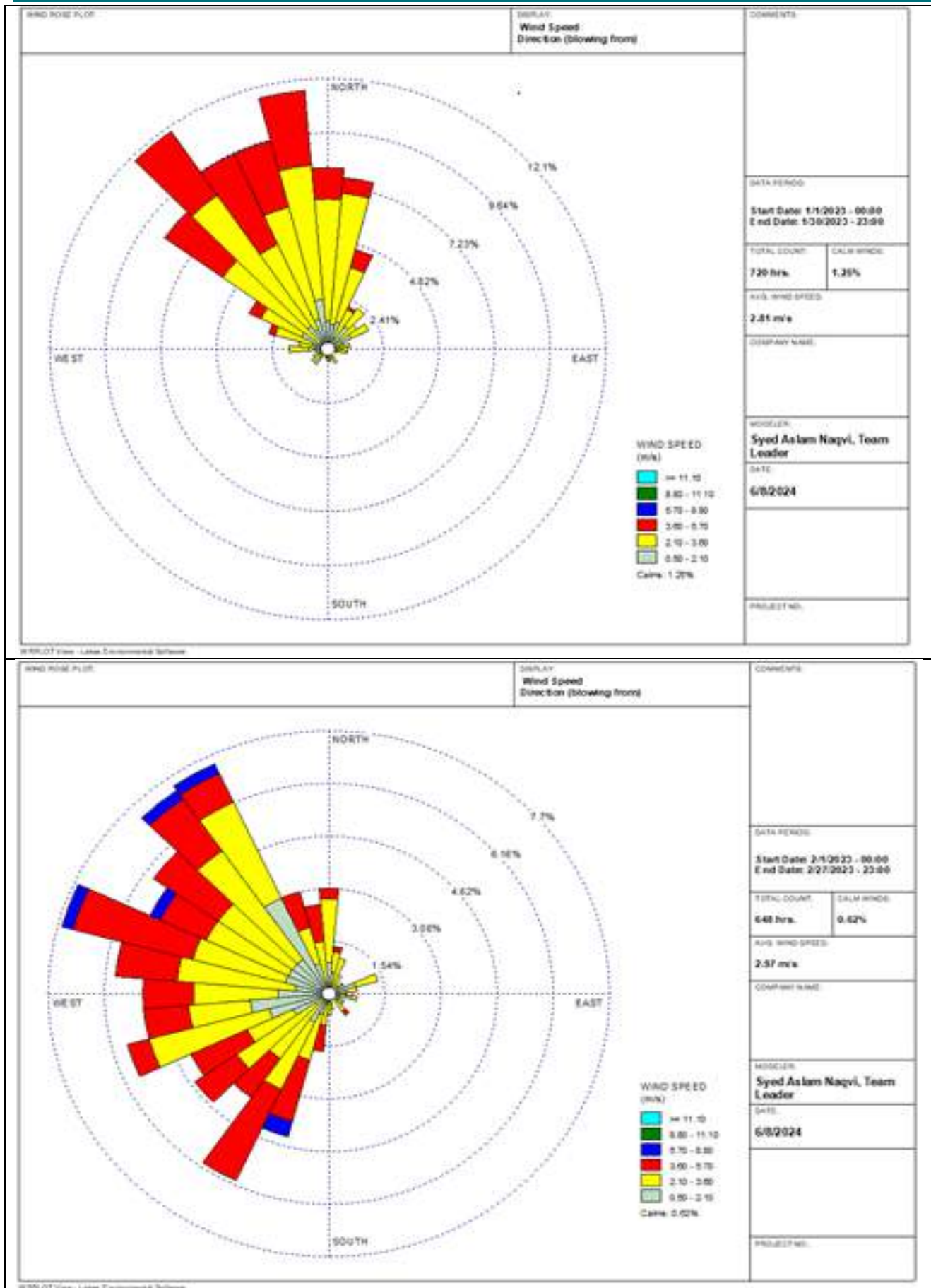
373. The CALPUFF View Version 9.0 model is used for air quality simulating the air quality along the road. This puff model can fully account for hour-by-hour and spatial variations in stability and wind. It performs well at downwind distances from a few kilometers. The current version can also work for Road Sources. Hence, it is applicable for simulating future scenarios, e.g., 2052 -53. Based on the chemistry of fuel, a review of different literature, e.g., literature UPEPA 42, CPCB-India, The emission factors criteria pollutant PM10, SO2, NOx, CO, etc., for 2052 traffic has been worked to be as follows given in **Table 7-12**.

Table 7-12: Emission Factors from Road

Description of source	Emission Rate of Criteria Pollutants in g/s				Coordinates in m (Start and End Point)			
	CO	NO2	PM10	SO2	X1	Y1	X21	Y21
Bhomra_Navaron	0.001728	4.41E-05	3.85E-05	5.67E-05	705656.2	2551151	705656.2	2507321

374. The metrological data is collected for 2023 for the program area's center point (23.49916 N, 89.14893 E). Since the winter season is the most stable meteorological condition, the model is employed for this season wind data. The wind rose diagram for the winter season is presented in **Figure 7-1**. The predominant wind direction is Northwestern (NW).

7. Environmental and Social Impacts, Risks and Mitigation Measures



7. Environmental and Social Impacts, Risks and Mitigation Measures

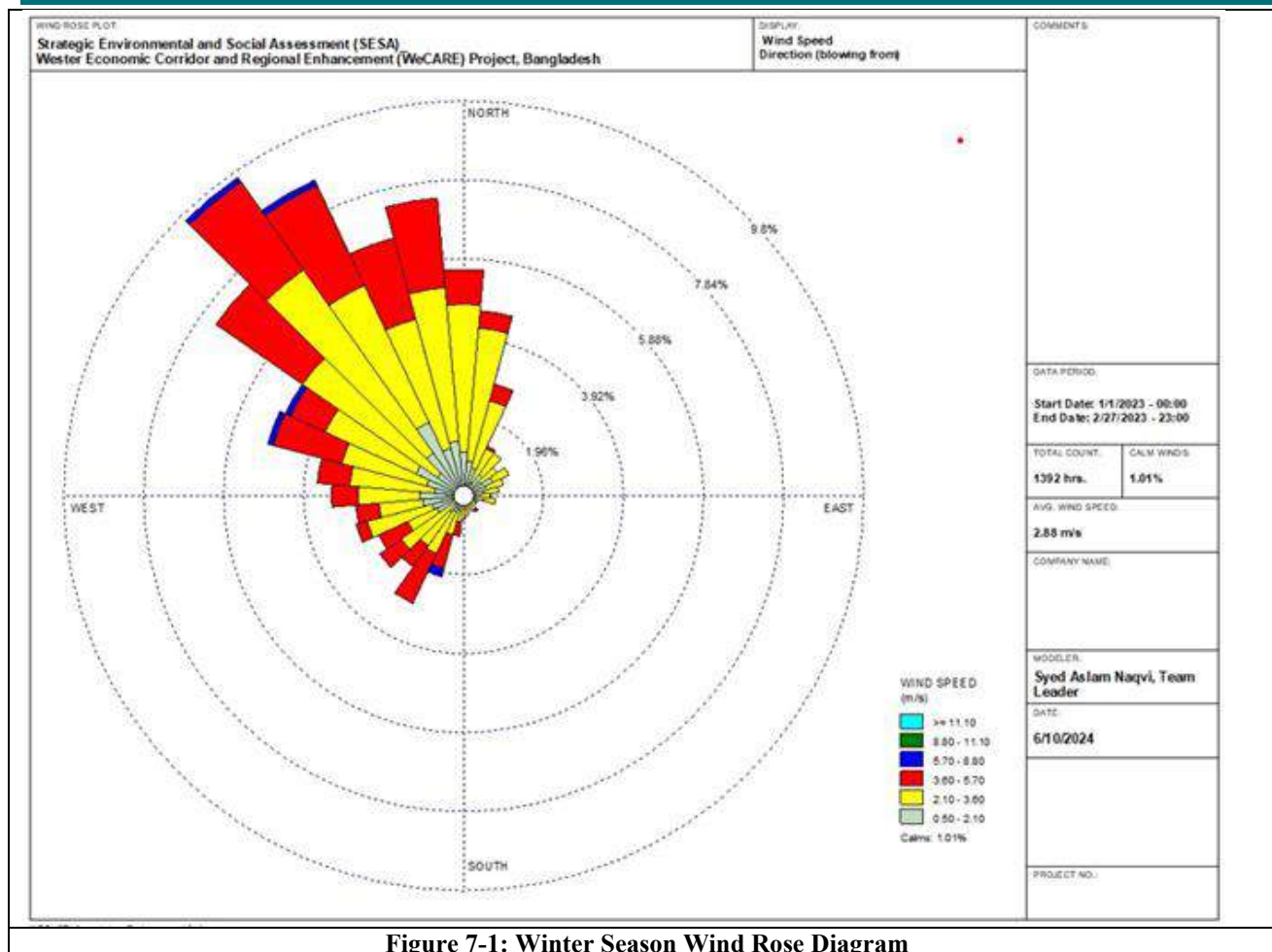


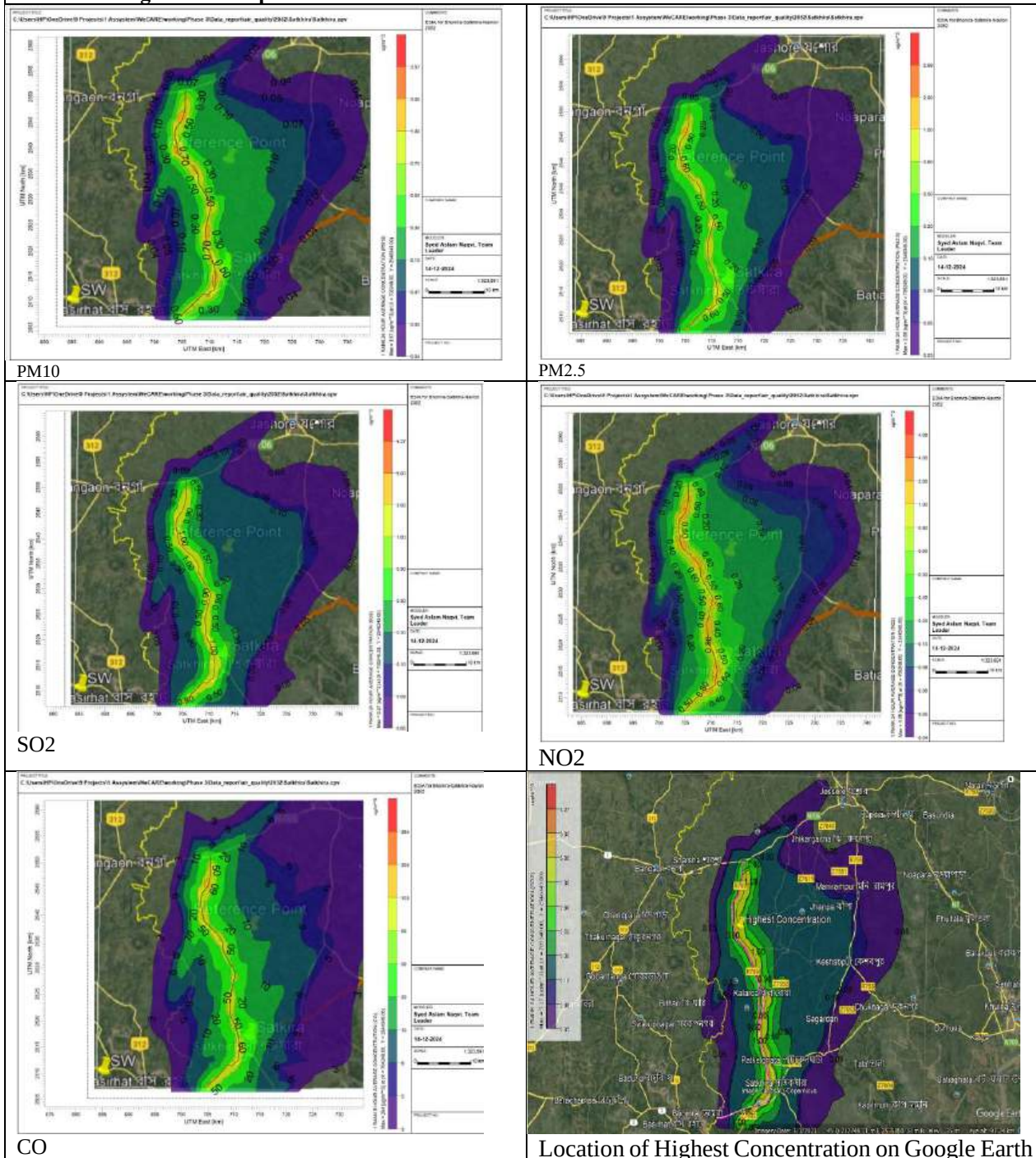
Figure 7-1: Winter Season Wind Rose Diagram

375. The simulation model is employed to determine the criteria pollutants, such as Carbon Monoxide (CO), Sulfur dioxide (SO₂), Nitrogen Dioxide (NO₂), PM₁₀, and PM_{2.5}, for road sources in 2052-53. The incremental values of the concentrations due to the increased traffic in 2052 and cumulative results are summarized in **Table 7-13**.

Table 7-13: Air Quality Cumulative Results							
Predicted Concentration of Pollutants						Baseline Value	Cumulative Value
Average Period	Rank	Peak	Year, Julian Day, Start Hour	X [km]	Y [km]		
CO - Concentration: [ppm]							
1-HOUR	1	0.75	2023, 013, 0500	704.248	2539.349	0.78	1.53
8-HOUR	1	0.14	2023, 013, 0000	704.248	2544.349	-	
NO2 - Concentration: [ug/m**3]							
24-HOUR	1	4.09	2023, 013, 0000	705.248	2546.349	13	17.09
PM10 - Concentration: [ug/m**3]							
24-HOUR	1	3.57	2023, 013, 0000	705.248	2546.349	55.7	59.27
PM2.5 - Concentration: [ug/m**3]							
24-HOUR	1	2.68	2023, 013, 0000	705.248	2546.349	49.1	51.78
SO2 - Concentration: [ug/m**3]							
24-HOUR	1	5.27	2023, 013, 0000	705.248	2546.349	178.3	183.57
CALPUFF View Version 11.0.0 by Lakes Environmental Software							

376. From the above table, it can be apprehended that all the values are within the prescribed limit except for the Sulfur dioxide because the baseline concentration exceeds the limits. The reason for exceeding limits in the baseline concentration is due to fossil fuel burning in rural areas. The results are shown in the following isopleths given in Figure 7-2.

Figure 7-2: Isoleths of Predicted Concentration of Criteria Pollutants in Ambient Air



7.4.5 IMPACTS ON NOISE ENVIRONMENT DURING OPERATION PHASE

377. Motor vehicles are inherently noisy, and noise impacts are inevitable in any road development regardless of scale or character⁴⁵. The noise sources during the operation of road projects are vehicle noise, friction between vehicles and road surface, driver behavior, and road maintenance. Vehicles noise⁴⁵ is generated from engine, transmission, suspension, acceleration, stop-and-go traffic conditions, and rough roads. Poor vehicle conditions are also one contributing factor.⁴⁵

378. During the operation stage, increased traffic will likely raise the noise level. However, this development will provide a mode to decongest traffic and thereby help reduce impacts due to increased noise levels.

379. Composition of Traffic and Growth: Based on the traffic survey, the traffic composition is Car / Jeep / Utility Van, Auto Rickshaw, Motorcycle, Minibus/Micro Bus, large bus, Small Truck, Medium Truck, Heavy Truck, and

⁴⁵ Roads and Environment a Handbook, The World Bank, 1997

7. Environmental and Social Impacts, Risks and Mitigation Measures

Non-Motorized. Their growth pattern in future years is given in **Table 7-10**. The traffic increase is given in **Table 7-11**.

380. Based on the traffic analysis report, peak-hour traffic has been worked out for 2052 (refer **Table 7-14**) and sound levels due to an increase have been simulated using the sound plan software 5.1.

Table 7-14: Peak hour Traffic values (Year 2052)

Station	Vehicle name	day	night
		Veh/h	Veh/h
Navaron to Satkhira	Total	839	600
	Automobiles	440	359
	Medium trucks	39	56
	Heavy trucks	44	67
	Buses	209	58
	Motorcycles	107	60
Benapole to Jashore	Total	749	604
	Automobiles	378	323
	Medium trucks	32	50
	Heavy trucks	37	60
	Buses	168	53
	Motorcycles	134	118

381. SoundPLAN Noise Model: SoundPLAN is a compact noise model that simulates sound levels due to various sources such as roads, railways, industry, etc. Country noise modeling standards are input to simulate noise level impacts. For this study, the Traffic Noise Model (TNM2.5) of the US Federal Highway Authority (USFHW) has been used to calculate the incremental noise levels.

382. To assess the impacts on the ambient noise environment due to the operation phase of this state highway development, a simulation model (SoundPLAN essential 5.1) followed TNM 2.5 standards in the model.

Different vehicle⁴⁵ Different types produce different levels of noise. In general, heavy vehicles such as transport trucks make more noise than light cars; they tend to have more wheels in contact with the road and often use engine brakes while decelerating. The incremental noise levels at different distances from the road edge are presented in **Figure 7-3**.

383. The TNM 2.5 considers different vehicles, such as passenger cars, medium trucks, heavy trucks (multi-axes), Buses, and Motorcycles.

384. The following is US FHWA noise equation 1 as follows:

$$L_{eq}(h)_i = L_{oei} + 10\log [N_i/(S_i \times T_i)] + 10\log (15/d)(1 + \alpha) + S_o - 13 \text{-----Equation 1}$$

Where,

$L_{eq}(h)_i$ = Leq at hour h for i^{th} vehicle type

L_{oei} = The reference mean energy level for the i^{th} vehicle type

N_i = The number of i^{th} class vehicles passing during the time T

S_i = The average speed of the i^{th} class vehicles, km/hr

T = The duration for which Leq is desired and must correspond to N_i the count of vehicles during the time T. Normally, T has been considered one hour but it could be longer or shorter.

D = The perpendicular distance, in meters, from the centreline of the traffic lane to the location of the receptor, i.e., the location where the noise level is desired

α = The factor which relates to the absorption characteristics of the ground cover between the roadway and the receptor

S_o = The shielding factor provided by a noise barrier if present.

385. It is observed that incremental noise levels near the edge of the road, i.e., 60m to 80m, are more than nighttime noise level standards of ECR 23. However, the incremental noise levels are reducing as the distance from the road edge increases. It can be visualized from the noise level maps which are presented in Figure 7-4 for daytime and

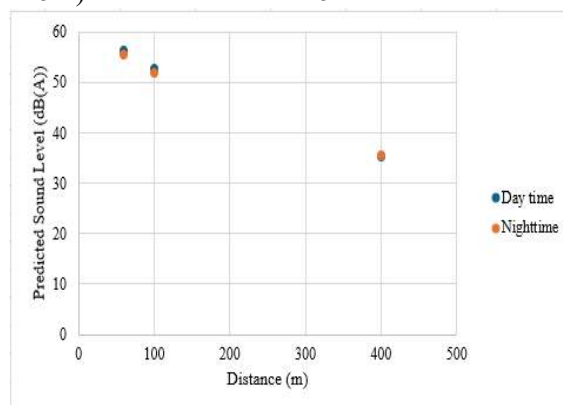
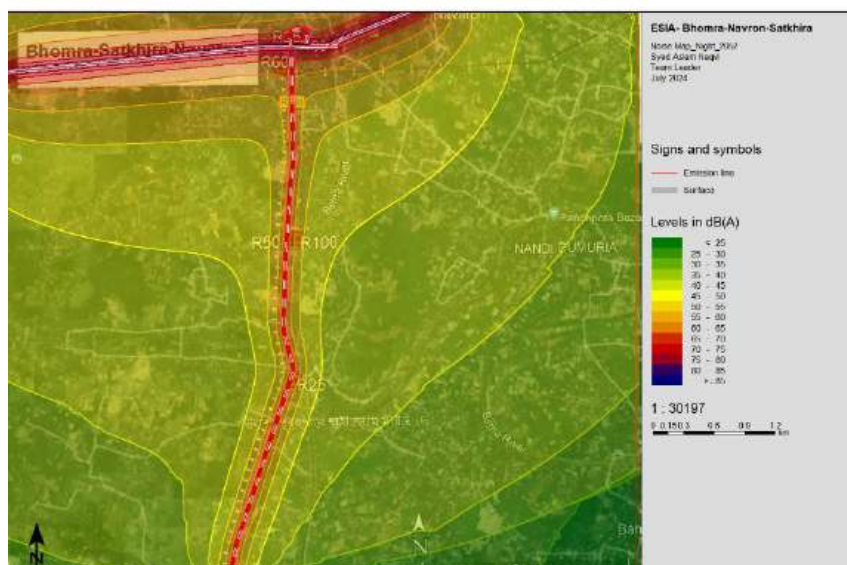


Figure 7-3: Incremental Noise Levels at Different Distances (m)

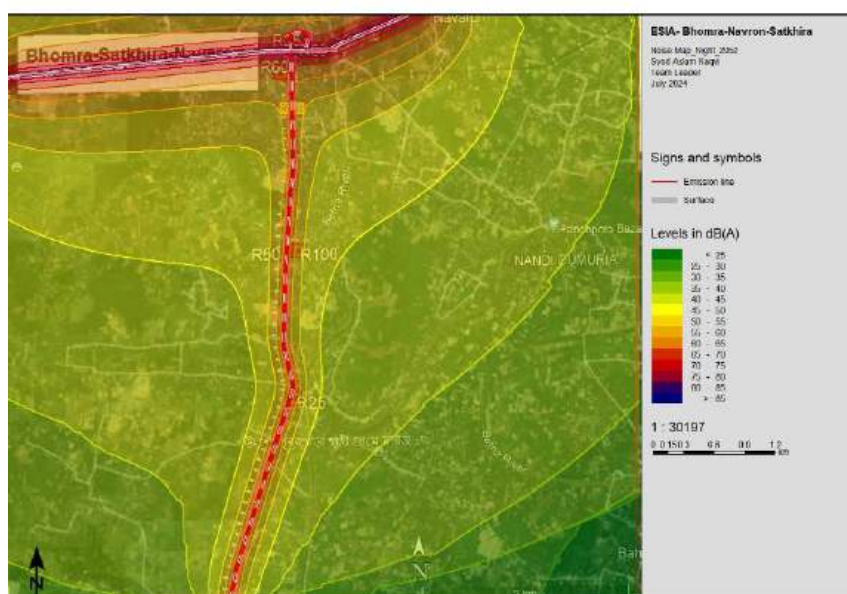
7. Environmental and Social Impacts, Risks and Mitigation Measures

nighttime for the year project year 2051-2052. To study the impacts, the highest incremental noise levels have been added to the baseline monitoring results which has been discussed in the following subsections.

Figure 7-4: Incremental Noise Level



Day time



Nighttime

386. The predicted values are added to baseline values and resultant values are increasing the standards. For two noise quality monitoring station, the resultant values are as follows in Table 7-15: Cumulative Noise Levels

Station	Baseline Noise Levels		Incremental noise Levels		Cumulative Noise Levels at a 60m distance from road		Remarks
	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	
ANL2	58.5	45.1	56.4	55.4	61	55	Noise levels increase by 2dB(A) during the daytime. Nighttime impacts are more due to increased traffic. Noise barriers along the boundary shall be provided as per ESMP.
ANL5	61.9	46.4	56.4	55.4	62	56	

Mitigation Measures

- ▶ Vehicular noise and horn use need to be controlled through law enforcement and public awareness. Vehicles should use proper horns per norms to keep noise within permissible limits.
- ▶ Pressure horns shall not be allowed.
- ▶ Silence zones need to be demarcated, and road signs prohibiting horns honking will be displayed in residential areas, sensitive locations, and silence zones. No honking signboards shall be placed near the sensitive receptors

7. Environmental and Social Impacts, Risks and Mitigation Measures

- ▶ Noise barriers shall be installed along the corridor using tree plantation, especially along sensitive receptor sections such as schools, hospitals, etc.
- ▶ The noise level will be monitored regularly, per the environmental monitoring plan suggested in Section ESMP of this report.
- ▶ It is recommended that an extruded acrylic (1.17 – 1.19 g/cm³ of density) sheet noise barrier of 6mm thick) be provided on the loop, take-off, and landing sides of the Navaron junction to reduce the noise impact on the community nearby. This sheet should be fixed on both sides. This will attenuate the noise level by 20db (A). The cost is about 400 BDT per square foot. A 2m height for a total 5 km length (2.5km on each side) will cost approximately 4,00,00,000 (Four hundred million or Forty crore Bangladeshi taka).

7.4.6 SOIL AND SEDIMENTS

387. Any Spillages or Accidental Vehicles Shall be Removed Immediately.

7.4.7 ROAD SAFETY

- ▶ Road furniture, as provided in the operation phase, needs to be appropriately maintained.
- ▶ Potholes or any other damages shall be rectified immediately after post-monsoon
- ▶ Highway Petrol/ Police deployment sufficiently at the project road in operation to oversee, monitor, and enforce traffic safety compliance on roads and highways as well as accident investigation and sexual misconduct, particularly women SH in the public buses during night

7.4.8 CUMULATIVE IMPACT

388. To assess the cumulative impacts on social and environmental impacts and risks in the project area, a three-level scale (Low, Medium, and High) has been selected. The color coding for working out the intensity of positive and negative impacts is given in **Table 7-16**.

Table 7-16: Intensity of Impacts						
NEGATIVE			Neutral	POSITIVE		
High	Medium	Low		Low	Medium	High

389. Based on the SESA study for the WeCARE program, cumulative environment, social impact, and risks are worked out considering the road projects in addition to this phase 3, LGED projects, Tourism, Land ports, Agriculture Industries, Shrimp farming, etc., which could be aligned with project lifecycle, have been identified through literature review and stakeholder consultations and field visits. The cumulative impacts are presented in **Table 7-17**.

Table 7-17: Assessment of Risks and Impacts on ENVIRONMENTAL and Socialparameter										
Sl.#.	Parameters	RHD	LGED				Tourism Sector	Industry		
		Phase 3, ADB Road Projects, junction Improvement	UP/Union /Bridges Feeder Roads (Phase 3, & 4)	GCM	Other Facilities	Agro-based Industry		Shrimp and Fish Cultivation	Other Industry (Land ports)	
1PHYSICAL PARAMETERS										
1.1	Land Use Pattern									
1.2	Air Quality									
1.3	Noise Quality									
1.4	Drainage Congestion/ Water Logging									
1.5	Erosion and Siltation									
1.6	Soil Quality									
1.7	Water Pollution									
1.8	Waste (Liquid/Solid) Generation									
1.9	Climate Change adaptation									
1.10	GHG emissions									
1.11	Carbon Emissions									
1.12	Loss of Top Soil of Agricultural Lands									
1.13	Safety									
2ECOLOGY AND BIODIVERSITY										
2.1	Acquatic Ecology									
2.2	Terrestrial Ecology (Tree Cutting)									

7. Environmental and Social Impacts, Risks and Mitigation Measures

Table 7-17: Assessment of Risks and Impacts on ENVIRONMENTAL and Socialparameter										
Sl.#.	Parameters	RHD	LGED				Tourism Sector	Industry		
		Phase 3, ADB Road Projects, junction Improvement	UP/Union Feeder Roads (Phase 3, & 4)	/Bridges	GCM	Other Facilities		Agro-based Industry	Shrimp and Fish Cultivation	Other Industry (Land ports)
2.3	Wildlife and Biodiversity									
2.4	Eutrophication//Pukur or Baor									
2.7	Tree Plantation									
3SOCIAL RISKS AND IMPACTS										
3.1	Population Growth									
3.2	Land Disputes									
3.3	Land Acquisition									
3.4	Loss of Agriculture Land									
3.5	Loss of Livelihood									
3.6	Loss of structures									
3.7	Social Dynamics and well being									
3.8	Out Migration Rate (Reduced)									
3.9	Health and Sanitation									
3.10	Poverty and Food Security									
3.11	Education/ Literacy									
3.12	Rural Development									
3.13	Gender Equality and Inclusiveness									
3.14	SEA/SH and Human Trafficking									
3.15	Marginalized/Special Ethinc Community									
4ECONOMICAL RISKS AND IMPACTS										
4.1	Growth									
4.2	Industry and Export									
4.3	Employment									
4.4	Infrastructure and Transport									
4.5	Connectivity and communication									
4.6	Tourism									
4.7	Agricultural Development									

390. To evaluate the cumulative impacts arising from the different projects using the assessment done above **Table 7-17**, the occurrence of impacts and risks on environmental and social parameters are summarized in **Table 7-18**.

Table 7-18: OCcurrence of Risks and Impacts on Environmental and Social attributes in the Project Area (2023-2041)

20.11)

Sl.No.	Parameters	Occurrence of Impacts						
		(- ve) High	(- ve) Medium	(- ve) Low	Neutral	(+ve) Low	(+ve) Medium	(+ve) High
1	PHYSICAL PARAMETERS							
1.1	Land Use Pattern	4	3	2				
1.2	Air Quality		4	2	1	1		
1.3	Noise Quality	1	3	3				
1.4	Drainage Congestion/ Water Logging		2	4		3		
1.5	Erosion and Siltation		2	2	1	2		
1.6	Soil Quality	2	1	3	3			
1.7	Water Pollution	2	1	4	2			
1.8	Waste (Liquid/Solid) Generation	3	3	3				
1.9	Climate Change		1	1	2	1	4	
1.10	GHG emissions			7	2			
1.11	Carbon Emissions		1	3	2		3	
1.12	Loss of Topsoil of Agricultural Lands	2	2	2	3			
1.13	Safety		1	3			3	2

Joint Venture of



STUP Consultant Pvt. Ltd.
 On July 1st, 2021, STUP was acquired by Assystem and rebranded as Assystem STUP.



BCL Associates Limited, Bangladesh

7. Environmental and Social Impacts, Risks and Mitigation Measures

Table 7-18: Occurrence of Risks and Impacts on Environmental and Social attributes in the Project Area (2023-2041)

Sl.No.	Parameters	Occurrence of Impacts						
		(- ve) High	(- ve) Medium	(- ve) Low	Neutral	(+ve) Low	(+ve) Medium	(+ve) High
Total Occurrence of Impacts		14	24	39	16	7	10	2
2	ECOLOGY AND BIODIVERSITY							
2.1	Aquatic Ecology		1	4		1		
2.2	Terrestrial Ecology (Tree Cutting)		2	1	2			
2.3	Wildlife and Biodiversity			1	2			
2.4	Eutrophication of Water Body (Baor/Pukur)		1	3				
2.5	Tree Plantation					1	1	3
2.8								
Total Occurrence of Impacts			4	9	4	2	1	3
3	SOCIAL RISKS AND IMPACTS							
3.1	Population Growth					9		
3.2	Land Disputes	2	2	4				
3.3	Land Acquisition	2	4	2				
3.4	Loss of Agriculture Land	3	2	2				
3.5	Loss of Livelihood	1	2	4	1			
3.6	Loss of structures	1	1	4				
3.7	Social Dynamics and well being			1		1	6	1
3.8	Out Migration Rate (Reduced)			1		2	3	
3.9	Health and Sanitation			1			5	3
3.10	Poverty and Food Security			1		1	5	
3.11	Education/ Literacy			1			4	4
3.12	Rural Development					2	3	3
3.13	Gender Equality and Inclusiveness			1		2	5	1
3.14	SEA/SH and Human Trafficking		1	3	2	1		
3.15	Marginalized and Special Ethnic Community		2	7				
Total Occurrence of Impacts		9	14	32	3	9	31	12
4	ECONOMICAL RISKS AND IMPACTS							
4.1	Growth						2	5
4.2	Industry and Export						2	5
4.3	Employment						2	5
4.4	Infrastructure, transport, connectivity and communication						2	5
4.5	Tourism						2	5
4.6	Agricultural Development						2	5
Total Occurrence of Impacts							12	30

391. The above table demonstrates that the environmental parameter land use is severely impacted because it will permanently change from agriculture to paved roads or industrial units, resulting in urbanization, etc. Waste generation will also cause a high impact on the environment, followed by loss of topsoil/soil quality. The social risks and impacts will be severe due to land acquisition and land disputes. The occurrence of impacts is summarized in **Table 7-19**.

Table 7-19: Sum of occurrence of Impacts

Parameter	Negative			Neutral	Positive			A sum of Positive and Negative Impacts
	High	Medium	Low		Low	Medium	High	
Environmental s	14	28	51	21	9	12	6	-66
Socio-economic s	12	17	40	3	10	48	48	37
Total Occurrence of Impacts	-162			24	+133			

392. Cumulative environmental impacts must be mitigated by adopting this report's suggested Environmental and Social Management Plan (ESMP). As seen above, social impacts will mainly be due to land acquisition (LA), and the Resettlement Action Plan (RAP) is being prepared as a standalone document separately to mitigate the impacts. Considering social factors, the project's road development will have positive sustainability.

8. Labor Management Procedure

8 LABOR MANAGEMENT PROCEDURE

393. This Labor-Management Procedure (LMP) has been prepared to ensure that the project complied with the Bangladesh Labor Act of 2006, as well as the World Bank's Environmental and Social Framework (ESF), Environmental and Social Standard 2: Labor and Working Conditions (ESS2), and Environmental and Social Standard 4: Community Health and Safety (ESS4). In Bangladesh, the LMP took into account the use of nationally adopted health and safety norms. For civil and construction work, the project will require both direct and contractual employees. The LMP applies to all direct workers, contracted workers, and major supplier workers who will be working on the project.

394. This section explains the labor-management approach for project aspects while taking into account national and international norms. The labor laws are governed by the Bangladesh Labour Act 2006 as amended in 2010 and 2013 and Labour Rules 2015. Some of the national and international laws regarding occupational health and safety that are relevant to this project are presented below in **Table 8-1**.

Sl. No.	Acts	Objectives/Description
1.	Bangladesh Labor Act 2006 (Amendment 2013)	Provides safety for the workforce during the construction period. The act guides the employer's extent of responsibility and the workmen's right to compensation in case of injury caused by an accident while working
2.	Bangladesh Labor Rules 2015	Provides guidelines on Employment Policy/Service, Registration of Manpower supply agency, Establishment Organogram, Appointment Letter, Various Register, Misconduct and punishment, two festival bonuses, Provident fund elaborated, Holiday, Health and fire safety, Wages, etc.
3.	Water Supply and Sewerage Authority Act 1996	The act calls for ensuring water supply and sewerage system to the public, preservation of system, and other related health and environmental facilities for the community.
4.	Labor Relations Under Labor Laws, 1996 (revision to scattered Acts and Ordinance to formulate the unified code)	The general concern during the project implementation state that the project manager must recognize labor unions
5.	Public Health Emergency Provisions Ordinance, 1994	Calls for special provisions concerning public health. In case of emergency, it is necessary to make special provisions for preventing the spread of disease, safeguarding public health, and providing adequate medical services, and other services essential to the health of respective communities and workers during construction-related work.
6.	Bangladesh Factory Act, 1979	Workplace provisions: these Act and Labor Laws require medical facilities, first aid, accident, and emergency arrangements, and child care services to be provided to the workers at the workplace.
7.	The Employees State Insurance Act 1948	Health, injury, and sickness benefit should be paid.
8.	The Employees Liability Act, 1938	Covers accidents, risks, and damages concerning employment injuries.
9.	Maternity Benefit Act 1950	Framed rules for female employees, who are entitled to various benefits for maternity.
10.	The Equator Principles (III) 2013	Provide guidelines on environmental and social standards with considering project manpower and other stakeholders.
11.	International Labor Organization Rules and Guidelines:	
12.	Convention 029 (1930)	Guidelines on Forced or Compulsory Labor;
	Convention 098 (1949)	The Application of the Principles of the Right to Organize and to Bargain Collectively;
	Convention 100 (1951)	Equal Remuneration for Men and Women Workers for Work of Equal Value;
	Convention 111 (1958)	Discrimination in Respect of Employment and Occupation;
	Convention 138 (1973)	Minimum Age for Admission to Employment;
	Convention 182 (1999)	The Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labor

395. To address the following points, the contractor will take necessary steps during the construction period according to the national laws relating to the labor-management procedures (occupational health and safety-relevant) as well as World Bank's (WB) Environmental and Social Framework (ESF), specifically Environmental and Social Standard (ESS2) and Community Health and Safety (ESS4) is presented respectively.

8. Labor Management Procedure

8.1 SELECTION AND LAYOUT OF CONSTRUCTION CAMP

396. Selection of labor camps and construction camps before starting the road construction depends on a few things including size, dimension, and time length of the project. The assigned contractor or responsible authority will select a certain location alongside the project area considering government-owned free land, barren land, river banks, etc. which have no consequence of environmental and social obligation. In terms of selecting the construction camp, avoiding any specific land that could be socially or environmentally critical is recommended. A tentative construction camp layout has been drawn to specify the temporary infrastructure establishment (Figure 8-1). Hot mixed plant, stockyard, stone crusher, batch plant, maintenance workshop, laboratory, etc. will be placed opposite the maximum yearly wind flow in a specific place. All necessary temporary infrastructure will be well-established or well-decorated, considering the project requirement. The contractor will follow or comply with the tentative layout with proper procedure. The selection criteria for the construction camps can be presented below-

- ▶ **Land Selection:** Barren land, government-free land, khas land, char land, etc. Avoid agricultural land, private land, vegetation areas, public places, recreational areas, forest areas, sensitive areas, etc.
- ▶ **Layout Placement:** Place environmentally or socially corrosive infrastructure (hot mixed plant, stockyard, stone crusher, batch plant, maintenance workshop, laboratory, etc.) far from the residential area, labor camps, office area, etc.

397. Selecting or drawing the construction camps in a certain place there have a few things that should be considered to maximize productivity, reduce areas needed for temporary construction, and maximize utilization, such as-

- ▶ **Safety:** Ensuring the selected construction camp location is safe from any natural, social, regional, or environmental hazards.
- ▶ **Site Accessibility:** Giving priority to easily accessible areas for selecting as construction camps that will be feasible to prevent any emergency easily.
- ▶ **Security:** The selected location should be secure from any national, or regional conflicts or any other insecure activities.
- ▶ **Environmentally Sound:** The selected location should be considered as any barren land or free land that has a lower impact on the surrounding environment.
- ▶ **Socially Feasible:** Avoid the socially crowded place where there has no chance to affect any local community.
- ▶ **Economically Sustainable:** In the selection of the construction camp location, it is mandatory to meet up the economic aspects to borrow or buy the land.

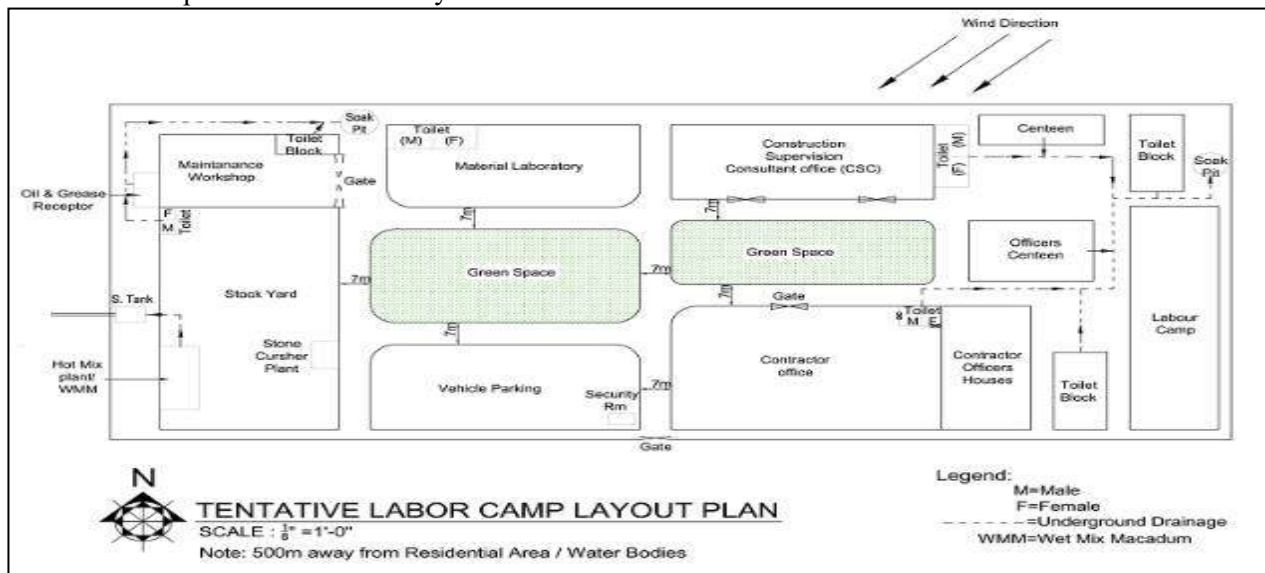


Figure 8-1: Tentative Layout of the Construction/Workers Camp

8.2 HIRING AND RECRUITMENT PROCEDURE

398. Hiring and recruitment of workers, staff, engineers, consultants, etc., will depend on the project dimension and time scenario. According to the WeCARE program description, dimension, and length, the contractor will have to appoint or recruit direct workers, contracted workers, primary supply workers, and also migrate workers based on expertise requirements. The hiring and recruitment process will be conducted considering the standard procedures of the Bangladesh Labor Act 2006, the Labor Rules 2015, the ILO Convention, the World Bank's ESS2, and ESS4. All the procedures will be undertaken by following the CoC of the contractors, which is

8. Labor Management Procedure

presented in Annex 7.3. The LMP applies to all project workers whether full-time, part-time, temporary, seasonal, or migrant workers. There will be provisions to avoid the use or employment of children and forced labor at any level of the project. The major procedure of hiring and recruitment of workers has been depicted here as-

- ▶ **Selection of Workers:** The contractor will select skilled, non-skilled, semi-skilled, and armature workers, engineers, staff, consultants, etc. for engaging them in the various dimension of project activities following the proper code of conduct and standards.
- ▶ **Source of Workers:** Depending on the type of work the contractor will procure properly for sourcing the workers. Direct workers, contract workers, supply workers, and migrant workers will be engaged by the contractor before starting the project activities or when needed with the proper application of ILO, Bangladesh, and World Bank Standard.
- ▶ **Appointment of Workers:** The contractor has full independency to appoint full-time, part-time, contractual, or intermittent workers depending on their workload and activities. The contractor will appoint workers on a contract basis, probation basis, or permanent basis by enforcing the Labor Act 2013, Labor Rules 2015, ILO Convention, and also ESS2 & ESS4.
- ▶ **Contract Documentation:** Contract documentation means the agreement paper between the workers and the contractor providing proper guidelines on the term of references, period, probation time, wage, benefits, compensation, penalty, termination, and conclusion. Human resource personnel on behalf of the contractor will prepare the proper documentation and supply it to the workers before the appointment for better understanding.
- ▶ **Probational Period:** A fixed probation period will be included in the contract document by following the guidelines of proper standards at the national or international level.
- ▶ **Services and Facilities:** The contractor will aware of the prospective workers about their services and facilities before processing any recruitment or hiring and also the workers will agree to obey the rules and regulations as well as commit to provide proper services to the project execution.
- ▶ **Conclusion of Probation:** The contractor may have the authority to monitor, evaluate, and conclude the probation period of every worker after completing the fixed probation period. According to the services from the workers the contractor will decide on permanent/contractual appointment or termination as following the Labor laws, rules and regulations.
- ▶ **Wage Adjustment:** After permanent/contractual appointment the contractor will adjust the worker's wages, benefits, services, and facilities as per standard rules, regulations, and laws which adopted for this project.
- ▶ **Project Execution:** The contractor will be the most prominent authenticated body to complete the project work following the supervision of the project owner, lender, and consultation organization. After executing the primary recruitment process (though the recruitment may run during the whole project lifetime), the contractor will properly execute the project work by compiling labor laws, standards, and regulations. The contractor will maintain the workers' profiles to avoid unwanted situations.
- ▶ **Local Recruitment:** The preference for project employment will be given to local people, those directly affected by Project-related displacement, and/ or those who have completed specific skills training under various programs offered and managed. To implement the local recruitment, a local recruitment process will be developed by the contractor, including the following activities:
 - Collect and finalize the information for recruitment from the contractor and its subcontractors (e.g., type of position, number of positions, job description)
 - Conduct public disclosure of a summary of upcoming recruitment (both skilled and unskilled positions) and the process for application at the project area and nearby communes;
 - Collect the data of candidates who have applied or registered in seeking employment, including personal background, contact information, expected position, training, and update of involvement;
 - Communication with the project's stakeholders and beneficiaries shall be clear to manage expectations.

399. The contractor should follow the below-explained code of conduct or term of reference for hiring or recruiting the workforce into the project-

- ▶ **Child Labor:** In keeping with internationally recognized standards, the project will make a distinction between child labor and young worker. The project will not tolerate child labor under any circumstances. The employment of young workers, i.e., minors aged from full 15 years to under 18 years who have reached the minimum age of employment and completed compulsory schooling, will be allowed under strict conditions and in compliance with requirements of internationally recognized standards and local relevant laws and regulations.
- ▶ **Forced Labor:** The Project defines forced labor in line with the ILO Convention as any work or service extracted from a person under threat or penalty, which includes penal sanctions and the loss of rights and privileges, that the person has not offered him or herself voluntarily. It includes slavery and abduction, misuse

8. Labor Management Procedure

of public and prison works, forced recruitment, debt bondage, domestic workers under forced labor situations, and internal or international human trafficking.

- ▶ **Probation:** The probation period shall be negotiated by the contractor and candidates based on the candidates' jobs. Only one probation period is applied for a job. A copy of the probation contract will be provided to the candidate which outlines the working conditions and term of employment of the candidate during the probation period.
- ▶ **Labor Contract:** The labor contract is an agreement between the contractor and an employee on a paid job, salary, working conditions, rights, and obligations of each party in the labor relations. The labor contract is also a legally binding agreement between the contractor and an employee, which is the first basis to resolve conflicts and disputes arising in labor relations.
- ▶ **Termination of Labor Contract:** An employee and the Project shall have the right to unilaterally terminate the labor contract, however, notification shall be given to each other in advance.
- ▶ **Harassment:** The Project prohibits harassment of any kind, including sexual harassment, and will take all appropriate measures to promote a harmonious work environment and to protect personnel from exposure to any form of prohibited conduct through preventive measures and the provision of effective remedies when prevention has failed. During the recruitment process, the HR Specialist must undertake diligent reference checks of candidates to ensure that individuals who have a documented history of prohibited conduct are not hired.
- ▶ **Non-Discrimination and Equal Opportunity:** Employees must be treated equally about gender, age, race, religion, disability, nationality, political beliefs, membership in unions, ethnic origin, religious beliefs, as well as sexual orientation. Equality in employment shall mean the absence of any form of discrimination, direct or indirect, for reasons specified as mentioned above. The Project builds its equal opportunity policy to ensure fairness in all aspects of employment, including hiring, training, evaluation performance, compensation, and benefits, as well as the termination of employment.
- ▶ **Compensation for Damage:** An employee who causes damage to equipment or otherwise damages the employer's assets shall have to pay compensation by enabling the laws. The contractor has the right to conduct a wage deduction from the employee's salary every month to make up for the loss. An investigation shall be conducted when an employee causes damage to the company equipment or assets.
- ▶ **Trade Union/Workers' Organizations:** The below requirements shall be followed when establishing a Trade Union/Workers' organization at the project. In the event of any practices that fall out of the requirements in this section, the Bangladesh Labor Rule 2015 and Trade Union Law shall be applied accordingly. Employees have the right to freely establish, associate, and participate in Trade Union or other Workers' Organizations at the workplace. The workers' organizations in the project can be Trade Union or other workers' organizations which has been established according to Bangladesh's labor regulations.
- ▶ **Wage:** Employees will be paid based on their performance and skills regardless of employees' characteristics such as gender, age, race, religion, disability, nationality, political beliefs, membership in unions, ethnic origin, religious beliefs, as well as sexual orientation. The base monthly salary shall be determined according to the wage scale and shall not be lower than the regional minimum wage.
- ▶ **Benefits:** The statutory benefits include medical examination, social security, and childcare assistance shall be ensured by the contractor.
- ▶ **Hours of Work and Breaks:** The regular working hours of all employees at the Project are 8 hours per day and/or 48 hours per week. Employees are entitled to have at least four (4) days off per month. Female employees who are in their 7th-month of pregnancy and who are nursing a child under 12 months of age will only work 7 hours per day but will be compensated for 8 hours.
- ▶ **Overtime Arrangements and Overtime Compensation:** The legal requirement on maximum overtime allowed shall be followed as not to exceed 4 hours per day, 40 hours per month, and 300 hours per year. The overtime premium shall be paid following the local regulatory requirements of Bangladesh.
- ▶ **Leaves:** The breaks and leave include statutory holiday, public leave, marriage leave, maternity leave, sick leave, work injuries leave, personal leave, bereavement leave, and annual leave
- ▶ **Retrenchment:** Retrenchment means the elimination of several positions or the dismissal or layoff of several workers by an employer, generally because of a plant closing or for cost savings. In the Project, retrenchment refers to a consequence of adverse economic circumstances or because of a reorganization or restructuring, it does not cover isolated cases of termination of employment for cause or voluntary departure.

8.3 FACILITIES AT WORKERS' CAMPS

400. According to the national and international labor laws, the contractor will ensure numerous facilities in the labor camps for good practices of environmental and social norms. A list of facilities in the worker's camps is listed below-

8. Labor Management Procedure

- ▶ **Lodging Facilities:** For all workers, the contractor will provide an adequate accommodation facility. Separate accommodations needed to be arranged for different caste and ethnic groups. A distinct location of the accommodation is required for men and women considering social security. The temporary campsite will not be located at a roadside to avoid/ minimize the danger of road accidents.
- ▶ **Drinking-Water Supply:** The availability and proper storage of potable water is also the responsibility of the contractor. The quality of water must be maintained by proper treatment and testing periodically. Water consumption by the site workers should not endanger the water right of the local population.
- ▶ **Sanitation and Waste Disposal:** The contractor is supposed to provide adequate sanitary facilities to the workers on site. There must be an adequate number of toilet and bathing facilities for all workers. A separate toilet and bathing facility for the women workers is mandatory. The proper outlet of wastewater is required to maintain the hygiene of the camp as well as workers. The camp should have a treatment facility for the wastewater to maintain public health.
- ▶ **Fuel Use:** The contractor will make fuel arrangements for cooking, lighting, and heating. Fuel usage from a public supply source should not affect its availability or cost to the local population. For environmental reasons, the contractor shall not use firewood for cooking and heating except legally authorized sources.
- ▶ **Fire Prevention Facilities:** Fire is a major cause of damage on construction sites. So, fire extinguishers are basic requirements for a construction project.
- ▶ **Medical Services:** The contractor must arrange first aid facilities and primary treatment facilities with a well-equipped medical room, ambulance (24/7) facilities, a trained doctor, nurse, OHS personnel, etc. The contractor will also ensure regular health checkups of the workers.
- ▶ **Construction Safety Clothing:** Basic safety supplies like safety shoes, hard hats, gloves, and goggles must be provided by the contractor for workers for the entire project time.
- ▶ **Food Supply/Kitchen or Dining Facilities:** The contractor will ensure proper food supply for the workers and a responsible person will be employed to monitor.
- ▶ **Information Signs:** Site maps should locate details of the project, and be displayed in the office of the site superintendent or project manager and posted at the entrance gate. Traffic regulatory signs should be displayed in every important location of the campsite. Labor relations policy and safety rules will be displayed to award the workers their responsibility.
- ▶ **Security:** It is necessary to have a proper guard entrance to the site provided by a booth. Also, it is necessary to keep track of all visitors to the project. It is necessary to have a standby generator to maintain site lighting. The boundary should be fenced off from a security point of view.
- ▶ **Offices:** The offices should be close together, close to the site, and in a safe area. Also, provide the offices with proper office equipment. The offices at the site may include job offices, general contractor offices, and sub-contractors and consultants Offices.

8.4 RECORD KEEPING AND MAINTENANCE

401. The control of documents and records related to labor management shall be conducted following the document control procedure of the contractor. The project owner, the contractor, and subcontractors shall retain the following documents and records-

- ▶ Employees' details information
- ▶ Internal Labor Regulation;
- ▶ Collective Bargain Agent (CBA) and other Trade Union/Workers' Organization's documents (minutes of Labor Conference, Social Dialogues, Trade Union/ Workers' Organization's Fund, records of Trade Union/ Workers' Organization's activities);
- ▶ Labor Contracts;
- ▶ Wage scale and pay slip;
- ▶ Documents on occupational accidents and diseases;
- ▶ Grievance documents;
- ▶ Training records;
- ▶ Discipline records;
- ▶ Monthly/Quarterly/Semi-Annual self-audit report of contractors, their subcontractors, and primary suppliers' performance
- ▶ Monthly performance report of subcontractors/ primary suppliers
- ▶ Quarterly/Semi-Annual report of the Project' Labor and Working Conditions Management
- ▶ Quarterly Reports on Utilization of non-local workers; and
- ▶ Annual Labor Compliance Self-Assessment Report.

8. Labor Management Procedure

402. All documents and records are required to be filed for at least five years or as per regulatory requirements, whichever is more stringent and kept in safe storage accessible only to authorized personnel. Records shall be made available for inspection and audit by the contractor and the project owner or its agents upon request.

8.5 MONITORING, AUDITING, AND INSPECTIONS

403. Monitoring and implementation follow the requirements are critical components to prevent issues from becoming problems in the first place and to ensure that action plans are implemented, and procedures are being followed. The monitoring program related to the LMP is presented in **Table 8-2**. Any major non-compliance (e.g., issues that could lead to a significant failure of structures, fatal accident, major injuries, authorities' notice/prosecution, or delay in project schedule) shall be corrected within one working day. Minor non-compliance issues (e.g., issues that do not lead to a breach of statutory requirements, bodily injuries/damage to properties, the environment, and surrounding communities) shall be corrected within one week.

Table 8-2: Internal Monitoring Program

Action	Performance Indicators	Monitoring Protocol	Responsibilities	Monitoring Records
Internal Monitoring	The number of child labor; Number of forced labors; Number of Trade Union/Workers' Organization members and activities; Number of Trade Union/Workers' Organization dialogues and no. of issues raised; Number of employees who sign the labor contract; Number of employees paid under regional minimum wage; Number of employees registered with social, health, and unemployment insurance; Type, number, and compensation of occupational accidents and diseases. Type and number of grievances; and Type and number of instances of disciplinary actions.	Quarterly	Contractor' Personnel; and HR Specialist.	Employees' information; Internal Labor Regulation; CBA and other Trade Union/Workers' Organization's documents (minutes of Labor Conference, Social Dialogues, Trade Union/Workers' Organization's Fund, records of Trade Union/Workers' Organization's activities); Labor Contracts; Wage scale and pay slip; Documents on social, health, and unemployment insurance payments; Documents on occupational accidents and diseases; Grievance documents; and Discipline documents.
	Number of local people (separated by gender) working at the Projects	Quarterly	Contractor' Personnel; and HR Specialist.	List of local people (separated by gender)
External monitoring	Performance indicators listed above; and Labor Audit Report; Other indicators upon request by Lender.	Quarterly	HR Specialist	Upon request by the Lender

8.5.1 INTERNAL AUDIT

404. Apart from daily inspection, internal audits at planned intervals will be scheduled to ensure appropriate preventive actions are being taken as planned, and corrective actions are being carried out on a timely basis. The internal auditing program is shown in **Table 8-3**.

405. The contractor' personnel shall conduct internal labor and working condition management audit quarterly during the construction phase and semi-annually during the operation phase to ensure the performance of the project complies with the applicable standard. The template of the audit checklist is presented in **Table 8-3**.

Table 8-3: Internal Auditing Program			
Sl. No.	Audit/Inspection	Responsibilities	
		The Project Owner/Lender	The Contractor/Subcontractor/Primary Supplier
1.	Monthly inspection		x
2.	Quarterly self-audit		x
3.	Quarterly audit of Subcontractor/Supplier Management (during the construction phase)	x	
4.	Semi-annual Labor Compliance Self-Assessment (during construction and operation phases)	x	

8. Labor Management Procedure

8.5.2 REPORTING

Internal Reporting

406. Internal reporting is defined as communication between the project owner, the contractors, subcontractors, and primary suppliers. The internal reporting during construction shall include, but is not limited to:

- ▶ Quarterly self-audit report of contractor and primary supplier performance, including subcontractors' performance.
- ▶ Annual report of contractor/primary supplier management; and
- ▶ Annual report of the project's labor and working conditions management.

407. HR specialists/contractors and primary suppliers shall be responsible for the implementation of corrective actions for issued identified during the audits and assessments. A report on corrective actions implementation status shall be prepared and submitted to the contractor's personnel/HR specialist in the next audits

8.6 GRIEVANCE REDRESS MECHANISM

408. The contractor will assist and take necessary steps for collecting written complaints on behalf of the PIU and coordinate responses to all complaints. Both verbal and written complaints are to be entered into a Grievance Complaint Log as addressed when receiving a complaint all employees shall refer the complainant to the PIU or the resident engineer. The process of GRM is sorted out below-

- ▶ The person receiving a complaint shall ensure that the Grievance Complaint Log is completed.
- ▶ The form shall then be forwarded to the PIU expert who will assign it a number.
- ▶ The PIU expert shall ensure that all actions are made to close out the complaint.
- ▶ Information on proposed corrective action sent to complainant (if appropriate); the date the complaint was closed out; and Date response sent to the complainant.
- ▶ All complaints shall be responded to in writing, though a verbal response will be provided as well if this is more appropriate in the circumstances (e.g., where the complainant cannot read).
- ▶ All complaints must be responded to within two weeks of being received, even if the response is just a summary of what is planned and when it is likely to be implemented.
- ▶ Further correspondence should be given once the complaint is closed out.
- ▶ The PIU expert through the contractor will be responsible for providing a monthly report detailing the level of complaints and any outstanding issues to be addressed.
- ▶ Monthly reports will include an analysis of the type of complaints, levels of complaints, and action taken to reduce complaints.

409. The PIU expert shall file all documentation related to complaints in a file in his office.

8.7 CLOSURE OF THE CONSTRUCTION SITE AND CONSTRUCTION LABOR CAMPS

410. The contractor will hand over the borrowed land to the individuals or government after completing the entire project activities while with complying national or international standards. The closure of the construction site and construction labor camp will be done considering the below aspects-

- ▶ The temporary infrastructure should be demolished considering the baseline environmental aspects after completing the project time;
- ▶ Materials, scarps, debris, etc. should be relocated or vacuumed as per the standard procedure;
- ▶ All of the machinery, vehicles, and equipment should be relocated without hampering the existing environmental features;
- ▶ The land should be handed over by making its natural state like before borrowed;
- ▶ The labor camps should be ensured empty before demolishing and safe exit of the workers will also be ensured;
- ▶ Environmental and social assessment should be conducted after or during the closure of the construction site and construction labor camps for avoiding any environmental and social hazards;

411. Remain wastes from the construction camps should be properly dumped into a designated dumping yard during the closure of the labor camps.

9 EMERGENCY RESPONSE PLAN AND DISASTER MANAGEMENT

9.1 INTRODUCTION

412. Accidents or unforeseen risks to the workforce, local populations, and the environment may occur during project construction. As a result, proper planning from the inception is critical to ensuring a system of coordinated action between contractors and local governments. Aside from giving emergency direction, unrecognized hazardous situations can exacerbate an emergency, and an emergency response plan can help eliminate them. The planning phase identifies problems that can be addressed before an emergency arises. Furthermore, an emergency response plan raises safety awareness and demonstrates the contractor and sub-contractors' commitment to workers, the community, and the environment.

9.1.1 PURPOSE

413. The purpose of this document is to describe the project's emergency response and crisis management system and provide clear guidelines to the Management Team and the Site Construction Team for the response to and control of any emergency or crisis associated with company activities. The objective is to:

- ▶ Control or limit the effect of a range of potential emergency incidents that may occur within the project area.
- ▶ Ensure safe, efficient, and orderly evacuation of all persons if necessary.
- ▶ Ensure the safety and well-being of all personnel on the premises during an emergency incident, including assigning responsibilities for specific actions.
- ▶ Outline the procedures to be followed, including communication protocols, to ensure all vital information is communicated to relevant stakeholders as soon as possible.
- ▶ Contain and control an emergency incident to minimize the effects on people, property, and the natural environment so that normal operations can be resumed; and
- ▶ Define & record emergency training requirements and emergency plan review.

9.1.2 SCOPE

414. This Emergency Response Plan (ERP) will be applicable for all workers, employees and visitors involved in the road construction activities.

9.1.3 REGULATORY FRAMEWORKS AND SAFEGUARDS

415. The relevant provisions under the following regulations and guideline will be applicable towards the implementation of the Emergency Response Plan and these are placed in **Table 9-1**.

Table 9-1: Related Provision and Acts	
Reference	Full Title
National Labor Laws	Bangladesh Labor Rules 2015
National Labor Rules	Bangladesh Labor Act 2006

9.2 ROLES AND RESPONSIBILITIES

9.2.1 INCIDENT COMMANDER (IC) - PROJECT MANAGER

- ▶ The Project Manager is the first person in charge of project safety, taking overall and leading responsibility for managing the contractor's safety production works.
- ▶ According to the occupational health and safety plan, combining the actual situation of this project, the Project Manager will establish a sound project organization, perfect the distribution of resources required by this project, and constitute the responsibility system of occupational health and safety production.
- ▶ The Project Manager will ensure the implementation and improvement of the safety and health plan/guidelines and the fulfillment of the related Acts, laws, regulations, and obligations required by the approved safety and health plan, taking overall responsibility for occupational health and safety accidents.

9.2.2 SITE EMERGENCY CONTROLLER (SEC) – DEPUTY PROJECT MANAGER

- ▶ Overall control of personnel and resources.
- ▶ The EMT will support and advise the Site Safety Supervision as necessary.
- ▶ Serves as public relations spokesperson or delegates to some staff members responsible for working with news media regarding any disaster or emergency. Also, assure proper coordination of news releases with appropriate corporate staff or other designated people.

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9.2.3 SAFETY ADVISOR- PROJECT SAFETY SPECIALIST

- ▶ The Safety and Health officer will take charge of establishing, operating, supervising, and inspecting the health and safety management plan in the Project Manager's relationship.
- ▶ The Safety and Health officer will lead and direct work on occupational health and safety production at the project site, taking direct leadership responsibility for production, organization, and mobilization.
- ▶ The Safety and Health officer will oversee the implementation and realization related to occupational health safety management.
- ▶ The Safety and Health officer will organize training about occupational health and safety management and occupational health and safety knowledge to enhance the employees' awareness of occupational health and safety, enrich their understanding of occupational health and safety, and promote the development of occupational health and safety management.
- ▶ The Safety and Health officer will oversee the compilation and implementation of Safety Management Plan, preparation of monthly security reports, and safety inspection & assessment work in site.
- ▶ The Safety and Health officer will oversee the investigation and settlement of health and safety accidents.

416. A key aspect of effective emergency response is a communication system that can rapidly transmit accurate information. This requires reliable communication equipment, strong procedures, and well-trained personnel.

9.2.4 SITE EMERGENCY RESPONSE TEAM (SERT)

417. The SERT is an initial response team to any emergency incident onsite and comprises of personnel responsible for firefighting, rescue operations and first aid as specified in the applicable regulatory requirements. The role of the SERT is to:

- ▶ Provide immediate response.
- ▶ Assess the alert level.
- ▶ Make the initial notifications.
- ▶ Secure and contain the site.
- ▶ Co-ordinate with the SEC, Construction Area Supervisors and arriving off-site emergency response personnel.
- ▶ Respond to distress calls and assist in rescue and evacuation;
- ▶ Administer first aid as required and if required, arrange for medical evacuation and other back up as needed;
- ▶ Keep an accurate log of all treatments given and times; and
- ▶ Maintain the response until the situation is resolved.

9.2.5 CONSTRUCTIONS MANAGER

- ▶ To provide support to IC, SEC, and SERT.
- ▶ To manage and task additional resources to support the construction team.

9.2.5.1 SITE ENGINEERS:

- ▶ Initiate initial response actions if they are the first person on the scene.
- ▶ Restrict access to the incident scene and surrounding area as the situation demands. Take any other steps necessary to minimize any threat to health and safety.
- ▶ Request medical assistance, if necessary.
- ▶ Verify substance released and obtain Safety Data Sheets, as necessary;
- ▶ Coordinate further response actions with the construction manager, Site Emergency Controller, and Emergency Response Team (SERT).

9.2.5.2 SECURITY COORDINATOR

- ▶ Manage the project security of the onsite workers, employees, and visitors;
- ▶ Provide ongoing monitoring of the context and the risks during the emergency;
- ▶ Proactively adopt procedures and policies to the situation at hand;
- ▶ Monitor entry and exit of personnel into and out of premises;
- ▶ Provide security briefings to site workers and employees regularly.

9.2.5.3 LOGISTICS COORDINATOR

- ▶ Coordinate logistic request and material request arrangement.
- ▶ Advises SEC and SERT on logistic issues.
- ▶ Arrangements transportation; and

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- Coordinate domestic requirements, such as food, refreshments, etc.

418. The organogram of the Site Emergency Response Team (SERT) has been presented in **Figure 9-1** and Emergency Action Procedures in **Figure 9-2**. The contact details of the SERT have been presented in Annex 9.1.

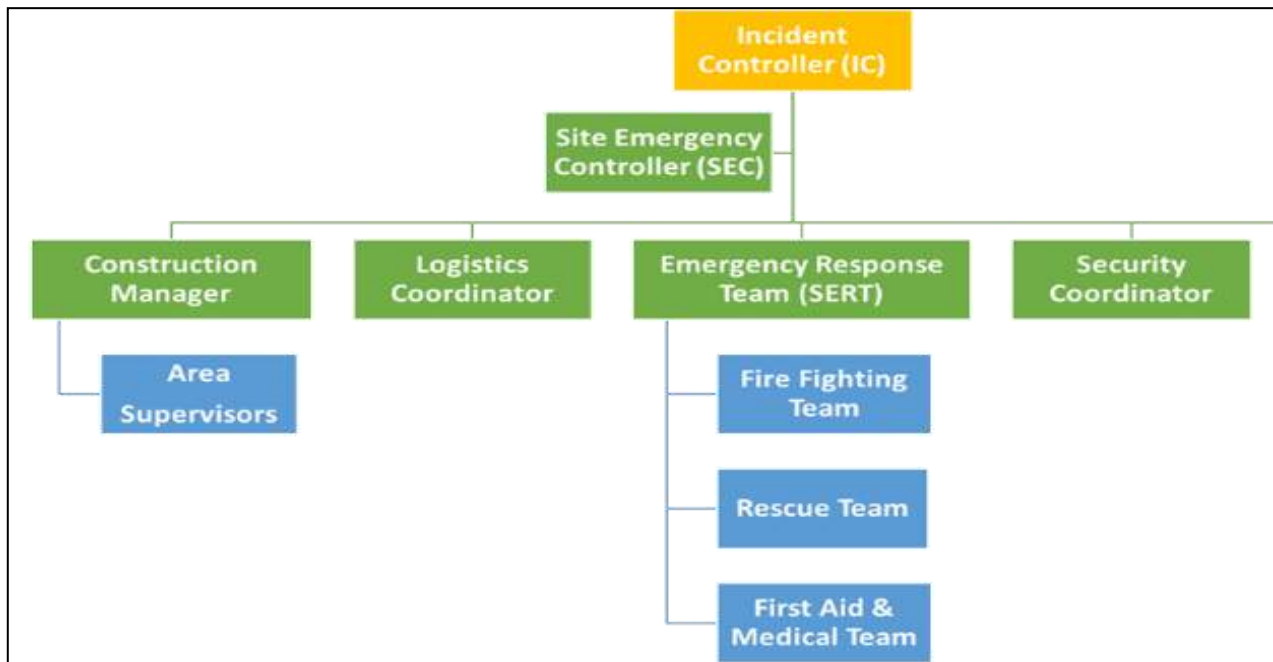


Figure 9-1: Organogram of the Onsite Emergency Management Team (EMT)

9. Emergency Response Plan and Disaster Management

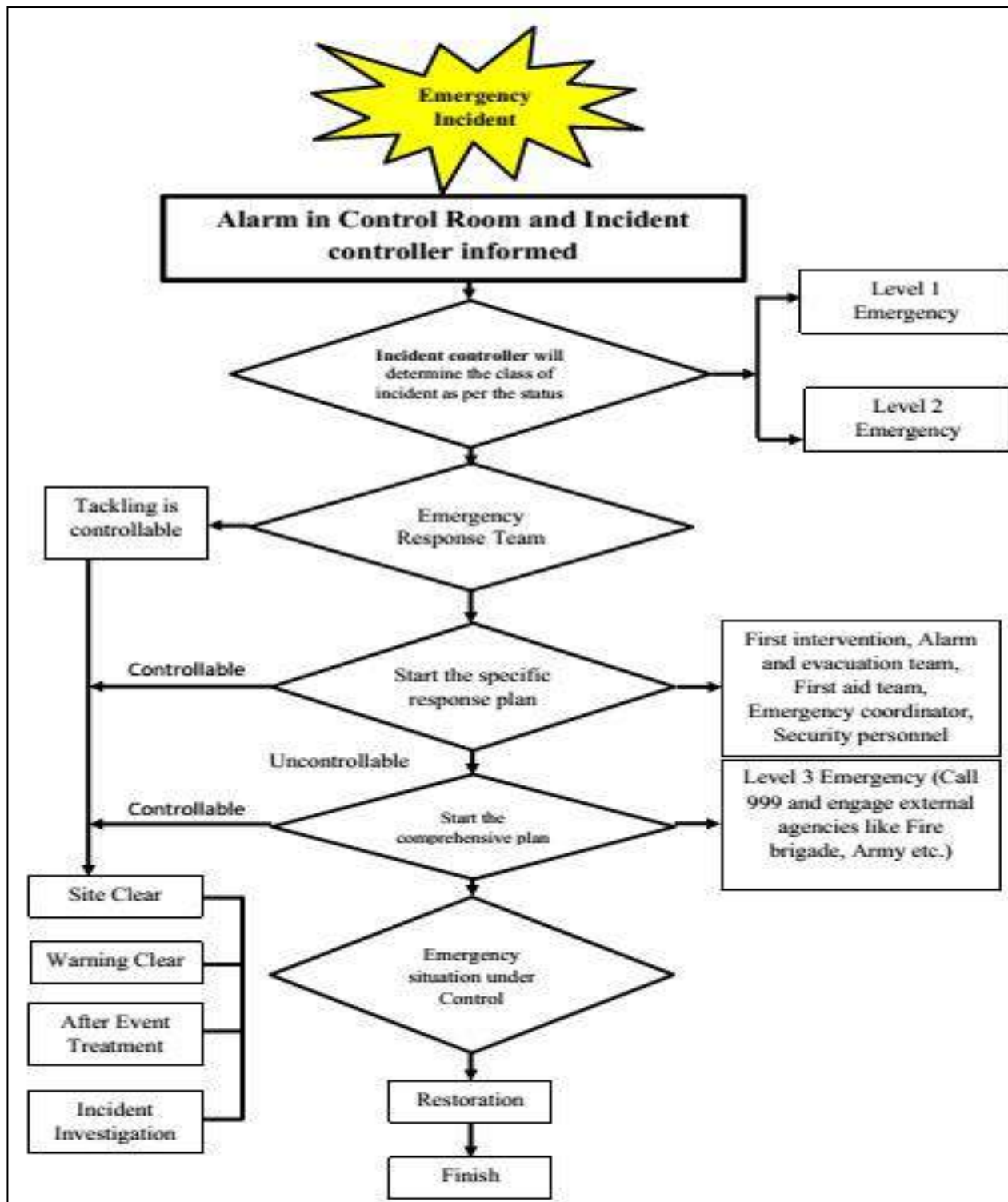


Figure 9-2: Emergency Action Procedures

9.3 PRE-EMERGENCY PLANNING

419. This section provides the potential emergency scenarios identified during the site risk assessment exercise and can be faced by site supervisors/managers. Based on the working activities and likelihood, an approximate emergency scenario has been presented in Annex 9.2.

9.4 EMERGENCY CLASSIFICATION

420. The types of on-site emergency scenarios are based on the magnitude and severity of the emergencies considered in the earlier section. The site has categorized three broad levels of emergency scenarios, namely:

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- ▶ **Level 1:** The emergency is confined to the area of occurrence and can be effectively and safely managed by the emergency equipment and available resources. The site emergency team (SET) will be active during this emergency. SET team information is presented in Annex 9.3.
- ▶ **Level 2:** The emergency has occurred and spread to a small area, but it can be managed by the emergency equipment and resources available at the site. The head office's management will be involved during this level 2 emergency. SERT team information is presented in Annex 9.3.
- ▶ **Level 3:** This is an emergency or an incident which:
 - Cannot be effectively and safely managed or contained at the location of occurrence by available resources and emergency equipment.
 - Additional external support is required as it can potentially exert effect beyond the site boundary and can be catastrophic.
 - This level of incident and emergency is likely to affect the neighboring population, industries, property and environment outside of the site boundary.
 - The management and control of this emergency scenario require active support and involvement from the country-level and district administrations.
 - An external agency will be involved during this level 3 emergency. The information about the external agency team is presented in Annex 9.3.

9.5 LEVEL OF PRIORITY

421. The level of response required shall depend upon the seriousness of the incident. For any crisis or emergency occurrence, response priorities shall ensure the protection of:

- ▶ First Priority: People
- ▶ Second Priority: Environment
- ▶ Third Priority: Assets
- ▶ Fourth Priority: Contractual and/or commercial arrangements
- ▶ Fifth Priority: Project and Partner reputation

422. The Incident Commander (IC) and Site Emergency Controller (SEC) will decide upon the level of emergency and deployment of external emergency responders during an emergency scenario. The external agencies, as identified by the site, are:

- ▶ Fire Service & Civil Defense Station, Jashore
- ▶ Rapid Action Battalion (RAB) unit – 06;
- ▶ Jashore Police Station;
- ▶ Jashore General Hospital.

9.6 EMERGENCY NOTIFICATION & EVACUATION PROCESS

9.6.1 NOTIFICATION

423. The Project Manager must be informed of any on-site incidents as soon as possible. The Project Director shall be notified of any incident with actual or potential significant off-site impacts on people or the biophysical environment within 12 hours of the Applicant or other relevant party undertaking the development becoming aware of the incident. Full written details of the incident shall be provided to the Project Director within seven days of the date on which the incident occurred. The Project Director may require additional measures to address the cause or impact of any incident, as it relates to this consent, reported per this condition.

9.6.2 EVACUATION

- ▶ Any emergency, evacuation must take place.
- ▶ All personnel and workers shall act per directions from Site Supervisors and SERT personnel to evacuate the construction site immediately.
- ▶ All shall move calmly to the nominated assembly area and shall not leave the said area until all is clear with the Site Emergency Controller (SEC) and SERT.
- ▶ If a clear danger exists, the Site Emergency Controller (SEC) will call emergency services.
- ▶ The Incident Commander, Site Emergency Controller, Site Construction Manager, and SERT may reassess the situation to determine whether immediate action should be taken.
- ▶ If the designated assembly point becomes endangered or the evacuees need to remain outside the premises for an extended period, personnel will be relocated to a suitable alternate assembly point at the direction of the IC and SERT.

424. The whole process of evacuation has been depicted in **Figure 9-3**.

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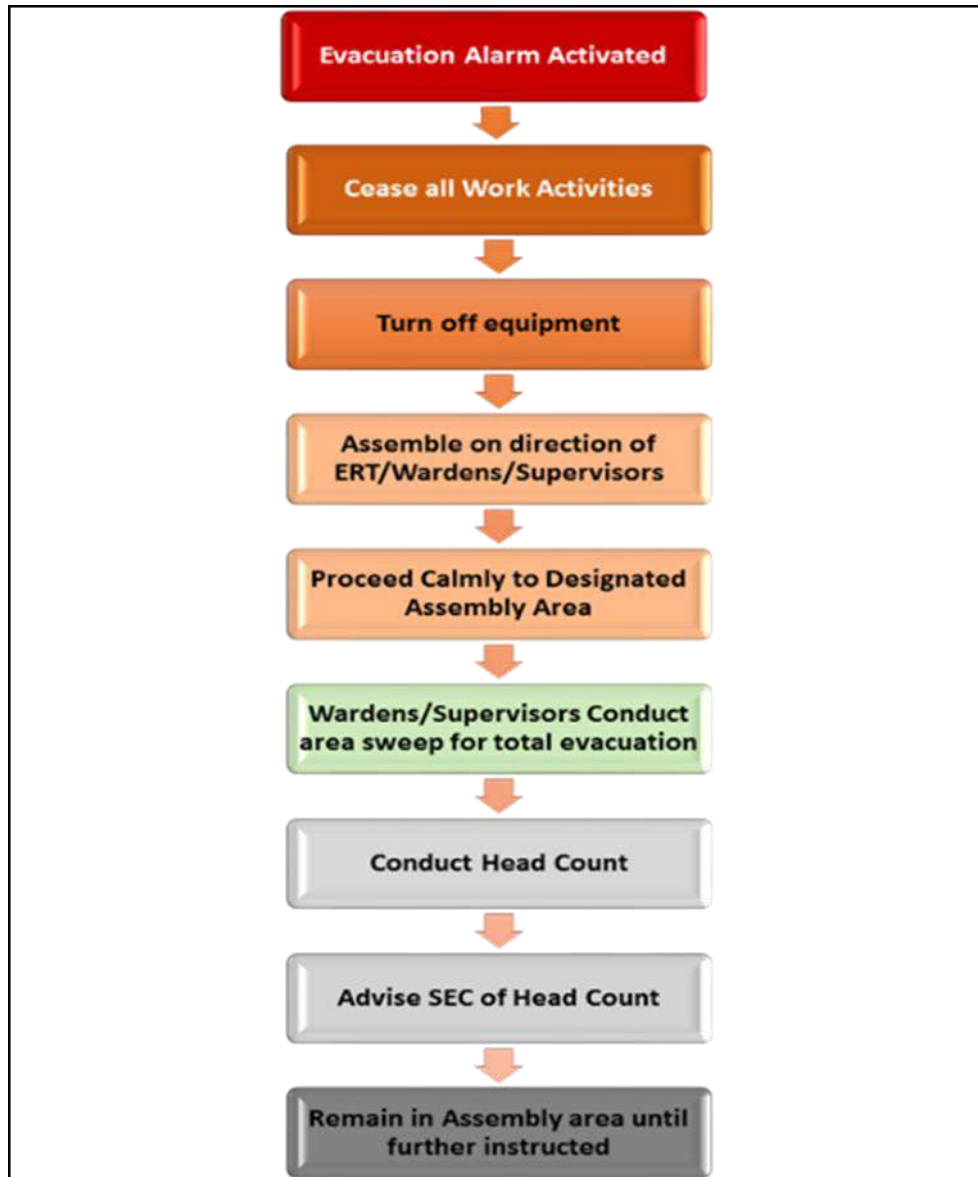


Figure 9-3: Evacuation Process Flow Chart

9.6.3 HEAD COUNT

- ▶ After evacuation, all persons on site, including visitors and contractors, shall assemble at the assembly point.
- ▶ The SERT will conduct a roll call to ensure all persons are accounted for, including visitors and workers. The muster roll and visitor register need to be maintained by the contractor, and they will be readily available to SERT after an emergency.
- ▶ The list of missing persons shall be advised to the Site Emergency Controller, who will then advise the Emergency services for their rescue and further action as necessary.
- ▶ No personnel shall search and rescue for missing persons in endangered areas except for the specialized and trained SERT personnel and external emergency services, if any.

9.6.4 RE-ENTRY

425. Re-entry to the site will not occur until the Emergency Services advises it to do so. The site emergency controller will relay this to all personnel.

9.6.5 EMERGENCY MUSTER POINT

426. The emergency muster point of the Site in a different construction site location. During an emergency, the personnel of the contractor/sub-contractor workers will be assembled at this emergency muster point. The following safety precautions will be taken for the emergency muster point:

- ▶ The entry of goods vehicles will be stopped during an emergency to minimize exposure to the secondary emergency scenario, such as an accident owing to traffic movement near the emergency muster point.

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- ▶ The Site will use physical road barriers to separate this area from any internal traffic movement during an emergency;
- ▶ The SERT will assist the Site personnel (which includes visitors) in reaching at the emergency muster point;
- ▶ The security guard at the main entrance will manage the traffic movement on the site access road during emergencies to prevent traffic congestion that may occur by the goods vehicles plying in and out of the construction area.

9.6.6 PUBLIC COMMUNICATION DURING EMERGENCY

427. The following safety precautions will be taken during the emergency that demands protection to the public:

- ▶ Immediately block the public road outside the factory and allow emergency vehicles only.
- ▶ Continuously announce mike in the nearest community for evacuation if necessary due to the severity of the emergency
- ▶ Call external government authority (Fire service and civil defense, Union perished, Police, etc.) to take control of the community according to government protocol.

9.6.7 ASSEMBLY POINTS

428. In an emergency such as fire, non-essential persons and injured persons are evacuated from the affected area to the safest area, i.e., the assembly point. The assembly point is the least affected by downwind direction and near the road. The senior officer will oversee this point. The total capacity of 04 assembly points is to accommodate about 300 persons.

429. Non-essential personnel shall assemble at the Emergency Assembly Point as announced by the Site Incident Controller. During handling the emergency, if more workforces are required, then from the assembly point, non-essential persons will be called as per the requirement, and it will be decided by SMC. All the assembly Points should be identified with the suitable signage which is presented in **Figure 9-4**.



Figure 9-4: Signage of Emergency Assembly Point

9.7 EMERGENCY RESPONSE FOR TYPICAL EMERGENCIES IDENTIFIED

430. This section describes the emergency response procedure that needs to be implemented during typical emergencies. The emergency contact number, agency, equipment, training, etc., are presented in Annex 9.1 to Annex 9.5

9.7.1 FIRE

431. During any fire incident, the site needs to follow the following instructions to ensure the resurrection of safe working conditions:

- ▶ The person who recognizes the fire must activate the nearest fire alarm or inform the construction Area Supervisor;
- ▶ The IC will declare the emergency and activate the Emergency Response Team (SERT);
- ▶ The SERT will assess the alert level and co-ordinate with the SEC, construction Area Supervisors and arriving off-site emergency response personnel;
- ▶ Apart from the trained fire fighters, no other personnel will be allowed at the place of incident. The fire fighters must ensure that they have wear essential PPEs such as safety suit, safety helmet, self-containing breathing apparatus (SCBA) based on the requirement and magnitude of the fire;
- ▶ Disconnect utilities and equipment unless doing so jeopardizes site safety;

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- ▶ The fire will be isolated by removing the surrounding inflammable material. This will be done without compromising the safety of the firefighters to the extent possible;
- ▶ The small fires will be extinguished by using appropriate fire extinguisher (based on the class of the fire);
- ▶ The fire hydrant system and on-site fire tenders will extinguish big fires. The stormwater lock gate should remain closed during use of the fire hydrant system to prevent exit of water used for fire extinguishing purposes;
- ▶ Rescue and attend the injured personnel and call the medical emergency number, if required.

432. The fire extinguishers to be used based on the types of fire have been enumerated in **Table 9-2**.

Table 9-2: Types of Fire Extinguisher			
Sl. No	Causing Agent	Classification of Fire	Type of Extinguisher
1.	Combustible Packing Material	Class “A” Fires	Dry Chemical Powder & Water
2.	Petroleum oil	Class “B” Fires	Foam Type
3.	Gas	Class “C” Fires	CO2
4.	Metal	Class “D” Fires	Dry Chemical Powder
5.	Electrical Panel	Class “E” Fires	Dry Chemical Powder
6.	Cooking Fire	Class “K” Fires	Wet Chemical Type

9.7.2 FUEL AND CHEMICALS SPILLAGE

433. In case a large chemical Spill has occurred:

- ▶ Immediately notify the designated official such as construction Area Supervisor;
- ▶ The IC will declare the emergency and activate the Emergency Response Team (SERT);
- ▶ The SERT member must wear adequate PPEs prior starting of the spill management procedure;
- ▶ Secure the area and alert other site personnel. If required initiate an emergency evacuation process;
- ▶ No person will be allowed to involve in spill containing activity unless they are trained to do so;
- ▶ Contain the spill with available equipment (e.g., pads, booms, absorbent powder etc.). In case of acid spillage spray, dilute sodium carbonate and plenty of water. In case of caustic spillage spray, dilute citric acid and plenty of water. In case of oil spillage try to stop its flow, close the main valve of the storage tank or isolate the pipeline (in case of leakage from flanges) by blinding. Collect the spilled chemical in container by use of spill kit;
- ▶ Do not allow the flow of spilled chemicals in the storm water drain. Channelize it to Waste water treatment plant through connecting drains after treatment send to ETP.
- ▶ Attend the injured personnel and call the medical emergency number, if required;
- ▶ Dispose of the spilled chemicals in environment friendly manner. If require, consult to the Department of Environment (DoE) Bangladesh in this regard.

434. In case a small chemical Spill has occurred:

- ▶ Immediately notify the designated official, such as construction Area Supervisor;
- ▶ If toxic fumes are present, secure the area (with caution tapes or cones) to prevent other personnel from entering.
- ▶ Deal with the spill per the instructions described in the SDS.
- ▶ Small spills must not be handled without wearing the proper PPEs.

9.7.3 LEAKAGE OF GAS

435. The following procedure will be followed in case of leakage of gas:

- ▶ The person who smells the gas odor or identifies the gas leak should immediately inform the construction Area Supervisor or directly to IC or SEC. Automatic gas detectors installed in the process areas will activate the alarm automatically after any gas is detected in the process area.
- ▶ An emergency will be declared;
- ▶ Construction Area Supervisors will initiate the evacuation of the workers from the incident scene through safe exit in a disciplined manner. Workers will be instructed to calm and not to be panicked;
- ▶ The SERT will assess the alert level and co-ordinate with the SEC, Area Supervisors and arriving off-site emergency response personnel;
- ▶ For LPG Gas Leakage from the LPG cylinders:

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- Any LPG cylinder which develops a leak should be promptly removed to an isolated open place away from any source of ignition;
- Cylinder with valve leakage needs must be capped immediately and tagged by mentioning the defect;
- In case of leak from the LPG pipe, the cylinder regulator knob/ valve needs to be close;
- Do not try to repair the appliance or any part of the system when pipe line or appliance in use;
- Use adequate PPEs;
- Do not use naked lights to detect the leak;
- In case of heavy Leak, stop all ignition sources in the vicinity and evacuate all the people to a safe area;
- In case of outbreak of fire, trigger the firefighting procedures as specified in previously.
- Call first aid team and get medical attention as quickly as possible. In case of any accident such as burn and asphyxiation send the affected people to the OHC and hospital.

436. Risks of hazardous spills and uncontrolled pollution due to the plant's effluents of Construction, phase the mitigation impacts of a hazardous spill's information presented in Annex 9.6.

9.7.3.1 FOR NATURAL GAS LEAKAGE

- ▶ The person who smells the gas odor should inform the concerned person;
- ▶ Do not use a mobile phone or switch on electrical installation as this could cause an explosion.
- ▶ Evacuate the people from gas leakage surrounding area and send them to a safe area;
- ▶ Immediately contact the respective operators who are handling the unit.
- ▶ Instruct operators to close all shutoff and isolation valves and identify the leakages.
- ▶ In case of an outbreak of fire, trigger the firefighting procedures as specified previously.
- ▶ Call the first aid team and get medical attention as quickly as possible in case of an accident such as burn and asphyxiation;
- ▶ Coordinate with the Emergency management team and act as per their guideline

9.7.4 MEDICAL EMERGENCY

437. In case of any medical emergency

- ▶ If the person cannot walk, then call the emergency phone number for ambulance and assistant. Inform construction manager
- ▶ Provide the following information:
 - ▶ Nature of medical emergency;
 - ▶ Location of the emergency (building, area);
 - ▶ Name of the person, department.
- ▶ Do not move the victim unless necessary.
- ▶ Call the personnel trained in CPR and First Aid to provide the required assistance prior to the arrival of the ambulance
- ▶ In rendering personnel exposed to hazardous materials, consult the Safety Data Sheet (SDS) and wear the appropriate personal protective equipment. Attempt first aid ONLY if trained and qualified
- ▶ Do remember:
 - In case of first and second-degree burns, expose the affected area under cold water for 15-20 minutes. Do not put any chemical such as toothpaste etc., on the affected area and do not apply synthetic clothing on the burnt surface;
 - Do not use water in case the person is exposed to water-reactive chemical;
- ▶ In case of electrocution, please follow the following steps to revive the person suffered from electrical shock:
 - Ensure that the source of electrocution is de-energized if the victim is still in contact with the source of electrocution. Do not touch the victim until the source has been removed or disconnected.
 - Apart from the trained first-aiders, do not allow any other person to go near to the victim.
 - Conduct a head-to-toe physical examination of the victim, which will include identification of the different contact points and thermal burn. Burn injuries caused by an arc or thermal wave must be managed as burn injuries.
 - Check if the victim is able to communicate and if he/she is able to talk then ask for if the victim is experiencing any pain or able to move.
 - Assess for any fractures and neurological deficits caused by the shock. Do not move victim in case of any neurologic deficit such as spinal injury; keep the person in lying position unless medical help arrives.
 - In case victim is not able to communicate, then monitor victim's cardiac rhythm. Provide respiratory support to the victim if he/she is not able to breathe properly (asphyxiation).
 - Monitor the cardiac rhythm of the victim and if required start cardiopulmonary resuscitation (CPR) to the victim. The CPR must be given by trained first-aiders.
 - Based on the impact of the injury transfer the person to the nearest hospital on priority basis

9.7.5 TERRORIST ATTACK OR BOMB THREAT

438. For terrorist attack and bomb threat

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- ▶ The person perceiving the attack should immediately call emergency numbers of the police department as provided in the Annex 9-3.
- ▶ Upon receiving such information, the IC will initiate a short meeting with SERT, security and other department. All types of security aspect and safeguards, individual roles and responsibility will be discussed
- ▶ Strengthen security in all entrance along with arms.
- ▶ Prevent any associate from entering the factory.
- ▶ Tell the labors and visitors not to engage with any terrorists.
- ▶ Instruct general workers and management personnel not to touch any suspicious item.
- ▶ Inform SERT, area supervisor or security personnel about presence of any suspicious item.
- ▶ Weapons of mass destruction likely to be employed by terrorists. Do not try to remove, deactivate or detonate any explosive or bomb.
- ▶ If the source of the threat is outside, the SERT will:
 - Reverse-evacuate all people into pre-identified safe location i.e., all the Site personnel will be moved inside of the buildings near of the project (as the conditions inside the buildings are safer than outside)
 - Close all doors leading into such safe location to prevent entry of terrorist;
 - Shut down all utility systems to the building (gas and electricity are the priorities);
 - All people assume the duck, cover, and hold position on the ground;
 - Allow personal and staff to leave at their own discretion once cleared to do so by public safety, emergency management, or military authorities;
- ▶ If the source of the threat is inside the plant the SERT will:
 - Evacuate site personnel to a safe distance outside of building if possible;
 - Follow the primary fire drill route, or the alternate route if the primary route is too dangerous;
 - Instructors and managers take roll after evacuating;
 - Immediately notify the IC of any missing people;
 - No one may re-enter the building(s) until entire building(s) is declared safe by public safety, emergency management, or military authorities.
- ▶ Inform security supervisor about the required safety measures and communicate the same to down the level.
- ▶ Inform the local police station and administrative officer immediately and take all types of help required.
- ▶ Call on administrative office of neighboring factory and request for help by providing additional security. Phone numbers are available in emergency contact diary.

9.7.5.1 WORKERS AND LOCAL COMMUNITY AGITATION

- ▶ The person who discovers the unrest should dial the emergency contact number and notify the IC or SEC;
- ▶ IC must warn the site personnel of the unrest and mobilize SERT.
- ▶ The SERT will ensure the safety of labor and site personnel in the immediate vicinity.
- ▶ IC will instruct to seal off the affected area, if possible.
- ▶ The IC will instruct the site security personnel to isolate the agitated workers.
- ▶ In case of agitation caused by the local community, the security will close all the entry gates and prevent outsiders inside the site.
- ▶ Based on the issue's magnitude, IC will call the Jashore Police Station for help.

9.7.5.2 MALICIOUS ACT SUCH AS THEFT AND VANDALISM

439.If MGI receives any information on the malicious act or vandalism caused by the worker (s) then:

- ▶ The worker (s) involve in such activity will be identified and the site security, area supervisor and respective contractor agency must be informed.
- ▶ The designated department will issue a show cause notice.
- ▶ A formal hearing process inclusive of self-pleading will be conducted in presence of IC and other designated personal.
- ▶ If a person is suspected of carrying a weapon to site:
 - The person who believes someone has a weapon should immediately dial emergency number;
 - The person who believes someone has a weapon should immediately notify the IC and/or area supervisor and nearest security person;
 - If suspect threatens another person with a weapon, do not engage to disarm them and remain calm;
 - The security person will dis-weapon the worker in case they are carrying any weapons if possible;
- ▶ In case of any fight among workers:

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- The person who witnesses an assault or fight should dial emergency contact;
- Notify the incident to Commander (IC);
- IC will initiate emergency response and security and SERT will be deployed to diffuse the situation;
- The security and SERT should seal off area where assault/fight took place, if possible;
- The SERT will document all activities and ask victim(s)/witness (es) for their account of incident, including details such as weapon use, physical injury causing substantial pain or impairment of physical condition.

440. Based on the magnitude of the issue the local police station will be involved and involved person may be handed over to them.

9.7.5.3 SYMPTOMS

441. The following symptoms may appear 2-14 days after exposure*

- ▶ Fever
- ▶ Cough
- ▶ Throat Sore
- ▶ Running nose
- ▶ Shortness of breath/ difficulty in breathing

*This is based on what has been seen previously as the incubation period of MERS-CoV viruses

9.7.5.4 MONITORING

442. Once the workers reach the construction site, they are given a brief site safety training that includes the following:

- ▶ Information on appropriate social distancing and hygiene practices, including:
 - ▶ Avoid physical contact with others and maintain a distance of at least 3 feet whenever possible.
 - ▶ Appropriate cleaning practices (i.e., washing hands frequently with soap and water for at least 20 seconds, or, if soap and water are not immediately available, using alcohol-based hand sanitizer and rubbing hands until they are dry;
 - ▶ Alternatives to shaking hands upon entry and the importance of workers not touching their own faces (mouth, nose, eyes).
 - ▶ Wearing masks over their noses and mouths to prevent them from spreading the virus
 - ▶ Remove and dispose of any PPE being used.
 - ▶ The importance of staying home if they are sick.
 - ▶ The importance of cleaning and sanitizing frequently touched surfaces like tools, handles, and machines.
 - ▶ The need to report any safety and health concerns.
 - Worker screening is done (checking body temperature with infrared thermometer) to reduce sick workers entering the job site;
 - While construction is ongoing supervisors keep a close watch and monitor adherence to social distancing by the workers. When required the workers are split into smaller groups to adhere to the 2m or 6ft social distancing rule;
 - To the extent possible, lunch break times are also staggered so that large group of workers does not sit at one place

443. Social distancing and physical distancing are explained to the persons working the field. However, they were advised not to leave the working vicinity as well as the labor shed. If anyone have to leave the site, they must maintain quarantine.

9.7.5.5 EMERGENCY RESPONSE

444. All employees must use site emergency contact number to concern departments including Contractor, Sub-Contractor and other stakeholder. In case of any suspected cases, Corona specific call center No-16263 (DGHS) or 333 must be contacted.

9.7.6 EARTHQUAKE

- ▶ During an Earthquake event
 - Stay calm and await instructions from the Emergency Coordinator or the designated official.
 - Avoid overhead fixtures, windows, filing cabinets, and electrical power.
 - Assist people with disabilities in finding a safe place.
 - Protect your head.
 - Evacuate as instructed by the Emergency Coordinator and/or the designated official.
- ▶ After the Earthquake Event

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- Visually inspect the structures such as buildings, storage tanks for any visible cracks. Identify critical and weak areas of the building and organize to support them adequately to prevent collapse.
- Isolate electrical supply if required.
- Isolate all pipelines of steam, natural gas etc. in case of any leakage.
- Empty such tanks, which are found in relatively unstable conditions.
- Take a review of material storage and ensure that stored materials are kept in safe manner.
- Ensure that LPG cylinders are removed from manufacturing areas and stored in the designated shed in safest manner. Also identify leaked cylinders if any
- Immediate ready to use all Emergency equipment like stretchers, breathing equipment, PPEs, Dewatering, portable welding gas cutting equipment, Spill kits, emergency lights, Battery-operated public-address equipment, ropes, lifting tackles, trolleys, emergency medical equipment, etc.
- Inspect hazardous chemicals storage area to comply with normal storage safety requirements. Also, inspect secondary containments and restore their integrity wherever necessary.
- Inspect the firefighting equipment provided at site.
- Inspect if the electrical panel and other sources of ignition for any fault and damage
- Ensure that flammable liquids i.e., Petrol, Diesel and other petroleum products are stored under secondary containment with due precautions.

445. After such inspection, notify the top management about the damage that has been identified.

9.7.7 FLOOD

446. In case of any flood, an incident flood alert communication procedure will be initiated as discussed below:

- ▶ **Red Alert:** This will be triggered when the floodwater level rises within 1 foot of the working site level. All preparations for temporary protection are to be started at this state. This includes:
 - Giving sufficient notice to evacuate before flooding;
 - Initiate protection of raw materials, finished goods, critical equipment, records and electronic equipment as best as possible;
 - Take normal actions for building evacuation and proceed to safe location;
- ▶ **Orange Alert:** This will be triggered when floodwater level will raise within 2 feet of working site level. During red alert:
 - Evacuate all affected spaces immediately;
 - Relocate to a safe place on the upper floors of the building;
 - Prevent personnel from wading through flood waters of any depth;
 - Do NOT try to leave the building in a car. In case anyone needs to evacuate, he/ she must wear life-jackets or similar flotation devices.

447. The general emergency instruction for flood emergency is furnished below:

- ▶ Evacuate the people from flooded area and send them to a safe Area.
- ▶ Switch of the power supply from effected area.
- ▶ Remove obstructions from the drain.
- ▶ Coordinate with the SERT and take action as per their guideline.

448. Based on the magnitude of the flood incident, the IC and SEC will decide upon involving outside agencies during the flood scenario based on the emergency classification as mentioned above.

9.7.8 WINDSTORM

449. The nature of the wind storm provides for more warning than other natural and weather disasters. The following responses need to be implemented:

- ▶ Once a storm alert has been issued
 - Stay calm and await instructions from the Emergency Controller or the designated official
 - Continue to monitor local weather stations and radio stations for instructions.
 - Stay away from the riverside.
 - Collect drinking water in appropriate containers.
- ▶ Once the storm has arrived
 - Remain indoors, specifically in small interior rooms on the lowest floor and without windows,
 - Stay away from doors and windows and potential falling objects such as electrical poles, scaffolding, cable trays, etc.
- ▶ After the cyclone
 - Inform the Emergency Management Team to investigate the property loss for further action.
 - Immediately notify the SERT for any missing personnel

9. Emergency Response Plan and Disaster Management

450. Based on the magnitude of the wind storm incident, the IC and SEC will decide on the level of emergency and deploy external emergency responders.

9.8 EMERGENCY RESPONSE EQUIPMENT

451. The following emergency response equipment namely:

- ▶ Firefighting Equipment: The firefighting equipment includes:
 - Fire extinguishers;
 - Hose reel and fire hydrant boxes;
 - Fire water tank;
 - Fire pumps;
 - Fire tenders;
- ▶ Personal Protective Equipment (PPE)
 - Fire retardant suits;
 - Self-containing breathing apparatus;
 - Safety helmet, safety goggles, safety vest.
- ▶ Medical Aids
 - Ambulance.
 - First aid boxes.
- ▶ Spill Control kit.

452. The detailed list of the emergency equipment is furnished in the Annex 9-4 of this response plan. All the emergency response equipment specified in the Annex shall be inspected and maintained on a monthly basis and records maintained.

9.9 EMERGENCY RESPONSE TRAINING

453. The aim of emergency response training is to build the capacity of Project employees and improve preparedness and response at all levels before, during, and after emergencies. The focus of emergency response training is generally on improving the participants' technical skills but also on personnel and team management. It also aims to improve emergency response coordination and the quality and availability of emergency management tools/equipment.

454. Per the relevant provision of the Bangladesh Labour Act, 2006 and Bangladesh Labour Rules, 2015, all workers or at least 18% of the workers employed in the project, shall be trained on the following emergency response aspects:

- ▶ Fire-fighting.
- ▶ Emergency rescue operation;
- ▶ First aid; and
- ▶ Portable fire-fighting equipment usage.

455. The trained workers shall be divided into fire-fighting team, rescue team and first aid team (6% members in each team) and records related herewith shall be preserved in accordance with Form 22 (Annex 9-5) of the previously mentioned Rules.

456. The members of firefighting team, rescue team and first aid team shall wear the prescribed uniform while conducting their respective operations and the dress code shall be as follows:

- ▶ Firefighting team: yellow coloured apron, in rear of which 'FIRE' shall be written in red colour.
- ▶ Rescue team: yellow coloured apron, in rear of which 'RESCUE' shall be written in red colour.
- ▶ First aid team: White coloured apron, in rear of which 'FIRST AID' shall be written in red colour.

9.10 EMERGENCY DRILLS/EXERCISES

457. Fire drills and emergency evacuation drills shall be arranged at least once in every six-month period and records of such drills shall be maintained in Form 22 in the Annex 9-5. In addition, the concerned Inspector and nearby Fire Service Station shall be informed minimum 15 days before such drills are held.

9.11 EMERGENCY COMMUNICATION

458. Clear communication is essential during an emergency. Multiple methods need to be used during an emergency as one single method of communication may not be able to communicate the emergency to the designated site personnel and off-site agencies in a timely manner. The Site has provided emergency and warning signage at conspicuous locations of Site to make Site personnel aware about the:

9. Emergency Response Plan and Disaster Management

- ▶ Potential hazards and risks pertaining to their operation and activities;
- ▶ Pertinent risks present at a particular area;
- ▶ Emergency escape route.

459. The Site has displayed emergency-related signage such as:

- ▶ Emergency exit signage;
- ▶ First Aid Box Signage;
- ▶ Floatation Device Signage;
- ▶ Fire Extinguisher & Hydrant Signage;
- ▶ Safe Mustering Point Signage

460. In case of an emergency, emergency communication will be initiated. The emergency communication:

- ▶ Must be made in simple language;
- ▶ No code word should be used

461. The methods of communication at the site to notify all personnel during an emergency include:

- ▶ Emergency siren;
- ▶ Manual Call Point
- ▶ Public address system;
- ▶ Mobile phone, landline and intercom;
- ▶ Two-way radio or wireless system;

462. The IC will evaluate the emergency and determine the best method to notify the site personnel. The on-site and off-site emergency contact numbers are furnished in Annex 9-1 and Annex 9-3 of the response plan.

9.12 AUDIT AND EMERGENCY RESPONSE PLAN REVIEW

463. IC and SEC will annually review this Plan with the other Emergency Response Team members (SERT). In addition, IC will also be involved in monitoring the following performance indicators to assess the effective implementation of the procedure:

- ▶ Emergency drill records; and
- ▶ Training records.

464. **Audit:** A periodic audit dedicated to assessing the overall integrity of the emergency management system shall be conducted. Plant Managers shall be responsible for resolving matters arising from such audits and for implementing corrective action/s.

465. The Incident Reporting guideline per Bangladesh Labour Rule 2015 is in Annex 9.5.

10. Environmental and Social Management Plan

10 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

10.1 OBJECTIVE

466. The objective of the environmental and social management plan (ESMP) is to implement the mitigation measures effectively. It is also a key to the project's sustainable development. The desired result for achieving sustainable development is difficult to achieve without a management plan.

467. The proposed ESMP covers the potential impacts identified during the study, mitigation measures to reduce/mitigate the intensity of the impacts, a responsibility matrix for mitigations, and budgetary cost estimates for the project construction and operation phase. The different agencies identified are for the proper implementation of the ESMP.

468. The PIU of RHD will be the central coordination body for implementing the ESMP during the preconstruction, construction, and operation period (**Table 10-1**). The individual departments will carry out different tasks such as tree cutting, tree planting, utility shifting, waste management, etc.

Table 10-1: Different Agencies for Implementation of ESMP		
Agencies Name	Responsibility	Period
Road and Highways Department	Overall implementation of Project	Overall Pre-construction and Construction Phase
Forest Department	Permission for tree cutting and tree plantation under social forestry	Pre-construction and Construction Phase
Department of Environment (DoE)	For No Objection Certificate as per the requirement and renewal of ECC	Pre-construction and Construction Phase
Satkhira Palli Biddut Samity (SPBS), Jashore Palli Biddut Samity (JPBS), West Zone Power Distribution Company Limited, Bangladesh Telecommunications Company Limited (BTCL), Power Grid Company of Bangladesh (PGCB)	Electric Poles and Telephone Cables Shifting	Pre-construction
District Administration	For taking up joint verification	Pre-construction and construction phase
Zila Parishad	Tree cutting	Pre-construction stage
Municipalities	Solid Waste Management	Construction phase
Union Parishad	Solid Waste Management	Construction phase
Bangladesh Water Development Board (BWDB)	Permissions for sourcing of water for construction activities (Surface Water or groundwater), if required joint verification	Construction phase
Inland Water Transport Authority, Bangladesh	No Objection for the construction of Bridges for maintaining clearance	Pre-construction stage

10.2 DESCRIPTION OF PHASES OF PROJECT

469. The environmental and social risk clauses emphasize the requirements for environmentally responsible construction and specify the need for the contractor to apply the mitigation and monitoring measures as defined in the ESMP. The proposed plan covers the following phase project:

- Design/pre-construction phase
- Construction phase
- Operation phase

470. **Design/Preconstruction phase:** The design stage requires most surveys/field investigations/meetings, and desktop work for designing the project; there will not be any major impacts on the existing environment. Similarly, the pre-construction stage pertains to the mobilization of the contractor, Construction Supervision Consultant (CSC), and NGO engagement to support RHD in implementing Resettlement, Rehabilitation, and Land acquisition work. However, before mobilization of the contractor, RHD needs to undertake various activities to provide encumbrance-free alignment, which involves the demolition of structures, tree cutting, utility shifting, compensation to be paid to the project-affected persons (PAPs), etc. Some activities do not require specific mitigation, but activities like tree cutting and utility shifting require mitigation measures, as discussed in the proposed updated ESMP.

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471. **Construction Phase:** Construction stage activities require careful management to avoid environmental impacts. Activities that trigger the need for environmental measures to be followed include:

- ▶ Implementation of site-specific mitigation/management measures
- ▶ Monitoring the quality of the environment along the construction sites (e.g., air, noise, water, soil, and sediment).

472. Several other environmental issues have been addressed as part of good engineering practices, the costs of which have been accounted for in the engineering costs. They include improving major and minor junctions, roadside drainage, providing additional cross drainage structures or raising the road height in low-lying stretches, providing bus stops, providing soil erosion prevention measures, etc.

473. Therefore, these mitigation measures shall be included in the contract document of the contractor for its implementation by the contractor and the sustainable development of the project.

474. To implement it properly, it is suggested that non-compliance should be considered as a major lapse from the contractor for which they need to be penalized. All lapses in the clearances/NOCs obtained by the contractor shall be deemed as major non-compliance. They must ensure all these approval/NOCs are valid throughout the construction stage/liability/maintenance period. The contractor needs to follow the conditions stipulated in the environmental clearance (EC), consent to establish (CTE), and consent to operate (CTO), as well as other approvals given by the regulatory authorities.

475. **The Operation/Post Construction Phase** includes monitoring and evaluating the ESMP measures and maintaining shrubs and trees. An updated ESMP for the pre-construction, construction, and operation/postconstruction phase has been **Table 10-2**.

10. Environmental and Social Management Plan

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
A Design stage/Pre-construction Stage						
A-1	Design Consideration	- Regular interaction with the design team - Considering the area's hydrology, new culverts are proposed, and the size of culverts has also been increased to meet the cross-drainage requirement. - Issues on Pedestrian safety and road safety measures have been addressed by providing vehicular underpasses, pedestrian overpasses (POP), Flyovers, etc. - Culverts of adequate spans have been provided to meet the requirement of animal crossing. - Ensure road design, embankment height; Pavement design to comply with the relevant international and national approved design manual of RHD Geometric Design Standards Manual (Revised-2005); AASHTO "A Policy on Geometric Design of Highway and Streets" 2001, etc. - The Bangladesh National Building Code (BNBC) should be considered for designing road infrastructures, particularly all buildings and building	Design consultant/ E&S consultant	PIU	Design stage/Pre-construction Phase	Geometric Standards Manual (Revised-2005); Bangladesh National Building Code; Road Master Plan; National Road Design Standard and Manual
A-2	Land Acquisition and Clearance of Private Structure	- Approximately 783.6659 acres of land will be acquired for widening and strengthening. Private - The livelihood of affected persons will be affected by LA. - A livelihood restoration plan has been suggested to mitigate the impacts of the Resettlement Action Plan (RAP) along with its budget. - The Skill Development Plan has also been included in LRP. - Special support for the disadvantaged/marginalized groups has been kept in the RAP. - Provision for compensation for squatters and encroachers have been made in the RAP. - Payment of cash compensation under law (CCL) by DC to compensate for the impacts of the loss of land as per RAP. - As per RAP, payment of Top UP (Replacement Value (RV)/Cost minus CCL where RV is higher than CCL) by RHD with assistance from I-NGO.	INGO	PIU	Design stage/Pre-construction Phase	National Land Use Policy 2001; The Acquisition and Requisition of Immovable Property Act, 2017 (ARIPA); Khas Land Policy 1997; Vested Property (Repeal) Act 2013
A-3	Issues from stakeholder Consultations	- The participants agreed to the project, provided that proper compensation would be given to them for their land, etc. - Fair and hassle-free compensation shall be paid as per RAP. - A non-governmental organization, namely "INGO," has facilitated the implementation of RAP and LAP. - Notice has been kept for 3-4 months - Participant agreed to remove the trees since they are very old and could pose a risk/injury/causality by falling tree branches during the cyclone.	NGO/RHD	PIU		

10. Environmental and Social Management Plan

Table 10-2: Environmental and Social Management Plan						
Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ The design includes VOPs, POPs, flyovers, ROB, and service roads, as stakeholders requested. ▶ Side drains have been provided about 50km in length in urban or rural residential areas. ▶ Bridges and culverts of adequate capacity have been provided in the design, ▶ Road safety measures, along with necessary road furniture, are provided in the design. ▶ Compensation shall be paid; livelihood restoration measures are suggested in RAP.				
A-4	Issues of the CPRs	▶ A total of 156 CPRs such as mosques/schools/temples/clubs, etc., falling within the corridor of impact, which need to be shifted. ▶ A non-governmental organization, namely “NGO,” has been engaged to facilitate the shift in CPRs. ▶ Payment of Cash Compensation under Law (CCL) for affected structures by DC for relocation of the structures as per RAP ▶ RHD will pay Top-up (Replacement Value/Cost minus CCL where RV is higher than CCL) for structures with assistance from an NGO as per the RAP. ▶ If there is any loss of the water body, proper compensation will be given by DC/RHD with assistance from the NGO as per RAP.	NGO	PIU	Design stage/Pre-construction Phase	
A-5	Tree-cutting ▶ Loss of mature tree species (9000), ▶ Loss of common species such as Rain tree, Mahagoni, babul, neem, mango jackfruit, debdarr, deoa, dumur, gamari, ipilipil, jalpai, jam, khejura etc, ▶ No endangered/threatened species are to be affected. ▶ Loss of nest/resting/feeding sites of birds	▶ Necessary permission from the concerned agency shall be obtained before cutting the trees. ▶ Identified/marked trees shall be removed ▶ No trees will be cut beyond the toe lines ▶ The tree plantation will be undertaken during the construction phase in place of the avenue of tree removal. It will be carried out in a 1:3 ratio, i.e., three (3) saplings for one tree cutting. Trees are to be planted under the project as given in subsection ▶ For private trees, DC will compensate titleholders, and RHD will disburse to non-titleholders as per the RAP. ▶ A 95% survival rate shall be considered for the release of tree plantation. ▶ The contractor shall be responsible for six (6) years of maintenance of tree plantations. ▶ Shrub plantation on medians, maintained by Khilana Zone. ▶ Shrub Plantation and grass carpeting in embankment slopes, including maintenance of trees.	FD/Zila Parishad	PIU	Pre-construction Phase	National Environmental Policy 1992; The Forest Act 2000; National Forest Policy 1994; The Private Forests Ordinance 1959; Bangladesh Wildlife (Conservation & Security) Act, 2012

10. Environmental and Social Management Plan

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
	➤ Decrease in carbon sequestration	➤ The Forest Department, under Social Forestry and the Arboriculture Department RHD, will carry out 60% of Tree plantation (refer to Section 10.3). The contractor will undertake 40% of the tree plantation in the project. ➤ Necessary tree guards shall be provided to protect saplings. ➤ The same contractor will carry out the maintenance of trees under the supervision of Khulna Zone. ➤ Watering of the tree plantation will be ensured. ➤ Cluster plantations need to be considered on community lands, such as ponds/mosques, or at other locations desired by the community. ➤ All realignments shall be enhanced with the tree plantation, ➤ Trees will be planted as an enhancement measure around the ponds or LGED link roads and vegetative noise barriers along the sensitive receptors in consultation with the stakeholders as per the requirement by the contractor ➤ Tree plantation around the monuments, along with other enhancement measures, shall be undertaken in the project. ➤ Fast-growing native trees will be planted to improve the carbon sequestration ➤ The contractor shall take reasonable precaution to prevent his workmen or any other persons from removing and damaging any flora and fauna. ➤ While clearing vegetation, it must be ensured that no faunal species, such as mongooses, foxes, squirrels, etc., are injured and/or die. ➤ While removing the tree, if any endangered or endemic species is found immediately, the work shall be stopped. The species' name, etc., must be reported to the nearest forest department through RHD. ➤ Sacred trees (banyan, etc.) will be cut as per the stakeholder consultations. ➤ The responsible agency (Forest department, Zilla parishad, etc.) must prepare a tree-cutting plan showing the schedule of tree cutting, locations of dumping and transportation of logs within their jurisdiction, and trees to be numbered/marked before cutting. ➤ • The contractors must ensure proper OHS measures during tree cutting by arranging appropriate PPE (Helmet, gloves, eye shield, boots, etc.) for the workers. If any electrical or other types of saws are used, necessary safety measures must be taken to prevent accidents. ➤ The trees should be cut so that fallen branches/logs do not damage pavement, nearby structures, utility lines, road furniture, etc. Local electric lines may be disconnected for a short period with prior intimation to the local authority/people if needed.				

10. Environmental and Social Management Plan

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ Tree-cutting to be coordinated with the local authority and Police for traffic control and to ensure CHS. ▶ Pits/holes created due to the removal of trees must be filled up to avoid accidents. ▶ Logs/chopped trees are to be kept away from the shoulder and roadside so that they don't hinder the smooth traffic flow. ▶ The contractors need to ensure adequate safety measures once these logs are loaded into vehicles and during transportation. ▶ First aid /medical facilities to be arranged by the contractors to deal with any accident/injury. ▶ RHD to regularly monitor the tree-cutting activities and submit monthly progress reports to WB				
A-6	Utilities Shifting ▶ Increase in ambient air quality due to operation of heavy equipment ▶ Increase in Ambient Noise Levels due to operation of excavator, concrete mix, traction of electric lines ▶ Short-term impacts are due to temporary power cuts during the shifting of utilities like electric poles. ▶ For a few days, there may be problems of street lighting, residential, commercial, and bazar areas ▶ Shifting of underground cable	▶ Well-maintained and in good working condition machines and equipment meeting the pollution board requirement shall be deployed at the site during the erection of electrical poles. ▶ Warning signboards shall be placed at visibility locations. ▶ Proper safety measures should be adopted during the implementation of the utility shifting so that accidents of workers, technicians, and local people can be avoided. ▶ All workers and project personnel should use PPE at the site. ▶ A utility shifting plan will be prepared by the design team in consultation with the responsible agencies like - Satkhira Palli Biddut Samity (SPBS), Jashore Palli Biddut Samity (JPBS), and Bangladesh Telecommunication Company (BTCL) for relocation of the utilities ▶ Utility shifting shall be done as per the agreed Utility shifting plan ▶ The contractor, in consultation with the responsible agencies and RHD, will inform the local people about the schedule of the utility shifting prior to the start of the work ▶ Any grievance/complaint shall be recorded and resolved by the competent authority as soon as possible. ▶ To reduce the impacts, shifting shall be carried out in phases ▶ Excavation/concreting for erecting the electric poles shall be planned so that it shall not disturb the movement of the local people and traffic. ▶ Installation of the electric poles and cable holders shall not be done in such a way that it shall not disturb or concern of safety the children playing in the park or going to schools	Satkhira Palli Biddut Samity (SPBS), Jashore Palli Biddut Samity (JPBS), West Zone Power Distribution Company Limited, Bangladesh Telecommunications Company Limited (BTCL)	PIU	Design stage/Pre-construction Phase	

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
	fault may be anticipated ➤ Generally, shifting of Optical Fiber Cables may create communication problems due to damage during relocation.	➤ Shifting shall not disturb access to religious places, community halls, municipal services, local water sources, etc., as well as tourist locations/spots. ➤ No material shall be so placed/stored that it may pose a risk or cause inconvenience to any person or the public. ➤ Safety to the community while working near the residential/commercial areas ➤ Proper access to the community/public shall be provided. ➤ Shifting of utilities may block access to houses, business centers, and health centers. ➤ Erection of electric poles may cause inconvenience and block access to the Public/Community. ➤ Storage of construction material on the road may pose risks. ➤ Safety issues of the workers, technicians, and residents				
A-7	Cross-drainage Structures and drainage	➤ Contract-wise cross-drainage structures and side drains 82.6Km in the urban areas have been provided.	Design Consultant	PIU	Design stage/Pre-construction Phase	The Embankment and Drainage Act 1952
A-8	Environmental Monitoring	➤ The monitoring of air, noise, soil, and water has been carried out at different locations along the project corridor. This will serve as a benchmark for monitoring during construction and operational phases.	E&S consultant	PIU	Design stage	Environmental Conservation Act 1995; Environment Conservation Rules 1997; Environmental Courts Act 2000
A-9	Road safety issues. ➤ Poor road geometry ➤ Mixed Traffic (fast-moving and Slow-moving)	➤ The design engineer has incorporated geometric improvement. ➤ Slow-moving vehicular traffic lanes, Bus bays, Vehicular Overpasses (VOP), Foot over bridges (FOB), pedestrian overpasses) numbers, One Rail over the Bridge cum fly, and an elevated section. ➤ Compliance with International highway for curvature and grading and safety curve at all Grade U-Turn and bridge approaches ➤ Sidewalks/pedestrian zones along the road near habitat areas, schools, hospitals, and religious places need to be included in the design, which the EPC contractor will further review;	Design Consultant	PIU	Design stage/Pre-construction Phase	National Land Transport Policy; RHD's Road Master Plan; National Road Design Standard
A-10	Permission and Clearances	➤ The contractor shall follow the Environmental Clearance Certification (ECC) requirement and mitigation measures suggested in ESMP while establishing the construction campsites, crusher units, hot mix plants, concrete batch mix plants, WMM plants, and workforce camps. ➤ Layout approval for construction camps/labor camps other than CSC	Contractor	CSC/ PIU	Design stage/Pre-construction Phase	Environment Conservation Rules 1997; Environmental Courts Act 2000; Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and

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Table 10-2: Environmental and Social Management Plan						
Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ Permissions for sourcing of water for construction activities (Surface Water), if required ▶ Extraction of Groundwater, if required ▶ Contractor shall follow standard procedures as per Bangladesh Labor Act 2006 for labor recruitment				Occupational Health and Safety Policies 2013
A-11	Orientation to contractors	▶ Orientation program for the contractor to meet this ESMP and WB's ESS requirements. The salient features of the program are as follows: ▶ Obligations under contract to submit and prepare of Contractor Environmental and Social Management Plan ▶ Regulatory compliance requirements, if there are any. ▶ Grievance redress mechanisms for both social and environmental issues shall be developed to address the problem at the site. ▶ Various plans required under C-ESMP related to standalone Contractors' Occupations Health & safety (C-OHS), standalone Contractors' Traffic Management Plan (C- Traffic Management Plan) V, community health and safety, hazardous and non-hazardous waste, campsite management, emergency response, blasting, borrow area, muck disposal, restoration, etc. ▶ These C-OHS and C-Traffic Management Plans will be approved before commencement and reviewed by the WB. ▶ Labor management procedures to be adopted ▶ Community health & safety aspects at the workplace and Reporting requirements, etc., under the project. ▶ The Contractor shall appoint one Environmental safety, Social-cum-Community Liaison Officer, and one Health and Safety Officer, who shall solely be responsible for implementing all ESMP provisions in close coordination/consultation with the Environmental and Social Specialist in the RHD/CSC. ▶ Contractor policy on Gender violent free environment at the construction site or contractor's facilities. ▶ Provision to prevent any form of sexual harassment (SH) or sexual exploitation and abuse (SEA) as per RAP. ▶ Company policy on labor employment.	Contractor	PIU /CSC	Pre-construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013
B	Construction Phase					
B-1	Hot mix plant/WMM/Batching Plant/crushers ▶ Air pollution,	▶ The hot mix plant shall be installed on the downwind side and 500m away from the residential area. ▶ Batching plants/WMM shall be installed 500m from the residential area on the downwind side.	Contractor	CSC/ PIU	Construction Phase before installing the plants	Environment Conservation Rules 1997; Environmental Courts Act 2000;

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Table 10-2: Environmental and Social Management Plan						
Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
	▶ Fugitive Dust Emission ▶ Noise Pollution ▶ Water pollution/waterlogging ▶ Safety Hazards	▶ These plants shall be 500m from the water bodies or rivers/canals. ▶ No batching plant /labor camp/construction camps shall be allowed to be established on the banks of the river/canal. ▶ Drainage and a sump, which shall be cleaned regularly, shall be provided to prevent water logging in the batching plant. ▶ Hot mix plant shall be fitted with pollution control devices, Bag filters, etc. ▶ The stack height shall be at least 10m above the ground. ▶ The premises shall be enclosed, and trespassing shall not be allowed. ▶ The contractor shall submit the detailed layout plan for approval to the Engineer before getting into formal agreement with landowners for setting up of such site. ▶ Actions by Engineer and PIU against any non-compliance shall be borne by the Contractor at his own cost. ▶ These plants need to be operated by the skilled and trained staffed which will be ensured by the CSC.				Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013
B-2	Labor Camp/construction camps	▶ Labor camps shall be located away from the at least 500m away from the residential areas/waterbodies' like Chitra river, Bhairab river, Naboganga river and Begobati river and wetland. ▶ A detailed layout plan for all such sites shall submit and get approval from the CSC. ▶ Contractor shall prefer to the non-productive lands which has access to the existing roads. ▶ Contractor must make an agreement with the land parcel owner along with the photographs of original land. ▶ Rooms of the labor camps must be properly ventilated. ▶ Hygienic conditions must be ensured in the labor camps ▶ To prevent soil erosion, the construction/labor camps shall not be established on the banks or river or waterbodies. ▶ No timber or wood shall be used for cooking purpose ▶ No illegal tree cutting shall be allowed. ▶ Mobile toilets or toilets with septic tanks shall be provided. ▶ Separate facilities for women workers shall be provided as suggested in B-23. ▶ Either canteen facility or cooking gas shall be provided. ▶ Labor/construction camps shall be properly fenced, and an informatory board and project details shall be displayed at the entrance and exit of the camp.	Contractor	CSC/RHD	Construction Phase while establishing the camps	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks																								
		▶ Water logging shall not be allowed at construction camps/batching plants/WMM plants, etc. ▶ Contractor shall display company policy to prevent Sexual Harassment and Exploitation at the workplace or construction camp/site/labor camps. ▶ Gender-based violence-free environments shall be maintained at site/labor camps/construction camps. ▶ Code of conduct (COC), along with other terms and conditions of employment, shall be provided to the workers in clear and vernacular language.																												
B-3	Potable water	▶ The contractor shall provide potable water meeting the World Health Standards (WHO) in the construction camps/labor camps/construction sites. ▶ Drinking water quality shall be tested to check its portability to meet the requirement of WHO standards.	Contractor	CSC/PIU	Construction phase (entire period)	National Water Policy 1999; Water Reservoir Conservation Act 2000; The Water Act 2013																								
B-4	Sanitation Facilities	▶ Drains shall be provided. ▶ Proper lavatory facilities for male and female workers shall be provided. ▶ Proper hygienic condition must prevail in such facilities. ▶ The mobile toilet shall be provided at construction camps/labor camps of adequate capacity. ▶ These, if mobile toilets are provided, shall be periodically replenished with fresh water for ablution purposes and wastewater shall be emptied through suction tankers and carried to the nearest municipal sewage treatment facilities or soak pits shall be provided. ▶ Untreated liquid waste shall not be allowed to be discharged into surface water bodies. <table><tr><th>Sl. No.</th><th>Sanitary Unit</th><th>For Male Personnel</th><th>For female Personnel</th></tr><tr><td>1.</td><td>Water Closet</td><td>1 for every ten persons</td><td>1 for every 1-10 persons</td></tr><tr><td>2.</td><td>Ablution Taps</td><td>One in each W.C</td><td>One in each W.C.</td></tr><tr><td>3.</td><td>Urinals</td><td>1 for 6-20 persons 2 for 21-45 persons 3 for 46-70 persons 4 for 71-100 persons</td><td>--</td></tr><tr><td>4.</td><td>Washing Taps with the draining arrangement</td><td colspan="2">One for every ten persons or part thereof</td></tr><tr><td>5.</td><td>Drinking Water Fountains</td><td colspan="2">One for every 30 persons</td></tr></table>	Sl. No.	Sanitary Unit	For Male Personnel	For female Personnel	1.	Water Closet	1 for every ten persons	1 for every 1-10 persons	2.	Ablution Taps	One in each W.C	One in each W.C.	3.	Urinals	1 for 6-20 persons 2 for 21-45 persons 3 for 46-70 persons 4 for 71-100 persons	--	4.	Washing Taps with the draining arrangement	One for every ten persons or part thereof		5.	Drinking Water Fountains	One for every 30 persons		Contractor	CSC/PIU	Construction Phase (entire period)	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013
Sl. No.	Sanitary Unit	For Male Personnel	For female Personnel																											
1.	Water Closet	1 for every ten persons	1 for every 1-10 persons																											
2.	Ablution Taps	One in each W.C	One in each W.C.																											
3.	Urinals	1 for 6-20 persons 2 for 21-45 persons 3 for 46-70 persons 4 for 71-100 persons	--																											
4.	Washing Taps with the draining arrangement	One for every ten persons or part thereof																												
5.	Drinking Water Fountains	One for every 30 persons																												

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		6. Baths, Preferably Showers and ablution As required Note: i) One water tap with the draining arrangement shall be provided for every 50 persons or part thereof in the vicinity of the water closet and urinal or part thereof ii) Crèches, where provided, shall be fitted with water closets (One for ten persons or part thereof), wash basins (1 for 15 persons or part thereof), and drinking water taps with drinking arrangements for every 50 persons or part thereof. iii) Toilets must have a ventilation system and proper lighting arrangements. iv) Male and female toilets shall be clearly demarcated as “For Men Only” or “For Women Only” along with symbols etc. Source: National Building Code, India				
B-5	Solid Waste Management	▶ Contractor shall segregate waste at source. ▶ Biological waste from labor camps, construction camps, or other contractor facilities shall be collected for composting and gardening. ▶ Intermingling of waste shall not be allowed. ▶ Municipal waste shall be disposed of at the approved landfill sites only, or the contractor shall make necessary arrangements with the municipalities/Zila Parishad. ▶ Construction and demolition (C&D) waste shall be disposed to identified and approved locations. ▶ C&D waste shall not be dumped into the water bodies. ▶ It is envisaged that about 40% of the sacrificed material will be reused in the sub-base preparation. The rest of the material will be disposed of in the approved landfill in consultation with the Zila Parishad, etc. The contractor shall store the usable material properly on an impervious platform to prevent it from mixing with the earth. ▶ Contractor shall prepare a waste management plan ▶ Open burning of solid wastes, whether hazardous or nonhazardous, shall not be allowed. ▶ E-waste shall be collected and disposed to approved vendors only.	Contractor	CSC/PIU	Construction Phase (entire period)	Bangladesh Solid Waste Management Rules 2021
B-6	Hazardous Material Management	▶ Oil/fuel shall be stored as approved design and safety protocol applicable in the country. ▶ Entry of unauthorized persons shall be prohibited in Hazardous Waste Management areas.	Contractor	CSC/PIU	Construction Phase (entire period)	Bangladesh Solid Waste Management Rules 2021; National 3R Strategy

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ If there is any spillage of hazardous waste, the contractor will remove it immediately. ▶ An area shall be assigned for storing the oil/oily waste or any flammable material. ▶ Smoking shall be prohibited in such areas. ▶ Drip trays shall be provided at DG sets/below the nozzles to fuel the construction vehicles and equipment. ▶ Used oil or hazardous material/flammable material shall be collected in drums and stored on the impervious platform, sloped or bermed to contain a minimum of 25 percent of the total storage volume. ▶ It shall be disposed to the authorized/approved vendors per the DOE norms. ▶ Tires shall be appropriately stored under the shed and disposed of to approved vendors. ▶ Hazardous materials from vehicle tanks to storage shall be transferred in areas with impervious surfaces to avoid environmental loss and sloped to a collection or containment structure. This shall not be connected to the municipal wastewater/stormwater collection system. ▶ To the extent feasible, secondary containment for components (tanks, pipes) of the hazardous material storage system shall be provided. ▶ Periodic (e.g., daily or weekly) reconciliation of tank contents and inspection of visible portions of tanks and piping for leaks shall be undertaken. ▶ Inform the employees about the hazards ▶ Warning signboards shall be displayed at such locations. ▶ Awareness training shall be given to workers by the contractor's environmental safety health officer. ▶ Material Safety Data Sheets (MSDS) shall be compiled. ▶ Standard operating procedures (SOPs) for fueling/storing or other hazardous material operations shall be prepared. ▶ Contractor shall prepare a hazardous waste management plan.				
B-7	Water Resources and Water Quality	▶ Water quality was monitored during the baseline survey. ▶ Contractor shall undertake the water quality monitoring as per environmental monitoring program. ▶ Contractors shall ensure that construction materials like earth, stone, and ash do not block water flow. ▶ Construction camps/facilities shall be kept away as per B2. ▶ If a water body is lost, DC/PIU will provide proper compensation with assistance from an NGO.	Contractor	CSC/PIU	Construction Phase	National Water Policy 1999; Water Reservoir Conservation Act 2000; The Water Act, 2013; Environment Conservation Rules 1997

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		- Workers shall not be allowed to pollute the water body. - No illegal excavation shall be allowed from the bunds of water bodies. - The water flow will be restored soon after completion of the work. - No waste will be dumped into the water bodies. - Oil and grease separators shall be provided near the vehicle washing area/maintenance workshop. - Drains shall be provided in labor camps/construction camps/workshops and other contractors facilities along with soak pits. - Silt fencing at the mouth of water body shall be provided. - Side drains have been provided in urban areas - River protection works are provided in the design				
B-8	Clearing and grabbing	- Clearing and grabbing shall be restricted to the working area within the toe line. - Further activities must be planned/ started immediately to prevent fugitive dust emission and soil erosion during monsoon. - The top (15cm) soil shall be preserved to redevelop the areas as required. - Revegetation/turfing shall be started immediately after completion of the work	Contractor	CSC/PIU	Construction Phase during clearing and grabbing operation	The Forest Act 2000; and National Agriculture Policy 1999
B-9	Borrow Areas	- Only identified and approved contractors shall use borrow areas - Borrowing of earth from the cultivable land shall not be preferred. - When borrowing earth from cultivable lands, the depth of borrowed earth shall not be more than 45cm. - The top 15cm of soil shall be removed and stored separately. Thereafter, excavation shall not exceed 30cm, and topsoil shall be spread over the land. - Borrow areas shall be dug at least 800m from the habitation. If unavoidable, the depth should not be more than 30cm and should be properly drained. - Borrow pits shall not be dug continuously. - The borrowing of the earth shall be used only after an agreement between the contractor and land parcel owner and must include the photographs of the original land. - Haulage of borrowed materials will be maintained dust-free by the sprinkling of water. - The borrow areas shall be 500m away from the toe line of the road. - To reduce the earth requirement, about 40% of the scarified material will be reutilized in the subbase material. - If trees are there, it should be protected by providing slopes in 1:2 around them while borrowing the earth.	Contractor	CSC/PIU	Construction Phase during earthworks	National Land Use Policy, 2001

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		- Side slopes of 1:4 shall be maintained in the borrow areas. - A redevelopment plan shall also be prepared and agreed upon by the land parcel owner, which needs to be approved by the CSC.				
B-10	Loss of topsoil	- The topsoil (15cm) shall be removed and preserved for reuse for redevelopment purposes. - Topsoil shall be preserved outside drainage lines, and stockpiles will be protected from erosion by silt fencing and diversion channels. - Use stripped topsoil to cover all disturbed areas along the proposed tree plantation sites. - Limit equipment and vehicular movements to within the approved construction zone. - Topsoil shall be distributed free to local people who need it for their purposes. - The residuals shall be reused to form the ground around the interchanges, the areas along the road within the acquired land, or recover the vegetation in some affected areas due to the road project. - The material stockpile sites shall be 500m away from surface water bodies and areas prone to surface run-off. - An open ditch shall be built around the stockpile sites to intercept wastewater. If necessary, retarding basins shall be constructed to remove sands and other solids in the stormwater before it reaches the downstream rivers. - During rainstorms, open stockpiles of construction materials (e.g., aggregates, sand, and fill material) of more than 50 m³ shall be covered with tarpaulin or similar fabric. - Measures shall be taken to prevent the washing away of construction materials, soil, silt, or debris into any drainage system. - At the start of site establishment, perimeter cut-off drains to direct off-site water around the site shall be constructed, and internal temporary drainage works and erosion and sediment control facilities shall be implemented.	Contractor	CSC/PIU	Construction Phase	
B-11	Soil Erosion	- The Contractor shall reuse the excavated soil as much as possible unless the soil is considered unsuitable for filling. - The Contractor shall plan his works to minimize surface excavation works during the rainy season where practicable - Immediately after work on bridges or high embankments is completed, slope stabilization measures such as turfing, etc., shall be taken. - Excavation or similar activities shall not be undertaken during the monsoon period.	Contractor	CSC/PIU	Construction Phase	

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		- Construction and demolition waste shall not be stored near the bridge construction sites; it shall be disposed of at approved landfill sites. - Loose materials shall be bagged and covered. - Ground clearance area shall be minimum - Approach roads shall be provided in construction facilities to reduce soil erosion. - All exposed earth areas shall be completed and revegetated as soon as possible after earthworks have been completed. - If soil excavation is unavoidable during the rainy season or at any time of year when rainstorms are likely, exposed slope surfaces shall be protected by temporary drainage measures. - The working area shall be marked to restrain the activity within the demarcation area only.				
B-12	Soil Quality	- Fuel or other petroleum products shall be stored on the impervious platform. - The movement of construction vehicles, machinery, and equipment shall be restricted to the corridor or identified route. - Soil contamination by bitumen, fuel, and chemical storage shall be stored on an impervious base - Any spillage of hazardous material shall be removed and disposed of to identified and approved sites. - Soil quality monitoring shall be undertaken as per Section 10.2	Contractor	CSC/PIU	Construction Phase	
B-13	Operation of Hot Mix Plants/Batching plants/crushers (Air Pollution)	- The stack height of the Hot Mix Plant shall be at least 10m from the ground. - Regular maintenance of construction vehicles and equipment/plants shall be undertaken. - The construction vehicles/machinery/equipment shall use only designated routes. - DG sets shall comply with the requirements of the Department of Environment.	Contractor	CSC/PIU	Construction Phase while installing plants and their operation	Environment Conservation Rules 2023; Environmental Courts Act 2000; Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013
B-14	Movement of construction vehicles (Air Pollution)	- Water sprinkling using sprays shall be done on the unmetallic haul roads. - Water sprinkling shall also be carried out on construction sites where the earthwork is unattended for four (4) days, especially in the summer season. - Construction vehicles/equipment shall comply with national standards. - Routine maintenance of pollution to control the emission.	Contractor	CSC/PIU	Construction Phase	Environmental Conservation Act 2023; and Bangladesh National Ambient Air Quality Standards 2005

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ Low-emission construction equipment, vehicles, and generator sets shall be used at the site. ▶ Only those construction vehicles shall be used shall be used. ▶ Vehicles transporting construction material shall be covered by tarpaulin. ▶ Construction vehicle speeds will be in the contractors' ESMP, subject to CSC approval.				
B-15	Noise Environment	▶ The Contractor shall abide by the provisions of the Specifications of Contract regarding environmental protection and DoE regulations (≤ 60 dB levels at mosques, schools, populated areas, and other sensitive sites). ▶ Noise-generating equipment/plants shall be provided with dampeners. ▶ Diesel Generating must be enclosed with soundproof acoustic enclosures to meet the Noise standards. ▶ Construction vehicles/equipment must be fitted with silencers ▶ Routine maintenance of equipment and construction vehicles shall be carried out. ▶ Low noise-generating equipment/construction vehicles shall be used. ▶ Noise monitoring shall be undertaken as per the Environmental Monitoring Program ▶ Workers working in noisy areas shall receive PPEs and wear earplugs. ▶ Contractors' facilities will be sited away from the residential areas/sensitive receptors as mentioned above. ▶ Near the sensitive receptors such as schools/mosques/hospitals noise generating activities shall be carried out after consultation with the management committee or low noise generating equipment shall be used only. ▶ In Residential areas, hospitals etc. noise generating activities shall be prohibited and work shall be scheduled in consultation with neighborhood champions. ▶ Reducing construction vehicles through the residential area in consultation with the local champions ▶ Vegetative noise barriers in the sensitive receptor ▶ Any issue shall be resolved through a grievance redressal mechanism (GRM) developed by the contractor.	Contractor	CSC/PIU	Construction Phase	Environmental Conservation Act 2023; and Noise Pollution Control Rules 2006
B-16	Terrestrial Ecology (Flora and Fauna)	▶ About 40% of the trees will be planted by the PIU through a contractor, and 60% of the trees will be by the forest department under social forestry immediately during the implementation phase. ▶ Trees shall be planted in the available space in between as per CSC directions.	Contractor	CSC/PIU	Construction Phase	National Environmental Policy 1992; National Environmental Management Action

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		- Limit the construction works within the designated sites allocated to the contractors. - No illegal tree felling shall be allowed at construction sites/borrow areas/construction camps/ labor camps. (Refer to B-8 and B-9 above) - The construction activity shall be restricted to only identified areas. - Hot mix plant/construction camps/labor camps/stockyards shall be located at a safe distance (500m away from the water bodies) - No untreated waste shall be allowed to discharge into the water bodies. - Construction camps/labor camps, etc., shall have a proper drainage system				Plan 1995; Environmental Conservation Act 2023 Bangladesh Wildlife (Conservation & Security) Act, 2012; National Fisheries Policy, 1998; Protection and Conservation of Fish Act 1950
B-17	Aquatic Ecology	- Passage to the free water flow shall be provided. - The contractor shall clear the site immediately after the construction activity is over. - Water Quality and sediment quality testing shall be undertaken as per the monitoring plan. - Bentonite slurry, if is proposed to be used, shall not be allowed to the dispose, or dumped into the waterbody or agricultural land. - Bentonite slurry shall be stored in container and need to be disposed to identified/approved sites in consultation with the Zill Parishad or Local Government office. - Washing of construction vehicles/equipment shall not be allowed near the waterbodies.	Contractor	CSC/PIU	Construction Phase	Environment Conservation Rules 2023; Bangladesh Wildlife (Conservation & Security) Act, 2012; National Fisheries Policy, 1998; Protection and Conservation of Fish Act 1950
Socioeconomic Environment						
B-18	Influx of Labor	- Trespassing to the contractors' facilities such as construction camp/labor camps shall be strictly prohibited. - Contractor facilities shall be located 500m away from residential areas. - Any issue shall be resolved through labor grievance redressal mechanism (GRM) developed by the PIU and run with assistance from the contractor. - Contractors shall be encouraged to recruit local skilled/unskilled workers. - Minimum 10-15% of female workers shall be given preference in the employment. - Separate lodging arrangement for women workers along with appropriate facilities as mentioned above in B1, B2, B3, B4, - The CoC will be strictly enforced by the contractor	Contractor	CSC/PIU	Construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
B-19	Child Labor	▶ Bangladesh labor Act 2006 section 34 prohibits the engagement of the child labor in any of activity of project. ▶ According to Section 44, anyone under 14 years is considered a child & between 14 and 18 years of age is considered as adolescent. ▶ It is recommended that people under 16 years of age should not be employed in any type of work and shall be encouraged to go to schools. ▶ Between 16- and 18-year of age persons can be employed for lighter works/office works for 6 hours only with prior approvals from the Engineer ▶ Company policy on the labor engagement rules shall be displayed at prominent locations such as contractor camps/labor camps/contractor office etc. ▶ People between 16- and 18-year of age persons shall not be deployed at any hazardous works such as painting/or other construction activity. ▶ To ensure the age, contractor must refer to Certification of laborers' age/National Identification Card/Birth Certificate etc.	Contractor	CSC/PIU	Construction Phase while recruiting the labor	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015
B-20	Community Health and Safety	▶ The contractor shall plan activities in residential areas after having discussion with the community. ▶ Locals shall be kept informed about the activities which the contractor is taking up in the residential areas. ▶ Trained drivers having valid license shall be allowed to drive construction vehicles/heavy equipment/plants. ▶ Speed of the construction vehicles/equipment shall be defined by the contractor in the contractors' ESMP. ▶ Excavated areas shall be properly barricaded. ▶ Trespassing of construction site shall be prohibited. ▶ Traffic management plan shall be prepared as per the activity schedules which will be approved CSC/PIU. ▶ Regular Consultation with the Community to know the effectiveness of implementation of mitigation measures at construction sites/camps ▶ Ensure implementation of mitigation measures suggested in B4 through B6 and B13 through B-15 at site to control the environmental pollution. ▶ Compensation for impacts on infrastructure shall be provided in accordance with the Resettlement Action Plan (RAP). ▶ Water logging shall not be allowed at construction site and minimize areas of standing water by providing effective drainage in construction areas to prevent vector borne disease such as malaria etc. ▶ Access to public shall be provided as per measures suggested in B-21.	Contractor	CSC/PIU	Construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ The prevention and management of HIV/AIDS and other STIs as suggested below in B-22. ▶ Vehicles/construction equipment need to be maintained and inspected/tested regularly, ▶ Drivers must have appropriate government licensing or certification and be provided with proper training. ▶ During the operation of construction equipment, a minimum safety distance from this equipment must be ensured for the movement of the local community to avoid any accident. ▶ Contractor shall take all precautionary measures to prevent community exposure to water-borne, water-based, water-related, and vector-borne diseases, and communicable and non-communicable diseases that could result from project activities.				
B-21	Access to the Public	▶ The contractor shall provide adequate warning signboards in the local and English languages with messages in pictures or drawings so that those who cannot read will be able to understand. ▶ Flagmen shall be deployed to control the traffic during tree felling or removal/erection of electric poles. ▶ The contractor shall provide temporary access to the local religious place, schools, or nursing home in consultation with the local champions. ▶ A grievance redressal mechanism shall be adopted at the site, which needs to be approved by the CSC to address the issue at the site.	Contractor	CSC/PIU	Construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015
B-22	HIV and STD ⁴⁶	▶ Awareness campaigns on HIV/AIDS/STD ▶ HIV/STD voluntary counseling, testing, and treatment. ▶ Ensuring that construction workers have access to condoms ▶ Provision of vending machines at the identified location ▶ Monitoring of outcomes in collaboration with National HIV/AIDS Authorities	Contractor	CSC/PIU	Construction Phase	Occupational Health and Safety Policies 2013
B-23	Labor Management	▶ Contractors shall follow the national legislation. ▶ Condition stipulated the contractor on labor management, workplace safety, and health, and protection shall follow labor-management procedures. ▶ Pooled transportation facilities, as may be required, shall be provided by the contractor. ▶ Contractors' company policies on the prohibition of Child Labor shall be displayed at the construction camps, labor camps, contractors' offices, etc.	Contractor	CSC/PIU	Construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015

⁴⁶ FIDIC | HIV-AIDS in the Construction Sector | International Federation of Consulting Engineers

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ All basic facilities, such as water supply, cooking gas, sanitation facilities, and a mobile toilet (of adequate capacity for men and women separately), shall be provided within the labor camp. ▶ Creche facilities for women workers to be made with separate toilets, washing, and cleaning (if possible) ▶ 1-2 caregivers for creche shall be employed. ▶ Women security guards at the labor shade shall be deployed. ▶ Feeding corner for lactating mothers, if required to be provided ▶ Separate labor shade for men and women shall be provided. ▶ Contractor shall prepare a Labor Management Plan in its C-ESMP as per the procedures stipulated in Chapter 8 of this ESIA.				
B-24	Occupational Health and Safety Aspects ▶ Personnel Safety ▶ Measures for Labor, Material, handling, Painting, etc.	▶ The contractor will prepare a standalone Contractor OHS plan, which needs to be approved by the CSC before activities commence. ▶ Contractor shall update the OHS plan regularly as and when required or as directed by the CSC. ▶ Contractors shall plan the activities to prevent untoward accidents at the site. ▶ Induction training to the workers and subsequent training on safety aspects. ▶ Trained workers will be deployed at hot mix plants, batching plants, and wet Mix Macadam (WMM). ▶ Toolbox (including its maintenance) training for the workers shall be adopted, such as job rotation, training safe work procedures, lock-out and tag-out, workplace monitoring, limiting exposure or work duration, etc. ▶ The contractor shall follow safe work systems and administrative or institutional control measures. ▶ No employee shall be exposed to a noise level greater than 85 dB(A) for more than 8 hours per day without hearing protection. ▶ In addition, no unprotected ear shall be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C). ▶ Exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc., shall be provided per CSC's direction. ▶ The Contractor shall always take all reasonable precautions to maintain the health and safety of the contractor's personnel. ▶ The contractor shall ensure that medical staff, first aid facilities, and ambulance service are always available at the site in collaboration with local health authorities. ▶ Workers shall wear protective footwear such as safety boots/gumboots, helmets, and protective goggles.	Contractor	CSC/PIU	Construction Phase	Occupational Health and Safety Policies 2013

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ Welders shall use protective eye shields or safety goggles. ▶ All electric wire must have proper insulation ▶ The workers and flagmen shall use lifesaving jackets. ▶ Workers working in noisy areas shall be provided earmuffs. ▶ Fall prevention and protection measures shall be implemented for the workers working at more than 2m height. ▶ Safety belts along with connectors and anchorage shall be provided and used by the workers working at heights (more than 2m). ▶ Ladder and scaffold shall be provided with guardrails system and safety net system shall be provided when activities are going on at height more than 2m ▶ Proper use of ladders and scaffolds by the trained workers. ▶ Necessary lightening having proper illumination shall be provided if required to work site during nighttime. ▶ Potable water supplies to the workers. ▶ Water supplied to areas of food preparation or for the purpose of personal hygiene (washing or bathing) shall meet drinking water quality standards ▶ Workers working in the dusty area shall be provided with nose mask. ▶ Sufficient fresh air shall be supplied for construction camps/labor rooms and confined workspaces. ▶ Construction/labor camps must receive natural light and be supplemented with sufficient artificial illumination, if required. ▶ Emergency lightening arrangement of proper illumination shall be installed at identified locations. ▶ Sufficient lightening arrangement shall be provided in toilets having doors along with locks. ▶ Eating areas such as canteen must be cleaned, and kitchen, toilet/ human waste must be segregated at source and collected separately as per measure suggested above. ▶ Hand, knee, and foot railings shall be provided on stairs, fixed ladders, platforms, ramps or loading bays etc. ▶ Covers should, if feasible, be installed to protect against falling items. ▶ First aid boxes shall be provided at identified locations. ▶ First Aid training to at least 25% of female and male workers. ▶ Tie-ups with local hospitals shall be maintained, and ambulance facilities shall be reserved for emergencies.				

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ The contractor shall arrange OHS training for all new workers and refresher training for the old workers/drivers. ▶ Regular health check-ups shall be undertaken at construction camps/labor camps, etc. ▶ Visitors such as CSC engineers or employer officials visiting the construction sites/camps shall wear helmets of approved color. ▶ Fire extinguishing devices shall be installed at the identified areas. ▶ Arrangements with the local firefighting department shall be made. ▶ Contractor shall prepare and get approved an emergency response plan, including an evacuation plan, in consultation with the Fire Service & Civil Defense Department (FSCD) and provide training to workers accordingly.				
B-25	SEA-SH	▶ Implementation of a GBV-free work environment shall be maintained at the project assisted by PIU ▶ PIU will have gender specialists to monitor the GBV-free environment. ▶ Gender-based discrimination shall be strictly prohibited and monitored. ▶ Any type of sexual harassment, including homophobic slurs or using social media against a colleague, shall be dealt strictly with as per local law of the country, and the employee shall be terminated immediately from his duties. ▶ All workers, including skilled and non-skilled workers, shall be trained on the code of conduct and company policy on the SEA-SH-free work environment. ▶ It shall be ensured that all, including managers/engineers and other workers, have attended the above-mentioned training. ▶ The contractor shall frame the Code of Conduct (COC) with minimum standards of behavior with which project actors agree to comply individually. ▶ COC Preventing SEA-SH and Violence against Children/female workers shall be rolled out among the individual and signed by each worker/manager/other staff. ▶ Each worker needs to sign the COC every six months. ▶ A signed copy of the COC shall be documented physically, and a scanned version will be stored digitally. ▶ The company policy on a GBV-free work environment and COC shall be displayed at labor camps/canteens and other contractor facilities. ▶ Staff shall be encouraged to report suspected or actual GBV. ▶ A grievance redressal mechanism (GRM) shall be established at the site to address the issues immediately.	PIU/Contractor/CSC	PIU	Construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015, SEA-

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Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		- Provision of separate, safe and easily accessible facilities (e.g., toilets, sleeping areas) for male and female users, which can be locked from the inside⁴⁷; - Provision of Safe, accessible, well-lit waiting areas and other public spaces (such as parking lots, and construction sites); - Visibly displaying signs around the project site that signal to workers and the community that the site is an area where SEA/SH is prohibited or a safe, SEA/SH free zone. - the PIU has hired a Gender Specialist to monitor indicators: (a) the number of training courses related to SEA/SH delivered; (b) percentage of staff who have agreed to a CoC; (c) the percentage of project actors who have attended CoC or SEA/SH trainings; or (d) percentage of SEA/SH cases handled in line with quality requirements/established protocols.				
B-26	Traffic Diversion and Detouring Plan	- Detailed “Traffic and Road Safety Management Plans” shall be prepared by the Contractor and submitted to CSC for approval. The traffic diversion plan shall contain but not limited to the following: - Traffic safety arrangements for carrying out construction activities in congested urban areas. - Arrangement of Signaling system and warning Signs system - Traffic routes for construction vehicles/equipment - Construction vehicles/equipment speed - Traffic control Arrangements at site - Parking of construction vehicles/equipment/trucks - Temporary Traffic diversion and detouring arrangement - Traffic arrangement after cessation of work each day, - Safety measures for night-time traffic - Precaution for transportation of hazardous materials - Arrangement of flagmen/walkie-talkie/mobile phones etc. - Temporary diversions shall be provided at rural/urban settlements. - The Contactor must prepare a C-Traffic Management Plan, which is to be approved by CSC. - A guideline for Developing a C-traffic Management Plan is given in Annex 10-1.	Contractor	CSC/PIU	Construction Phase	Bangladesh Road Sign Manual, Bangladesh Road Transport Authority Ministry of Communication, March 2000
B-27	Archaeology and cultural heritage management	- Contractor shall ensure that all archaeological and cultural heritage sites are protected from construction activities. - The contractor shall devise mitigation and chance-finding measures in consultation with the local champions.	Contractor	CSC	Construction Phase	The Antiques Law of 1968; Environment Conservation Rules 1997

⁴⁷ Good Practices Note on addressing Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) in Investment Project Financing involving Major Civil Works Second Edition, the World Bank

10. Environmental and Social Management Plan

Table 10-2: Environmental and Social Management Plan						
Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ If a critical site/potentially significant asset is uncovered during the contractor, the contractor shall immediately stop the work temporarily and report the finding to the project authorities. ▶ The contractor shall take necessary steps to protect chance finds from the impacts of any further project activities. ▶ Where necessary, signage and fencing shall be installed to protect known heritage sites close to construction areas. ▶ The CESMP shall include a contractor's code of conduct with rules and guidance on addressing chance finds and training contracted workers. ▶ Enhancement measures in the form of tree plantation are suggested in Section 10.3 for monuments identified during the study.				
C	Operational Phase					
C-1	Environmental Monitoring	▶ Environmental monitoring of the air, noise, water etc. shall be undertaken as per Section 10.2	Monitoring agency	Khulna Zone	Operational Phase	Environmental Conservation Act 1995; Environment Conservation Rules 1997
C-2	Monitoring and Evaluation of ESMP/RAP	▶ The client will undertake monitoring and evaluation of the effectiveness of the ESMP/RAP through the Environmental and Social division of PIU.	Monitoring agency	Khulna Zone	Operational Phase	
C-3	Terrestrial Ecology	▶ Shrubs and trees are planted on the median and along the road are to be maintained. ▶ Trimming of the shrubs shall be undertaken regularly as per Section 10.3	Monitoring agency	Khulna Zone	Operational Phase	National Environmental Policy 1992; Environment Conservation Rules 2023; Bangladesh Wildlife (Conservation & Security) Act 2012
C-4	Water Resources and Water Quality	▶ Side drains will be regularly cleaned before the onset of monsoon ▶ Water quality monitoring shall be undertaken.	Monitoring agency	Khulna Zone	Operational Phase	National Water Policy 1999; Water Reservoir Conservation Act 2000; The Water Act 2013
C-5	Air Quality	▶ Air Monitoring shall be undertaken as suggested in the Environmental Monitoring Plan. ▶ PIU shall advise DOE to implement Schedule 4: Standards for Emission from Motor Vehicles of Environmental Conservation Rules 2017 (Draft).	Monitoring agency	Khulna Zone	Operational Phase	Environmental Conservation Act 2023; Environment Conservation Rules 1997; and Bangladesh National Ambient Air Quality Standards 2005

10. Environmental and Social Management Plan

Table 10-2: Environmental and Social Management Plan						
Sl. No.	Impacts/Issues	Mitigation/Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
C-6	Noise and Vibration	► Noise and Vibration Monitoring shall be undertaken as suggested in the Environmental Monitoring Plan.	Monitoring agency	Khulna Zone	Operational Phase	Environmental Conservation Act 1995; Environment Conservation Rules 2023; and Noise Pollution Control Rules 2006
C-7	Soil and Sediments	► Any spillages or accidental vehicles shall be removed immediately.	Monitoring agency	Khulna Zone	Operational Phase	
C-8	Road Safety	► Road furniture, as provided in the operation phase, needs to be maintained properly. ► Potholes or any other damage shall be rectified immediately after post-monsoon. ► Road safety audits should be undertaken regularly. ► Public awareness campaign shall be regularly conducted using various Information, Education, and Communication (IEC) techniques such as Media (Television, newspaper), Display boards, safety weeks and event organization, etc.	Khulna Zone	Khulna Zone	Operational Phase	National Land Transport Policy; RHD's Road Master Plan; National Road Design Standard

10. Environmental and Social Management Plan

10.2.1 ENVIRONMENTAL MONITORING PLAN

476. To evaluate the effectiveness of the mitigation measures to reduce the environmental impacts, it is necessary to monitor the environmental parameters during the project construction and operation phase. The proposed monitoring plan provides information to ensure that the development initiative of this national highway is complying with the regulatory standards and helps define the thresholds that would signal the need for immediate corrective actions.

477. From the environmental monitoring point of view, ambient air quality with respect to noise, water quality, and soil and sediment quality is proposed to be monitored during the project's construction and operation. The contractor can collect the meteorology data from the nearest meteorology station located in Jashore, or it can be monitored at the site by installing the equipment.

478. The following subsections present an environmental monitoring plan covering the parameters to be monitored, sampling locations, and frequency.

10.2.2 AMBIENT AIR QUALITY

479. The ambient air quality is proposed to be carried out at three (3) locations in addition to villages near the construction camps/Hot mix plants/stockyards and borrow areas and near sensitive receptors such as schools/hospitals/mosques during construction. In total, the contractor must carry out ambient air quality at seven (7) locations. However, during the operation phase, the ambient air quality monitoring will be carried out at three (3) locations in consultation with the Department of Environment (DOE). The ambient air quality monitoring details are given in **Table 10-3**.

Sl. No.	Items	Description of Items
1.	Monitoring Parameters	Particulate Matter (PM10 and PM2.5), Sulphur Dioxide, Nitrogen Oxide, Carbon Monoxide (CO)
2.	Monitoring Locations	One in each contract (Bhomra, Satkhira, Navaron) plus three (3) locations as per the suggestion of the Environmental Engineer of CSC/RHD
3.	Monitoring Frequency	Continuous 24-hourly monitoring twice a week for summer, winter, and post-monsoon season
4.	Total number of samples	4-locations x 1-days per week x 4-week x3-season x 2.5 years The total number of samples is 120 During the construction phase per the contract. The total number of samples during the operation phase is 36 per annum.

10.2.3 AMBIENT NOISE AND VIBRATION MONITORING

480. Similarly, noise shall be monitored at three (3) locations in addition to villages near construction camps/Hot mix plants/stockyards and borrow areas and near sensitive receptors such as schools/hospitals/mosques during the construction phase. In a total of nine locations, the contractor will carry out noise monitoring during the construction phase. In contrast, the noise monitoring will be carried out at four (4) locations near sensitive receptors in consultation with DOE officials during the operation phase of the project. The noise quality monitoring details are presented in **Table 10-4**.

Sl. No.	Items	Description of Items
1.	Monitoring Parameters	Noise and Vibration quality monitoring (L_{eqday} and $L_{eqnight}$, L_{10} , L_{98} , L_{max} and L_{min})
2.	Monitoring Locations	Bhomra, Satkhira, Navaron, plus three locations such as construction camps/maintenance workshops/labor camps and one (1) location in sensitive receptors/residential areas near the construction site, per the suggestion of the Environmental Engineer of CSC/RHD. During the operation phase, near the four (4) sensitive receptors in consultation with the DOE officials.
3.	Monitoring Frequency	Continuous 24-hour monitoring using an Integrated Sound level meter with a data logger.
4.	Total number of samples	Throughout the construction period A total number of samples = 6 locations x 12 months x 2.5-years=180 per contract. The total number of samples during the operation phase is 72 per annum.

10. Environmental and Social Management Plan

10.2.4 SURFACE WATER QUALITY

481. As presented in the Table 10-5; surface water samples will be collected from the four (4) bodies during construction and operation. The sampling will be done once a season except during the monsoon season.

Table 10-5: Surface Water Quality Monitoring Details		
Sl. No.	Items	Description of Items
1.	Monitoring Parameters	pH, DO, BOD5, Temperature TSS, Oil and grease, free ammonia, etc. Total Coliforms, and E-coli form per 100ml
2.	Monitoring Locations	Two surface water bodies (river/canal)
3.	Monitoring Frequency	Once in a season except monsoon season
4.	Total number of samples	Throughout the construction period Total number of samples = 2-locations x 1-sample per season x 3-season x 2.5-years=15 samples Total number of samples during operation phase 12 per annum.

10.2.5 GROUNDWATER QUALITY

482. The groundwater samples will be collected from the four (2) locations during the project's construction phase. The samples will be collected and analyzed every season except monsoon season, as presented in Table 10-6.

Table 10-6: Groundwater Monitoring Details		
Sl. No.	Items	Description of Items
1.	Monitoring Parameters	pH, EC, TDS, Temperature, Taste, TSS, Oil and grease, Heavy metals
2.	Monitoring Locations	2 Groundwater samples Construction Camps Labor camps
3.	Monitoring Frequency	Every season, one sample from each location except for the monsoon season
4.	Total number of samples	Total number of samples = 2-locations x 1-sample per season x 3-season x 2.5-years=15 samples per contract Total number of samples during operation phase 6 per annum in consultation of DOE officials.

10.2.6 SOIL AND SEDIMENT QUALITY

483. The soil samples will be collected from the three (3) locations during the construction phase of the project. The samples will be collected and analyzed every season except monsoon season, as presented in Table 10-7.

Table 10-7: Soil Monitoring Details		
Sl. No.	Items	Description of Items
1.	Monitoring Parameters	pH, electrical conductivity, organic matter (%), nitrogen (mg/1000g), potassium (mg/1000g), phosphorous (mg/1000g), sulfates and sodium sulfates and oil & grease
2.	Monitoring Locations	3 Soil samples Construction Camps Labor camps Maintenance workshop
3.	Monitoring Frequency	Every season, one sample from each location except for the monsoon season
4.	Total number of samples	Total number of samples = 3-locations x 1-sample per season x 3-season x 2.5-years=22 samples

484. The sediment samples will be collected and analyzed every season except monsoon season from the four (2) sediment samples near the bridges of river/canal, as presented in Table 10-8.

Table 10-8: Sediment Monitoring Details		
Sl. No.	Items	Description of Items
1.	Monitoring Parameters	pH, electrical conductivity, organic matter (%), oil & grease, Heavy metals
2.	Monitoring Locations	2 Sediment samples from the river
3.	Monitoring Frequency	Every season, one sample from each location except for the monsoon season

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4.	Total number of samples	Total number of samples = 2-locations x 1-sample per season x3-season x 2.5-years=15 samples per contract

10.2.7 ENVIRONMENTAL MONITORING BUDGETARY COST ESTIMATES

485.To carry out the monitoring along project alignment during the construction and operation phase, the contract-wise environmental monitoring budgetary cost estimates have been worked out and is presented in the following **Table 10-9**.

Table 10-9: Environmental Monitoring Budgetary Cost Estimates per Lot				
Sl. No.	Environmental Parameters	Number of samples	Unit Cost (BDT)	Amount (BDT)
1.	Ambient Air Quality	120	35000	4,200,000
2.	Ambient noise and Vibration	180	5000	900,000
3.	Surface Water Quality	15	30000	450,000
4.	Groundwater Quality	15	30000	450,000
5.	Soil Quality	22	32000	704,000
6.	Sediment Quality	15	32000	704,000
Subtotal of Construction Phase Environmental Monitoring Cost				7,408,000 Say 7,400,000

486.The construction phase environmental monitoring cost is 7,400,000 BDT (Bangladesh Taka).

487.In addition to the above-discussed environment monitoring plan, it is proposed that the contractor will purchase, under an obligatory requirement of the contractor to implement ESMP, a set of portable equipment for PIU and CSC staff carrying out the monitoring as an emergency/ad hoc or when there is any grievance from the community. Thus, it is not included in the BOQ item of the bidding document. The budgetary cost estimate for the following equipment is as follows in **Table 10-10**.

Table 10-10: Budgetary Cost Estimates for Environmental Monitoring Equipment per contract	
Name of Equipment	Approximate Cost
Portable Handheld Integrated Noise level meter with data logger measuring range of 30dB(A) – 140 dB(A)	4,00,000
Vibration Monitor with Data Logger (Measuring Range: 30 ~ 120 dB)	5,90,000
The water quality monitoring kit has a pH meter, EC, temperature, DO pen, etc.	400,000
Portable Air Quality Meter (PM10 and PM2.5) with data logger and sensor heads to monitor gaseous pollutants (CO, NOx, and SO2).	4,00,000
Total	1,790,000

488.The total operation phase of environmental pollution monitoring of different parameters is presented in the Table 10-11.

Table 10-11: Environmental Monitoring Budgetary Cost Estimates for Operation Phase					
Sl. No.	Environmental Parameters	Period	Number of samples	Unit Cost (BDT)	Amount (BDT)
1.	Ambient Air Quality	Operation	9	40000	360,000
2.	Noise and Vibration Quality	Operation	9	10000	90,000
3.	Surface Water Quality	Operation	4	35000	140,000
4.	Groundwater Quality	Operation	2	35000	70,000
Subtotal of Operation Phase Environmental Monitoring					660,000

10.2.8 TREE PLANTATION ALONG THE ROAD ALIGNMENT

489.To make the project's development sustainable, a tradeoff approach has been adopted: planting three saplings for each tree to be removed to widen and strengthen the road. Tree plantation is the most economical, effective, and useful mitigation measure to control pollution and provides shade to the user, especially during summer. Since it is unavoidable to safeguard these trees, it is suggested that local, fast-growing trees be planted instead of trees removed for the project road development.

490.The project's development requires removing about 9000 roadside avenue trees. Some are very old/sacred trees that have also outlived their lives.

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491. Large trees are proposed to be planted in the available road space. In addition, biological noise barriers have been considered near sensitive receptors such as schools/institutions and temples to meet the tree plantation target. It is also proposed that landscaping be carried out on two monuments, including an informative signboard about the legend. These biological measures will be taken only after consulting with the stakeholders through an NGO. This will also help meet the target of tree plantation requirements along the alignment.

492. **Shrubs Plantation on Medians:** It is also proposed that shrubs be provided on the medians to reduce the glare of the road. While planting the shrubs on the medians, the following considerations have been made for all three contracts.

- The shrubs will be planted in 2 rows.
- The spacing will be 1m apart.
- To maintain a height of 2m of a shrub, it is recommended to trim these proposed shrubs at least once in the year before the monsoon period under the maintenance item during the operation phase.

493. The suggested shrub plantation on the median for each contract is as follows in **Table 10-12**.

Lot	Length of space available (m)	Spacing/Row Details	Number of shrubs to be planted	Species
1	10300	1m spacing and in 2-rows	20,600	Korobi
2	10880		21760	Radhachura
3	10460		20920	Konokchapa
4	10400		20800	Akondo
				Dad mordon
				Dhai ful
				Dat ranga
				Alamanda
				Hasna hena
				Rangan
				Arhar
				<i>Nerium oleander</i>
				<i>Caesalpinia pulcherrima</i>
				<i>Ochna squarrosa</i>
				<i>Calotropis gigantea</i>
				<i>Cassia alata</i>
				<i>Woodfordia fruticosa</i>
				<i>malabar melastome</i>
				<i>Allamanda schottii</i>
				<i>Cestrum nocturnum</i>
				<i>Ixora coccinea</i>
				<i>Cajanus cajan</i>

494. **Biological Barriers:** It is worth mentioning that the predominant land use pattern along the road is mixed areas comprising residential cum commercial areas. The standard noise levels for this land pattern are 60dB(A). These schools/mosques are in the mixed land use pattern and are partially affected due to the loss of the boundary wall. Compensation for constructing the boundary wall along the schools has been provided in RAP. The boundary wall of brick masonry of approximately 1.5m height will help break the line of sight between the receiver and source.⁴⁸ It is also reported that breaking the line of sight will reduce the noise of 5db(A) and the material weight of a 4.5-inch brick wall is more than 4 pounds per square foot.⁴⁹ It is also reported that for effective reduction, a greenbelt (of 15m to 30m wide and 4m to 5m tall plant)⁵⁰ along with shrubs having dense foliage, it is suggested that they be planted along the boundary wall of the schools. Thus, it is proposed to plant a dense tree plantation in three (3) rows along the school's boundary wall, which shall be undertaken to reduce the noise levels' intensity and enhance the affected school's landscape. However, it is reported tree plantation contributes very little to actual noise reduction but confers a psychological benefit in reducing the perceived nuisance of traffic noise.⁵¹ Other options, such as constructing earthen mounds, require land, which is not available on school premises, and concrete barriers are very costly. Thus, only tree plantation along boundary walls has been considered to reduce noise intensity. A 30 meter of dense vegetation can reduce noise by five decibels.⁵² The details are discussed in Section 7, and the plan for the plantation of the trees is shown in Annex 10-1. The tree plantation along the boundary wall is presented as follows in **Table 10-13**.

Lot	Number of institutions	Spacing/Row Details	Number of Trees to be planted	Suggested Species
1	20	3m spacing between 3 rows	1000	Jarul
2	15		900	Aam
3	9		450	Nageshwar
4	20		1000	Kalojam
				Kathal
				<i>Lagerstroemia speciosa</i>
				<i>Mangifera indica</i>
				<i>Mesua nagassarium</i>
				<i>Syzygium cumini</i>
				<i>Artocarpus heterophyllus</i>

⁴⁸ Transit Noise and Vibration Impact Assessment, FTA

⁴⁹ [Noise walls & barriers | WSDOT](#)

⁵⁰ A guide to the Reduction of Traffic Noise, VicRoad, 2003

⁵¹ Roads and the Environment- A Handbook. World Bank Technical Paper No. 376, 1997

⁵² [Highway Traffic Noise Barriers at a Glance - Design Construction - Noise Barriers - Noise - Environment - FHWA \(dot.gov\)](#)

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Table 10-13: Biological Noise Barriers in the Form of Tree Plantation details

Lot	Number of institutions	Spacing/Row Details	Number of Trees to be planted	Suggested Species
				Hijal Lichu Chatim Menda Koroch Dewa
				<i>Barringtonia acutangula</i> <i>Litchi chinensis</i> <i>Alstonia scholaris</i> <i>Litsea glutinosa</i> <i>Pongamia pinnata</i> <i>Artocarpus lacucha</i>

495. Enhancement Measures: One big pond in lot one and one monument in Contract 3 have been selected for enhancement measures by taking up tree plantation. To ensure the implementation of the proposed plan, the NGO engaged by the RHD shall be assigned to conduct stakeholder consultation for taking up this enhancement measure with them. The details are as follows in **Table 10-14**.

Table 10-14: Enhancement Measures in the Form of Tree Plantation details

lot	Length of Structure	Spacing/Row Details	Number of Trees to be planted	Suggested Species
1/4	300	3m spacing between 1-row	100	Khejur
2	120-		40-	Tal
3	50		17	Barun Koroch Hijal Jarul Narikel
	120		40	

496. Plantation Works: The contractor will take the following steps to plant shrubs and trees.

497. Site preparation: This activity needs to be undertaken well before monsoon for rainy season species and during October-November for winter species. Thorny bushes and weeds need to be removed entirely from the site. It should be followed by soil and water conservation work using physical measures, such as surface rainwater harvesting, trenches, and stone bunds; engineering structures, such as small check dams and biological devices, such as planting of fast-spreading grass and leguminous species and bushy materials. For planting seedlings/saplings, pits of appropriate size (1×1×1m for tree species, 0.5×0.5×0.5 m for shrub species) need to be prepared well in advance. The topsoil of 30 cm depth need be kept aside for mixing with Farmyard Manure (FYM) to promote microbial growth for nutrient recycling.

498. Seeding and Transplanting: For grass and leguminous species plantation, direct seeding could be practiced establishing a surface cover to check soil loss and grass growth for herbivores and nesting sites for birds. The plantation should be done in rows as per IRC guideline both row to row and plant to plant using healthy seedling/sapling. While planting, the poly bag should be moistened first. The poly bag should not be removed completely, only the bottom part of it should be removed by cutting it with a sharp blade without disturbing planting material. The planted material should be watered slowly to avoid soil disturbances.

499. Multi-purpose tree plants and shrub species have a special significance in fulfilling the objectives of improving the environment as well as the needs of the people. During lean periods of spring and summer, trees come to the rescue of livestock. The young, leafy, succulent material is highly nutritious and rich in crude protein and minerals. The tree species can be planted along the boundaries and in rows in the grassland. The trees must be planted as per the above schedule during monsoon. The fodder from the trees is available after 4-5 years. Three guards shall be provided during the initial growth period.

500. It is suggested that leguminous species, pollution-tolerant plants, soil-stabilizing species, multipurpose plants, and fruit-bearing trees be planted.

501. Plantation cost Break-up: It is proposed that a total of 27,000 trees (6,000 in Lot 1, 9000 in Lot 2, 6000 in Lot 3, and 6000 in Lot 3) be planted. Out of the total tree plantation, about 40% of tree plantation will be undertaken by RHD through contractors in the project, and the remaining 60% of the trees will be planted through the Forest Department under the social forestry program. A budgetary breakup for the tree plantation plan during the construction phase is given in **Table 10-15**.

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Table 10-15: Budgetary Cost Estimates in BDT for Tree and Shrub Plantation												
Sl#	Description	Rate (BDT)	Lot 1		Lot 2		Lot 3		Lot 4		Total Amount in BDT	Remark
			Units	Amount	Units	Amount	Units	Amount	Units	Amount		
1.	Plantation of trees & including pit, watering, mulching fertilizer, planting the saplings and fencing)	700	2400	1,680,000	3600	2,520,000	2400	1,680,000	2400	1,680,00	7,561,680	Project BOQ Item
2.	Shrubs Plantation on median including pit, watering, mulching fertilizer, planting the saplings and	30	10300	309,000	10880	326,400	10460	313,800	10400	312,000	1,261,200	Project BOQ Item
3.	Biological Noise Barrier	660	1000	660,000	900	594,000	450	297,000	1000	297,000	1,848,000	Project BOQ Item
4.	Enhancement Measures	660	100	66,000	40	26,400	17	11,220	40	11,220	114,840	Project BOQ Item
5.	Grass plantation			The cost has been considered in engineering BOQ.								
6.	Plantation of trees & including pit, watering, mulching fertilizer, planting the saplings and fencing)	700	3600	2,520,000	5400	3,780,000	3600	2,520,000	3600	2,520,000	11,340,000	Forest Department (Social Forestry)
Total number of tree plantations +Noise Barriers + Enhancement Measures								30547		Tree plantation in Project BOQ item		
Maintenance cost 10,000BDT per km per month for 2 years								12,000,000		Will be done by the contractor under the supervision of Khulna Zone		
		Total Tree Plantation cost by RHD through Contractor in the project BOQ item =9,524,520										
		The Forest Department will plant about 29,200 trees (3600 in Lot 1, 5400 in Lot 2, 3600 in Lot 3, and 3600 in Lot 4) under the Social Forestry scheme immediately during the implementation phase.										
		Total Shrub Plantation Cost (project BOQ item) =1,261,200										
		Note: About 40% of tree plantation will be taken up by the RHD as a Project BOQ item; noise Barriers and Enhancement measures will be undertaken by RHD through the Contractor in the Project BOQ item; the remaining 60% will be by the Forest Department, and Arboriculture Department of RHD under social forestry immediately during the implementation phase. Shrubs Plantation on the median will be taken up by the Contractor.										

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10.2.8.1 INSTITUTIONAL RESPONSIBILITY AND ARRANGEMENT FOR ESMP IMPLEMENTATION

502. The RHD has established a PIU to oversee the implementation and management of project-related activities. An organogram for the implementation of environmental and social management is presented in **Figure 10-1**.

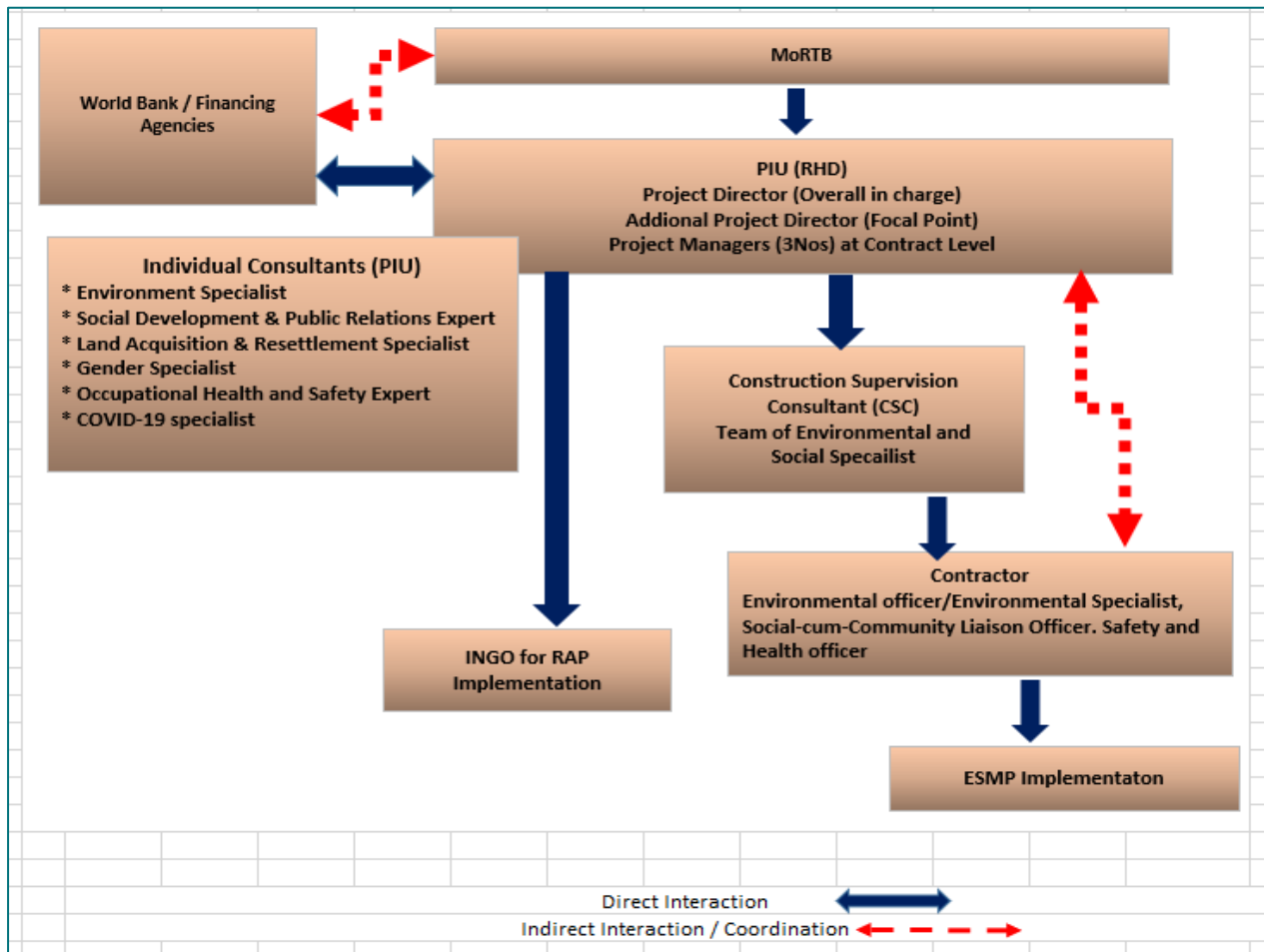


Figure 10-1: Organogram for the Implementation

503. The proposed institutional setup will be as follows:

504. The environmental officer/Environmental Specialist, Social-cum-Community Liaison Officer, and safety and Health officer of the Contractors will be responsible for implementing the ESMP at the site.

505. CSC will be the project engineer and report to the PIU. He will be responsible for contract administration and day-to-day project supervision, including implementing environmental and social management plans. The CSC will consist of an environmental and social expert. It is suggested that a team of environmental and social experts at the national level for each contract will be comprised of a senior environmental specialist, a Public Health Specialist, a Gender specialist, a senior Resettlement, and a rehabilitation specialist/ senior social development specialist, the CSC team.

506. The Project Implementation Unit (PIU) of RHD is the responsible agency for the overall implementation of project activities. Since the project road has been divided into three contracts, Project Managers at the contract level have been assigned to implement the project activities, including ESMP. Thus, there is a total of four (4) Project Managers in the PIU. PIU has hired Subject Matter Experts, namely, Environment Specialist, Social Development and Public Relations Expert, Land Acquisition/Resettlement & Rehabilitation Specialist, Gender Specialist, Occupation Health and Safety Specialist to assist the PIU in the implementation of ESMP and RAP. In PIU, an Additional Project Director (APD) has been deployed, who will be a focal point for the implementation of ESMP and the supervisor of the Project Managers. The head of PIU is the Project Director.

507. RHD is responsible for constructing and maintaining Bangladesh's major road and bridge networks. RHD has established a Project Implementation Unit (PIU) to implement this project.

10. Environmental and Social Management Plan

508. MoRTB is an umbrella agency responsible for ensuring the project is developed sustainably and meets the World Bank's environmental and social safeguards.

509. The roles and responsibilities of different designated staff at the project are given in **Table 10-16**.

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Table 10-16: Roles and Responsibilities of Different Designated Staff		
Institution	Designation	Role and Responsibility
MoRTB	-	- Ensure that the project, regardless of financing source, complies with the provisions of the ESMP, World Bank ESS and GoB laws and policies - Ensure that project implementation complies with government environmental policies and regulations. - Ensure that project environmental and social management is implemented and reported to the Steering Committee and the financing agency as required.
PIU	Project Director, PIU of RHD	- Overall implementation of the project - Coordination among the high-level committees to obtain regulatory clearance/permissions. - Participate in high-level meetings. - Review of the progress of the project and ESMP - Approved to release the funds
	APD, PIU of RHD	- Updating the PD on various aspects of the project - Coordination with the World Bank and regulatory authorities on EMP implementation with assistance from PIU - Recommendation to PD for release of funds - Responsible for regulatory obligations for the project. - Review the monthly progress of the contractor - Grievance redressal at the project level
	Project Manager (PM) - PIU	- Overall implementation of the project at the site - Check and verify Interim Payment Certificates (IPCs) for contractors' payment - Coordinate the different district level committees to obtain regulatory clearance/permissions. - Participate in district level meeting. - Monthly review of progress - Grievance Redressal at field level
	Environment Specialist (PIU)	- Planning and implementation of ESMP - Review the monthly progress of the contractor on ESMP implementation - Reviewing the periodic progress reports on ESMP - Assisting PIU on Environmental Safeguards issues and ESMP implementation - Conducting field visits as and when required - Assisting PIU in coordinating with the regulatory authorities. - Supervision and monitoring of the progress of activities of the consultants and contractors for the implementation of different components of ESMP - Guide PIU, CSC, and contractors in conducting subsequent monitoring and reporting and in undertaking corrective options - Imparting training for the field staff and contractors on ESMP. - Ensuring that the CSC commits and retains dedicated staff as social and environmental managers to oversee CESMP implementation - Ensuring that periodical environmental and social management and monitoring reports are submitted to the steering committee and co-financers through RHD. - Preparation and submission of semi-annual monitoring reports on ESMP implementation for the WB review through RHD - Implementation of environmental monitoring measures (such as environmental quality monitoring, tree plantation, landscaping, and wildlife monitoring) during the O/M stage of the Project. - Grievance Redressal

10. Environmental and Social Management Plan

Table 10-16: Roles and Responsibilities of Different Designated Staff

Institution	Designation	Role and Responsibility
	Social Development and Public Relations Expert	► Liaison with district administration (DC) to support land acquisition and RAP implementation activities. ► Assist the PMU on RAP implementing iNGO and setting up a baseline and monitoring system.
	Land Acquisition/Resettlement & Rehabilitation Specialist (PIU)	► Review and finalize RAP additions when necessary and Monitor activities of the NGO (iNGO); ► Conduct internal monitoring of the resettlement process to ensure smooth implementation. ► Ensure timely compensation payments and other entitlements as per the RAP are made before physical relocation or civil work commencement. ► Participate, record, and address grievances at the project level ► Coordinate with the project cell to ensure the availability of funds for all R&R activities. ► Monitor the effectiveness of entitlement contracts and payment modality. ► Promote improved social and environmental performance through the effective use of management systems. ► Ensure that proper implementation of Livelihood restoration plan and gender action plan including ► Grievance Redressal ► Liaison with relevant government authorities for protecting archeological and cultural heritage sites.
	Gender Specialist (PIU)	► Review and prepare the project Gender Action Plan (GAP) & support PIU for its implementation. ► Coordination with the WB task team and PIU ► Organize/facilitate initial training of PIU staff on GBV & support the PIU with the development of the GBV action plan ► Develop or adapt standard operating procedures for GRM ► Assess the need for and support the implementation of community consultations and stakeholders' engagement during upcoming implementation support missions. ► Support the adaptation of a code of conduct (CoC) for workers. ► Carrying out advocacy for promoting equal rights for women in skilled and unskilled labor force, day-care centers at worksites, etc.
	Occupation health and Safety (OHS) expert (PIU)	► Review and prepare the project OHS plans ► Review the progress of OHS implementation at site and safety arrangements made by the contractor to prevent untoward incident. ► To interact with regulatory agencies on the environmental, social, occupational, and safety issues, including safety aspects ► Review the Contractor's OHS plan and its updates
Construction Supervision Consultant	Environmental Engineer/Specialist	► Responsible for ensuring that effective measures of implementation of ESMP are being taken at the construction site. ► Before construction, review and approve CESMPs/method statements prepared by the contractors ► Inspection and reporting of Contractor activities to ensure effective implementation of the ESMP. ► Suggesting mitigation measures or action, followed by inspections and evaluation. ► Ensuring that the social and environmental mitigation measures are incorporated in the Contractors Environmental and Social Management Plan (CESMP), etc. ► Monitor the implementation of the CESMP and review the environmental management and monitoring reports prepared by the contractor ► Review of progress reports and periodic reporting to PIU ► Interaction with Environment and R&R Specialist (PIU) ► Overall, CSC is responsible for ensuring the proper and timely implementation of all their tasks specified in the ESMP
	Social Team (Social Development Specialist/Resettlement and rehabilitation (R&R)	► Inspection and reporting of Contractor activities to ensure effective implementation of the ESMP (social aspects) ► Implementation of RAP, Interaction with INGO, and reporting of progress of LAP/RAP ► Audits of Construction camps/labor camps and other facilities to monitor health/hygiene issues including HIV/AIDs ► Monitoring report

10. Environmental and Social Management Plan

Table 10-16: Roles and Responsibilities of Different Designated Staff

Institution	Designation	Role and Responsibility
	Expert/Gender Specialist, Public Health Expert)	
Contractor	1- Environmental officer/Environmental Specialist 2- Social-cum-Community Liaison Officer 3- Safety and Health officer	▶ Responsible for the preparation of the Contractor's site-specific Construction Environmental and Social Management Plan (CESMP) based on the ESMP of the Project. The CESMP will have but not limited to the following: - Labor Management Plan, - Waste Management Plan - GBV Action Plan, - Construction and Demolition waste, and Liquid Waste Management Plan Hazardous Waste Management Plan, - Workers' Camp Management Plan, - Construction Materials Sourcing Plan - Community Health and Safety Plan - Chance finds procedures - Training schedule of staff ▶ The CESMP needs to be approved by the CSC before the commencement of work. ▶ Responsible for preparing a Standalone C-OHS, which needs work to be approved before commencement of work at the site. However, it may be modified as per the site's requirements. ▶ To prepare a standalone C-Traffic Management Plan that met the Bangladesh Traffic Rules Manual's 2000 requirement. (Guidelines for Developing Traffic Management Plan is given in Annex10-3) ▶ Flow Chart and Reporting Mechanism of Incidents for developing an emergency response action plan are presented in Annex 10-4. ▶ Direct Reporting to the Project Manager of the contractor ▶ Assisting in ensuring that environmentally sound practices are adopted at the construction site. ▶ To prepare a redevelopment plan in consultation with CSC and land parcel owner for all the sites of identified project-related ancillary facilities like (i) construction camp, (ii) labor camp, (iii) stone crusher unit, (iv) borrow area and (v) waste including debris disposal site. ▶ Ensure that all valid permits and approvals are in place ▶ To have regular interaction with CSC and provide data on the implantation of ESMP. ▶ To ensure that all the waste is managed per the DOE rules and regulations. ▶ To ensure that Hazardous waste or chemicals are managed at construction sites/construction camps as per the DOE rules and regulations. ▶ To ensure that traffic management plans and road safety issues are attended to at the site. ▶ To interact with regulatory agencies on environmental, social, occupational, and safety issues, including safety aspects. ▶ Imparting training for the staff on environmental safety and health issues and ESMP measures. ▶ An environmental monitoring plan is being implemented at the site. ▶ Taking corrective action measures at the site. ▶ Ensuring that all the permits/approvals are valid. ▶ Prepare and submit monthly ESMP implementation progress reports per the format in annexes. ▶ The contractor will report to CSC within 24 hours any incident fatalities, injuries, gender-based violence, etc., including measures taken at the site. ▶ Prepare a monthly progress report on ESMP, OHS, etc., and submit it in the first week of every month.

10. Environmental and Social Management Plan

a) Environmental Engineer/Specialist:

510.CSC's Environmental engineer/specialist shall be well-experienced and qualified. The qualifications and experience of the Environmental Engineer shall be as follows:

511.**Qualification and Experience:** Bachelor of Engineering in Civil Engineering or Environmental Engineering, with 10 years of experience in the same field, or Master of Science in Environmental discipline, with 15 years of experience. He/she should have experience with two (2) Environmental Impact Assessment studies for Highway projects and should know about Policy, Legal, and administrative frameworks of the Environment.

b) Environmental Health and Safety officer – Contractor

512.To ensure the effective implementation of the Environmental and Social Management Plan (ESMP) at construction sites, camps, borrow areas, or other contractor facilities, it is essential for the contractor to engage a full-time Environmental and Safety Engineer. The qualifications for this role are quite specific:

513.A Bachelor of Engineering in Civil Engineering or Environmental Engineering or a master's in environmental science.

- ▶ A minimum of 7 years of experience in the construction industry, with a preference for road construction projects.
- ▶ Candidates who possess a diploma in safety aspects from a recognized institute in addition to their Master's degree will receive additional preference.

514.This role is crucial for overseeing the implementation of site-specific mitigation and management measures, monitoring environmental quality, and ensuring compliance with all necessary environmental and safety regulations1..

10.3 REPORTING

515.The Contractor will submit the monthly progress report on ESMP implementation to CSC according to the checklist in Section 10.6.

516.The CSC will validate the report based on observation/audit carried out by the Environmental Engineer/Specialist on the implementation of ESMP. The CSC will submit monthly progress reports and quarterly progress to PIU. The PIU will regularly transmit the monthly progress report to the World Bank as stipulated in the Environmental and Social Commitment Plan (ESCP). Besides, a quarterly report on monitoring the ESHS performance of the PIU will be submitted regularly to WB by the PIU as per the requirement of ESCP.

10.4 CAPACITY BUILDING

517.To strengthen the capacity of Staff, the following training of target groups such as PIU staff, stakeholders, community, project workers, consultants, contractors, and sub-contractors is suggested as per the Environmental and Social Commitment Plan (ESCP). The proposed capacity-building training of different target groups will be carried out by an Individual Consultant of PIU. The total training budgetary cost for capacity building for each contract has been worked out to be BDT 2,50,000 in **Table 10-17**.

Target Group	Subject(s)	Method	Time Frame	Cost (BDT)
All concerned PIU /project staff (6 Numbers) in Dhaka	▶ Environmental and Social Standards Overview ▶ Environmental regulations and national standards, ▶ Process of impact assessment and identification of mitigation measures, ▶ Importance of ESMP & its monitoring, ▶ Occupation Health and Safety (OHS) ▶ Community Health and safety (CHS) ▶ Road Safety and Traffic Management at construction site	Lectures	Before the beginning of the implementation of the project	50,000
Project Workers, Environmental	▶ Basic features of an ESMP,	Workshops and Seminars	Before the construction	1,25,000

10. Environmental and Social Management Plan

Table 10-17: Training Schedule and Training Cost for 2 days				
Target Group	Subject(s)	Method	Time Frame	Cost (BDT)
Engineers, field officers, contractors, Sub-contractors' stakeholders, community, supervision consultants (50 Number at Jashore/Jhenaidah)	planning, ► Implementation of ESMPs: ► Occupation Health and Safety (OHS) ► Community Health and safety (CHS) ► designing and execution of social and environmental mitigation (SEA/SH, GBV, COC) ► Road Safety and Traffic Management at construction site ► Enhancement measures, ► monitoring and evaluation of environmental conditions – during construction and operation			
Project staff field officers, contractors, Sub-contractors' stakeholders, community, dealing in social/lands matters (30Number in Jashore/Jhenaidah)	► Social awareness: Monitoring consultants/organizations, Land acquisition and compensation related Grievance Redressal Mechanism (GRM) and SEA/SH related GRM, Redressal Mechanism	Lectures, Workshops and Seminars	Before implementation of R&R and LA	75,000
Total training budgetary cost for capacity building for each contract				2,50,000

10.5 CHECKLIST FOR MONITORING ESMP

518. For effective implementation of ESMP provisions, checklists for different parameter monitoring and reporting format for various activities (EC-1 to EC-13) are presented in Annex 10-2.

10.6 ENVIRONMENTAL MANAGEMENT COST

519. The budgetary cost estimates for implementation of construction and operation phase ESMP is presented in Table 10-18. The total budgetary cost of the Environmental Management Plan (EMP) is approximately BDT 8,30,67,000 (Eighty-Three Million Sixty-Seven Thousand). This includes environmental monitoring costs and tree and shrub plantation per the Greenbelt development plan. The estimates also include a 2-day training cost of BDT 250,000 (Two Hundred Fifty Thousand) per lot. This will be conducted before the project's implementation phase. The ESMP budgetary cost estimates in the construction phase are BDT 2,36,25,000 for Lot 1, BDT 2,41,08,000 for Lot 2, BDT 2,22,99,000 for Lot 3, and BDT 1,30,35,000 for Lot 4. The operation phase ESMP budget estimate for the total road is BDT 6,760,000 (Six Million Seven Hundred Sixty Thousand).

520. It is recommended (if funds are available) that an extruded acrylic (1.17 – 1.19 g/cm³ of density) sheet noise barrier of 6mm thick be provided on the loop, take-off, and landing sides of the Navaron junction to reduce the noise impact on the community nearby. This sheet should be fixed on both sides. This will attenuate the noise level by 20db (A). The cost is about 400 BDT per square foot. A 2m height for a total 5 km length (2.5km on each side) will cost approximately 4,00,00,000 (Four hundred million or Forty crore Bangladeshi taka).

10. Environmental and Social Management Plan

Table 10-18: Budgetary Cost Estimates for ESMP Provisions in BDT:							
Component	Items	Estimated Rate	Lot 1	Lot 2	Lot 3	Lot 4	Remarks
A) Preconstruction Stage							
2 days Training in Dhaka/Jashore/Satkhira Budget for PIU staff	Lumpsum	2,50,000	2,50,000	2,50,000	2,50,000	2,50,000	RHD
B) Construction Phase ESMP Cost							
Environmental Health and Safety Training	Lump Sum	10,00,000	10,00,000	10,00,000	10,00,000	10,00,000	Obligatory requirement of contractor to implement ESMP
Environmental Monitoring	Monitoring of air, water, soil, and noise (Refer to Table 10-11)	6,60,000	6,60,000	6,60,000	6,60,000	6,60,000	Project BOQ Cost
	Provision of portable Environmental monitoring Equipment for ad hoc use by PIU and CSC staff	Refer Table--10.16	17,90,000	17,90,000	17,90,000	17,90,000	Obligatory requirement of contractor to implement ESMP
Air	Dust Suppression at construction sites/stockyard/construction camps/haul roads	Lumpsum	4,40,000	4,40,000	4,40,000	4,40,000	Obligatory requirement of contractor to implement ESMP
Shrubs	Plantation, including 6 years maintenance cost	Refer Table 10-15	3,09,000	3,26,400	3,13,800	3,12,000	Project BOQ Cost
Tree Plantation	Tree plantation, including 6 years of maintenance cost	Refer Table 10-15	16,80,000	25,20,000	16,80,000	1,680,00	Project BOQ Cost
Noise Barriers	Tree plantation, including 6 years of maintenance cost	Refer to Table 10-15	6,60,000	5,94,000	2,97,000	2,97,000	Project BOQ Cost
Enhancement Measures	Tree Plantation	Refer Table 10-15	66,000	26,400	11,220	11,220	Project BOQ Cost
Maintenance of Plantation	Maintenance of trees and plantation for 2 years @10,000 per km per month		22,32,000	19,20,000	14,40,000	14,40,000	Will be done by the contractor through Khulna zone
Safety	Demarcation of borrow area clearly, using fencing if needed.	Lumpsum	5,00,000	5,00,000	5,00,000	5,00,000	Obligatory requirement of contractor to implement ESMP
	Traffic Management Plan including Pedestrian Crossing	Lumpsum	15,00,000	15,00,000	15,00,000	15,00,000	
	Provision of Hoarding/Posters at construction camps and provision of health checkup at construction sites	Lumpsum	8,00,000	8,00,000	8,00,000	8,00,000	
	Provision for PPEs, such as helmet, gumboots, jackets, goggles etc. to labors	Lumpsum	6,00,000	6,00,000	6,00,000	6,00,000	
Construction Camps	Sanitary Facilities	Lumpsum	15,00,000	15,00,000	15,00,000	15,00,000	Obligatory requirement of contractor to implement ESMP
Waste Management	Solid/hazardous/C&D/Liquid	Lumpsum	10,00,000	10,00,000	10,00,000	10,00,000	Obligatory requirement of contractor to implement ESMP
Total for construction phase for contractor			2,14,77,000	2,19,16,800	2,02,72,020	1,18,50,220	

10. Environmental and Social Management Plan

Table 10-18: Budgetary Cost Estimates for ESMP Provisions in BDT:							
Component	Items	Estimated Rate	Lot 1	Lott 2	Lot 3	Lot4	Remarks
	Contingency @ 10%		2147700	2191680	2027202	1185022	
	Total construction phase for contractor		2,36,24,700	2,41,08,480	2,22,99,222	1,30,35,242	
Say			2,36,25,000	2,41,08,000	2,22,99,000.	1,30,35,000	The total construction phase EMP budgetary cost estimate is BDT 8,30,67,000
D) Tree plantation through the forest department under social forestry as per Section 10.3							
E) Operation Phase Cost of ESMP per Annum for 55 Km Road length							
Environmental Pollution Monitoring Refer to Table 10-9			660000			Operation and maintenance will be taken up Khulna zone through GoB funding.	
Shrubs and Trees Maintenance of trees and shrubs, including trimming of shrubs, watering, and clearing of weeds @ BDT 10,000 per Km per month			55,00,000				
Sanitation and sanitary facilities, including waste (liquid and solid) as per DoE requirement		LS	6,00,000				
Operation Phase Cost of ESMP per Annum			6760000				

Annexes

Annexes

Annex 1 :Screening of the Anticipated Impacts

521. In this ESIA study, the anticipation and identification of the significant VEC parameters is carried out based on the existing environmental condition and following the existing policies, laws, and administrative framework applicable to the Chachra Intersection project and relevant environmental and social safeguards policies of the World Bank. The impacts are identified according to the development stages, namely the pre-construction, construction, and operation stages of the Project in compliance to the World Bank's Environmental Social Safeguard Standard as follows:

- ▶ Related to Assessment and Management of E&S risk and impact (ESS 1)
- ▶ Relating to Labor and Working Conditions (ESS 2)
- ▶ Relating Resource Efficiency and Pollution Prevention and Management (ESS 3)
- ▶ E&S risks and impacts relating to Community Health and Safety (ESS 4)
- ▶ Related to Land Acquisition/Involuntary Resettlement (ESS 5)
- ▶ Relating to Biodiversity & Living Natural Resources (ESS 6)
- ▶ Tribal/Indigenous Population (ESS 7)
- ▶ Related to Impacts on Cultural Heritage (ESS 8)
- ▶ Stakeholder Engagement and Information Disclosure (ESS10)

The abbreviations used in the Table are as follows

+ve = Positive Impact; -ve = Negative Impact; H = High; Lo=Low; Medium = Me; AG = Above Ground; D = Design & Pre-Construction Stage; C = Construction Stage; O = Operation Stage; N = Neutral; PC = Pre-Construction; VEC = Valued Environmental Component; P = Permanent; T = Temporary; L = Localized/Limited; R = Regional; Mi = Minor; Mo = Moderate; Ma = Major.

Annexes

Environmental and Social Impacts Screening During Project Implementation Phases as Without Mitigation Measures Sceneries					
VEC	Impact/Activity	Project Stage	Duration	Area	Severity
Physical Environment (Compliance of WB's ESS 3-Resource Efficiency and Pollution Prevention Management and Bangladesh ECR 1997)					
Air Quality	Location of project road alignment	D	+ve, P	+ve, L	+ve, Me
	Dust, PM, emissions from construction equipment and vehicles, transportation and storage of materials,	C	-ve, T	-ve, L	-ve, Me
	Emissions from road traffic	O	+ve, P	+ve, L	+ve, Lo
GHG Emissions	Emissions from construction equipment and vehicles	C	-ve, T	-ve, L	-ve, Me
	Emissions from road traffic	O	+ve, T	+ve, R	+ve, Lo
Hydrology and Surface Water Quality	Alteration of rivers/streams for construction of cross structures and drains	D	-ve, T	-ve, R	-ve, Me
	Pollution from liquid and solid waste disposal from camps and construction activities, Extraction of water for construction works and use in camps	C	-ve, T	-ve, L	-ve, Me
	Siltation in receiving water bodies due to construction of bridges and culverts activities /earthworks	C	-ve, P	-ve, R	-ve, H
	Leakage of oil and grease from vehicles and equipment	C	-ve, T	-ve, L	-ve, Me
	Accidental oil spillage of vehicles	O	-ve, P	-ve, R	-ve, H
Ground Water Quantity	Pollution from liquid, solid waste from camps/construction activities	C	-ve, T	-ve, L	-ve, L
	Extraction of ground water for construction works and use in camps	C	-ve, T	-ve, L	-ve, Me
Land degradation/pollution	Opening of borrow area and quarries	D	-ve, P	-ve, L	-ve, Me
	Disposal of Solid waste from construction works and camps, muck disposal	C	-ve, T	-ve, L	-ve, Me
	Contamination of soil due to leakage/ spillage of oil, bituminous, and non-bituminous debris generated from demolition and road construction and non-bituminous debris generated from demolition and road construction	C	-ve, P	-ve, L	-ve, Lo
	Contamination of soil due to leakage/ spillage of oil due to road accidents	C & O	-ve, P	-ve, L	-ve, Lo
Biological Environment (Compliance of WB's ESS 6- Biodiversity-Conservation and Sustainable Management of Living Natural Resources and Bangladesh ECA 1995)					
Trees/Forest/ Terrestrial Vegetation	Removal of trees, shrubs and grasses	C	-ve, P	-ve, L	-ve, Me
	Growth of the compensated trees and additional plantation and development of grassland for improvement of GIB habitat	O	+ve, P	+ve, L	+ve, Me
Terrestrial fauna (Mammals, Birds, Insects, etc.)	Accidents of wild mammals/birds/insects	D	-ve, P	-ve, L	-ve, Lo
		C	-ve, P	-ve, L	-ve, Lo
		O	-ve, P	-ve, L	-ve, Lo
Migratory birds and ecologically sensitive areas	Habitat Loss and disturbance in feeding, breeding and migration of birds	C	-ve, T	-ve, L	-ve, Me
	None	O	N	N	N
Social Environment (Compliance of WB's ESS 5- Land Acquisition and Involuntary Resettlement)					
Private land and buildings	Location requiring removal of private structures/buildings	D	-ve, P	-ve, R	-ve, H
	Acquisition of private land. Demolition of private buildings.	C	-ve, P	-ve, R	-ve, H
	Possible complaints, opposition from disgruntled or unhappy affected persons	O	+ve, P	+ve, L	+ve, H
	Increase in value of land and property. Easier access to some areas and property.	O	+ve, P	+ve, L	+ve, H
Public property/infrastructure/ utility structures	Location removal of public structures/buildings and utility structures	D	-ve, P	-ve, L	-ve, M
	Demolition of public buildings. Removal and shifting of utility structures. Possible complaints from local public due to disruption of utility services	C	-ve, P	-ve, L	-ve, H
Affected ethnic minority or indigenous people	The project will not have ethnic minority PAPs, thus no impact on Indigenous peoples, their traditional culture, land resources, and territories. It does not require the adoption of the FPIC process.	C & O	N	N	N

Annexes

Environmental and Social Impacts Screening During Project Implementation Phases as Without Mitigation Measures Sceneries					
VEC	Impact/Activity	Project Stage	Duration	Area	Severity
Tradition, Culture and Ethnicity (Compliance of WB's ESS 8-Cultural Heritage and CRPs)					
Removal of cultural heritage	Cultural Heritage, Archaeology and CPRs	C & O	N	N	N
Noise	Location near residential areas, sensitive receptors (places of worship, hospitals, educational institutes, cultural/heritage sites etc.)	D	-ve, P	-ve, L	-ve, Me
	Disturbance caused to local residents from noise generated from construction activities, campsite activities using heavy equipment, movement of heavy-duty trucks during day and night time. Noise levels exceeding standards. Complaints from local residents near construction sites.	C	-ve, T	-ve, L	-ve, Me
	Noise levels exceeding baseline levels by more than 3dBA and causing disturbance to residents and sensitive receptors near project alignment	O	+ve, P	+ve, L	+ve, Lo
Vibration	Location near residential areas, sensitive receptors (places of worship, hospitals, educational institutes, cultural/heritage sites etc.)	D	-ve, P	-ve, L	-ve, Lo
	Vibration disturbance felt by local residents due to construction activities using heavy equipment and movement of heavy-duty trucks during day and night time.	C	-ve, T	-ve, L	-ve, Lo
Labor Management (Compliance of WB's ESS 2- Labor and Working Conditions and Bangladesh Labor Act 2006; Rules 2015)					
Occupational health and safety	Death, accident or injury of construction workers, due to poor safety standards. Illness of construction workers due to poor hygiene, health and sanitary facilities at the construction sites and camp sites.	C	-ve, T	-ve, L	-ve, H
	Accidents, injuries to operational staff	O	-ve, T	-ve, L	-ve, Lo
Community Awareness and HSE (Compliance of WB's ESS 4- Community Health and Safety and Bangladesh Labor Act 2006; Rules 2015)					
Public health and safety	Design of road safety features	D	-ve, P	-ve, L	-ve, H
	Dust and air pollution	C	-ve, T	-ve, L	-ve, H
	Accident/injury/death of local public living or moving near the project construction/camp sites due to poor safety standards. Illness of project construction/camp sites, mosquito breeding due to poor camp management, excessive dust/air pollution caused by project related activities. Traffic jams and accidents caused by project related activities.	C	-ve, T	-ve, L	-ve, H
	Accident, injury or death of public using the road. Health problems caused to people residing near road due to increased noise and air pollution	O	-ve, P	-ve, L	-ve, H
Stakeholder Management (Compliance of WB's ESS 10- Stakeholder Engagement and Information Disclosure)					
Stakeholder Disclosure	Assess stakeholders interest and support for project and ensure stakeholders' views to be taken into account in project design	D	+ve, P	+ve, L	+ve, Lo
Engagement of Local People	Promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life-cycle	C	+ve, P	+ve, L	+ve, Lo

Annexes

Annex 1.1 :Approved TOR for EIA Study from DOE

গণপ্রজাতন্ত্রী বাংলাদেশ
পরিবেশ গণিত

Government of the People's Republic of Bangladesh
Department of Environment
Head Office, Faridesh Shaban
E-16 Agargaon, Star-e-Bangla Nagar, Dhaka-1207
www.doe.gov.bd



Memo No: 22.02.0000.018.72.059.23.162

Date: August 07, 2023

Subject: Approval of Terms of Reference (ToR) for EIA Road Improvement Project under Western Economic Corridor and Regional Enhancement (WeCARE) Program (Phase-3), Satkhira-Jessore, Khulna by Roads and Highways Department.

Ref: 22.02.4049.016.72.001.23.446; Date: 13.06.2023

With reference to your application received on 22.06.2023 for the subject mentioned above, the Department of Environment hereby gives approval of the Terms of Reference (ToR) for Environmental Impact Assessment (EIA) Study of the proposed Road Improvement Project under Western Economic Corridor and Regional Enhancement (WeCARE) Program (Phase-3), Satkhira-Jessore, Khulna by Roads and Highways Department subject to fulfilling the following terms and conditions:

- The project authority shall conduct a comprehensive Environmental Impact Assessment (EIA) considering the overall activity of the said project in accordance with the ToR submitted in the Department of Environment (DOE). The EIA study shall be conducted as per the provision laid down in the Environmental Conservation Rules, 2023.
- The EIA report shall be prepared in accordance with the guidelines provided in the schedule-11 and Rules 15, 16 of the ECR, 2023.
- Consultation with Stakeholders/Public Consultation should be done in accordance with the Rule 16 of the Environmental Conservation Rules, 2023.
- The project authority shall submit the EIA report to the Head Office of DOE in Dhaka.
- Without approval of EIA report by the Department of Environment, the project authority shall not make any land and forest lease development.

১৩/০৮/২০২৩
(Signature)
Director (Environment Clearance)
Phone: 88-02-222218342

Mr. Md. Moinul Hossain
Additional Project Director
Road Improvement Project under Western Economic Corridor and Regional Enhancement (WeCARE) Program (Phase-3)
Office of the Additional Project Director (SR, R11.5)
Allentari, Tejgaon, Dhaka 1215

Copy Forwarded to:

1. Director, Department of Environment, Khulna Divisional Office, Khulna.
2. Assistant Director, Office of the Director General, Department of Environment, Head Office, Dhaka.

Annexes

গণপ্রজাতন্ত্রী বাংলাদেশ
সরকার
২২/০৭/২০২৩

Government of the People's Republic of Bangladesh
Office of the Additional Project Director (SL, RIED)
WeCARE Phase-1:
Jhenaidah-Jashore Highway (N-7) Improvement Project
Alimnagar, Tejgaon, Dhaka 1215.
Email: apd.wecarewfpnrd@gmail.com



Memo: JS.01.0000.274.14.27.21.260

Date: 15/05/2023

Subject: Request for Site Clearance and Approval of the Terms of Reference (ToR) for Conducting an Environmental Impact Assessment (EIA) for Phase-3: Bhomra-Satkhira-Navaron Road Improvement Project under Western Economic Corridor and Regional Enhancement (WeCARE) Program.

The undersigned is pleased to inform you that the Consultant Services for conducting an EIA and prepare the EMP for Phase-3 activities to be implemented by RIED (62 km long Bhomra – Satkhira – Navaron road section of the National Highway) under the WeCARE Program of being in process funded by GoB and World Bank. The project interventions include the upgrading of the Bhomra – Satkhira – Navaron national highway from a two-lane single carriageway to a climate-resilient four-lane dual carriageway.

As per requirement, the draft Terms of Reference (ToR) for the proposed EIA is submitted for approval. Accordingly, the draft ToR to conduct the EIA study is attached herewith for his endorsement.

His immediate action will be appreciated.

Enclosures:

1. Draft ToR of the EIA study for approval
2. Chellan Copy
3. Location Map
4. Feasibility report

১৫/০৫/২৩
১৫/৫
২০২৩

(Mr. Mohiul Haque)
(ID No: 601931)

Additional Project Director (SL, C.C. RIED)

Director
Khulna Divisional Office
Department of Government (DoG)
Panchash Mukherjee Bypass, Khulna

Copy to:

1. Project Director (ACU), WeCARE Phase-1: Jhenaidah-Jashore Highway (N-7) Improvement Project
2. PM-1215, WeCARE Phase-1: Jhenaidah-Jashore Highway (N-7) Improvement Project, Sankh Bazar, Tejgaon, Dhaka
3. Team Leader (ESIA, STUP-BCL JV), WeCARE Phase-1: Jhenaidah-Jashore Highway (N-7) Improvement Project

[illegible]

[illegible]

Annexes

ফর্ম-৩

অবস্থানগত হস্তগত এর জন্য আবেদনপত্র

বিধি ৯ এর উপ-বিধি (১), বিধি ১০ এর উপ-বিধি (১), বিধি ১১ এর উপ-বিধি (১), বিধি ১২ এর উপ-বিধি (১),
বিধি ১৪ এর উপ-বিধি (১) ও বিধি ২৩ এর উপ-বিধি (৪) প্রকৃতি

অবকাটা মো প্রকল্পের জন্য

বনায়,

পরিচালক
পরিবেশ অধিদপ্তর
বুলন বিভাগীয় কার্যালয়

জনাব,

যেহেতু এখানকার অবকাটা মো প্রকল্পের জন্য বিদ্যমান হস্তগত অধিদপ্তর কর্তৃক প্রাপ্ত অবস্থানগত

হস্তগত প্রাপ্তির জন্য আবেদন করেছি:

১। প্রকল্পের নাম	Bhomra-Satkhira-Navaron Road Improvement Project under Western Economic Corridor and Regional Enhancement (WeCARE) Program (Phase-3)					
(ক) প্রকল্পের অবস্থানগত ঠিকানা	Satkhira-Jessore, Khulna, Bangladesh					
(খ) অধিদপ্তর হস্তগত ঠিকানা	A-1, Baran Tejgaon, Dhaka-1215.					
২। (ক) প্রস্তাবিত প্রকল্প	RHD proposed to widen and strengthen the existing national highway Navaron to Bhomra from 2 lanes to 4 lanes along with SMT.					
(অ) প্রকল্পের প্রকল্প ব্যয়	About 3000 million BDT					
(খ) প্রকল্পের উন্নয়ন কাজ শুরু	July, 2025					
সম্পন্ন তারিখ						
(গ) প্রকল্প সমাপ্তির সম্ভাব্য তারিখ	June, 2030					
(ঘ) প্রকল্প চালু হওয়ার সম্ভাব্য তারিখ (প্রযোজ্য ক্ষেত্রে)	Not identified					
(ঙ) বিদ্যমান প্রকল্প	Not Applicable					
(চ) প্রকল্প চালু হওয়ার তারিখ						
(ছ) যেটি বিনিয়োগকৃত অর্থ						
৩। প্রকল্পের স্বত্ব বিবরণ	Government land and private land					
(অ) মোট স্বত্ব পরিমাণ (একর)	400 (tentative)					
(আ) স্বত্বের মালিকানাধীন বিবরণ	will be evaluated during detail study					
ক্রমিক	স্বত্বস্বত্ব	স্বত্ব	স্বত্বের অবস্থা	স্বত্ব বা স্বত্ব	স্বত্ব	মোট (একর)
(১)	(২)	(৩)	(৪)	(৫)	(৬)	(৭)
(ই) প্রকল্পের জন্য প্রাপ্ত স্বত্ব/স্বত্বের অবস্থা:						
স্বত্ব/স্বত্ব	স্বত্ব	স্বত্ব	স্বত্ব/স্বত্ব	স্বত্ব/স্বত্ব	স্বত্ব/স্বত্ব	মোট (একর)
(১)	(২)	(৩)	(৪)	(৫)	(৬)	(৭)
✓	✓	✓		✓	✓	✓

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Annexes

৬ (ক) প্রকল্পের প্রকল্প পরিবেশগত সংকটাপন্ন এলাকাগুলি কিংবা ভূমিরাজি এ এ বর্ণিত বিধি অনুযায়ী উল্লেখ করা হবে	No
৭ (ক) প্রকল্পের প্রধান কার্যক্রম (ভূমি উন্নয়ন, আবকাঠি পো নির্মাণ ও পরিচালনা পর্যায়)	Earthworks, road expansion, bridge and culvert construction
৮ (ক) প্রকল্পের উন্নয়ন ও পরিচালনার জন্য প্রয়োজনীয় প্রধান উপকরণসমূহের নাম ও পরিমাণ	Siltmen, Steel cement, stone, sand, aggregates etc.)
(খ) উপকরণসমূহের উৎস	Local as well as imported
৯ (ক) দৈনিক পানি ব্যবহারের পরিমাণ	10-12 m³
(খ) পানির উৎস	Ground water
১০ (ক) জ্বালানির নাম ও পরিমাণ (দৈনিক/মাসিক/বার্ষিক)	Diesel, petrol, oilane etc.
(খ) বিদ্যুৎ ব্যবহারের পরিমাণ (কিলোওয়াট ঘন্টা) এবং বিদ্যুৎ উৎস	National power grid
১১ (ক) প্রকল্পের পোড়কণন মাপ	Attached with this form
(খ) সে আউট প্লান (প্রয়োজ্য ক্ষেত্রে প্রযোজ্য/যজ্ঞ/পদ্ধতি) পরিমোহনাগারের অবস্থান নির্দেশিত	Not Applicable
১২ (ক) প্রকল্পের জন্য কঠোর পরিবার ও জমির বিবরণ (প্রযোজ্য ক্ষেত্রে)	Will be estimated during RAP study
(খ) কঠোরদের স্থানীয় সনেক পরিচালনা (প্রযোজ্য ক্ষেত্রে)	Will be estimated during RAP study
১৩ (ক) কঠিন বর্জ্যের প্রকৃতি	Municipal waste
(খ) দৈনিক সনেক কঠিন বর্জ্যের পরিমাণ	180-190 kg (tentative)
১৪ (ক) দৈনিক সনেক করণ বর্জ্যের পরিমাণ (সনেক/কি)	7-8 m³ (tentative)
(খ) করণ বর্জ্যের নির্মিত স্থান	Constructed catch pit
১৫ বায়বীয় দূষণের প্রকৃতি এবং ইহা নির্ণয় ক্ষমতা	Nature: particulate matter (PM), Sulphur oxides (SO₂), Nitrogen oxides (NOx), Carbon monoxide (CO). Mostly from construction equipment
১৬ বায়বীয় দূষণের উৎস ও শব্দময়ন নিয়ন্ত্রণ ব্যবস্থা	Source: construction equipment, labor camp. Control measure: Provide barrier around the construction yard and camp, regular maintenance of noise producing equipment
১৭ কঠিন বর্জ্য ব্যবস্থাপন পদ্ধতি	Provide adequate garbage bin for collecting waste and dumping in the designated area by licensed vendor
১৮ জল বর্জ্য পরিশোধন ব্যবস্থা (প্রযোজ্য ক্ষেত্রে)	Not Applicable
১৯ বায়বীয় দূষণ নিয়ন্ত্রণ ব্যবস্থা (প্রযোজ্য ক্ষেত্রে)	Water spraying throughout the construction area and labor camp, regular maintenance of construction equipment

Annexes

১৭. পেশাদার ঝুঁকি সূচনা ও নিয়ন্ত্রণের জন্য প্রয়োজনীয় ব্যবস্থা	Hazard Identification and control measures, providing proper PPE, training and awareness signage. Deploy adequate safety and security personnel
১৮. কর্মের তরফদিক হতে মৌজা মাপ	Will be provided during the application of environmental clearance after detail study
১৯. রাজস্বী উন্নয়ন কর্তৃপক্ষ/জেমার উন্নয়ন কর্তৃপক্ষ/রাজস্বী উন্নয়ন কর্তৃপক্ষ/স্থানীয় কর্তৃপক্ষ এর অনুমতিপত্র (প্রযোজ্য ক্ষেত্রে)	Not applicable
২০. (ক) ইমোজেন্ট ফেল্ড প্রাথমিক পরিবেশগত পরীক্ষা প্রতিবেদন/প্রয়োজ্য ক্ষেত্রে পরিবেশগত প্রভাব মূল্যায়ন প্রতিবেদনের সংশ্লিষ্ট অংশ	Document attached with this letter
(খ) প্রয়োজ্য ক্ষেত্রে পরিবেশগত বাস্তুসংস্থ পরিদর্শন প্রতিবেদন	Not applicable
২১. সভাপতি সমীক্ষা প্রতিবেদন (প্রযোজ্য ক্ষেত্রে)	Attached
২২. প্রকল্প প্রকল্প (প্রযোজ্য ক্ষেত্রে)	Not Applicable

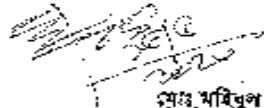
উপস্থাপনকারী (নিম্নস্বাক্ষরিত)

নাম : Md. Monirul Haque
পদবি : Additional Project Director (SE, C.O. RHD)
ঠিকানা : Alimnagar, Tejgaon, Dhaka-1215
ফোন : 01311092172
ই-মেইল : ard@wecarewb.gov.bd
তারিখ : 15/03/2023

Annexes

স্বাক্ষর

আমি এই মর্মে স্বাক্ষর করিতেছি যে, ব্যবহৃত হয়েছে যথাযথ তথ্য। আমার জ্ঞানমতে সত্য এবং উদ্বেগ
কোনো তথ্য গোপন বা বিবৃতি করা হয় নাই।



মেঃ মুহিবুল হক
পরিচিতি নং: ৩০১৯০১
অতিরিক্ত প্রশাসনিক পরিচালক (অর্থিক, ব্যবসায়িক, ও
উন্নয়নমূলক বিষয়-১)

(উন্নয়নাত্মক বাস্তবায়ন ও বাস্তবায়ন বিষয়ক প্রশাসনিক (একক) প্রধান কর্মকর্তা)

সনদ:

- * তফসিল ১-২ অনুসারে তথ্য বর্ণনা পরিদর্শন অফিসে দাখিল করা হয়েছে।
- ** বস্তু হ্রাস নিয়ন্ত্রণ সংক্রান্ত দাখিল করা হয়েছে।
- *** প্রত্যেক পৃষ্ঠায় উল্লেখ্য বা অধ্যয়ন অন্তর্ভুক্তি স্বাক্ষর ও সিল থাকিতে হবে।

Draft TERMS OF REFERENCE (TOR)

PREPARATION OF ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STUDY FOR PROPOSED ROAD UNDER WeCARE PROGRAM

1 INTRODUCTION

This Terms of Reference (TOR) is written for the use of specialist environmental consultants to prepare an Environmental Impact Assessment (EIA) for a road project within the WeCARE Program. The road will be developed by the Roads and Highways Department (RHD) of the Government of Bangladesh (GoB) which is the project proponent and financed by World Bank. By the requirements of the Bangladesh Environmental Conservation Rules 2023 (ECR, 2023) the roads are defined as 'A' Category and EIA will be required.

This part of the WeCARE Program includes the following alignment:

- ★ Bhomra – Satkhira – Navaron road section as Phase-3

By the ECR, 2023, the Project Proponent is required to submit Environmental Impact Assessment (EIA/ESIA) report to the Government for approval before commencing implementation of the project. Through this report, the relevant government authorities can monitor the impact within the life span of the project on the immediate environment, to enable major stakeholders of the project including the Government to manage the environment for the wellbeing of the community. This TOR has been prepared based on the Feasibility Study.

2 BACKGROUND INFORMATION

2.1 Description of the Project

Phase 3 will upgrade the Bhomra – Satkhira – Navaron section of the National Highway (62 km) from a two-lane single-carriageway to a climate-resilient four-lane dual-carriageway. It will include separate service lanes for slow-moving vehicles and vulnerable users on both sides of the carriageway, installation of an Optical Fiber Cable (OFC), and deployment of an Intelligent Transport System (ITS).

2.2 Name of Project

Western Economic Corridor and Regional Enhancement (WeCARE) Program, Bhomra – Satkhira – Navaron Road Section, Phase-3.

2.3 Project Proponent

The Project Proponent is the Roads and Highways Department of the Government of Bangladesh.

Contact Person: Md. Mondul Haque, Additional Project Director (SR, C.C. RHD), Western Economic Corridor and Regional Enhancement (WeCARE) Program, Phase-3, Bhomra – Satkhira – Navaron Road Improvement Project, Roads and Highway Department, Allenburi, Tejgaon, Dhaka-1215.

2.4 The objective of the Project

The objective of the project is to improve an existing 2-lane national highway to a 4-lane divided highway to be a part of the national road network.

2.5 Major Activities of the Project

The major activities of the project are widening of the existing national highway from 2 lane to 4 lane including improvement of junction roads and provision of the Slow-moving vehicular Transport (SMVT) road. Most of the proposed alignment will follow the existing road alignment but in certain areas where land is not readily available or the design requires, bypasses are being proposed. Also, in some locations through large commercial areas, an elevated alignment is proposed. Some land acquisition and resettlement will occur.

2.6 E&S Consultant

The E&S Consultant with appropriate qualifications and experience will carry out the EIA/ESIA study meeting the requirement Government of Bangladesh and the World Bank guidelines.

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3 SCOPE OF WORK AND TASKS

3.1 Scope of Works

The scope of work for the EIA/ESIA study shall at least involve the following aspects:

- To describe the context, components, and activities of the project;
- To identify, and assess key adverse environmental and social impacts that may result from the activities of the project;
- To identify, assess and recommend appropriate and practical mitigation measures to conserve or minimize the adverse environmental and social impacts identified;
- To identify, assess and recommend impact monitoring programs and compliance auditing programs.

After completion of the EIA/ESIA study, the E&S consultants shall prepare the EIA/ESIA report and undertake a presentation of the report to all key stakeholders including RHD, DoE, and WB. The ESIA study and preparation of the ESIA report should follow all the requirements of the Government of Bangladesh and the World Bank. Consultation should be carried out by the requirements of the Government of Bangladesh and the World Bank.

The E&S Consultants will work closely with the Detailed Engineering Design team and make recommendations to them on environmental and social aspect to reduce the impacts. The E&S Consultants will also incorporate all the recommendations of the WeCARE design Team into the Final ESIA.

3.2 Project Tasks

Task 1. Description of the proposed project: provide a brief description of the relevant parts of the project, using maps (at appropriate scale) where necessary.

Task 2. Description of the environment and social aspects: assemble, evaluate and present baseline data on the relevant environmental and social characteristics of the study area.

Task 3. Legislative and regulatory considerations: describe the pertinent regulations and standards governing environmental quality, social impacts, health and safety, protection of sensitive areas, protection of endangered species, siting, land use control, etc.

Task 4. Determination of the potential impacts of the proposed project: significant positive and negative impacts, direct and indirect impacts, and immediate and long-term impacts. Identify impacts that are unavoidable or irreversible. Wherever possible, describe impacts quantitatively, in terms of environmental costs and benefits. The potential impacts should include a prediction of air quality and noise impacts using the baseline survey data. A separate resettlement action plan is being prepared and the ESIA Consultants will not be required to determine land acquisition and resettlement requirements.

Task 5. Preparation of recommended mitigation measures: examine the full range of possible mitigation measures, and appropriate mitigation and abatement measures to minimize and control the various impacts identified shall be studied and detailed recommendations concerning mitigation of the key adverse environmental impacts shall be given. The potential mitigation measures shall be discussed with RHD to ensure that the recommendations of the report will be implemented.

Task 6. Analysis of alternatives to the proposed project: describe alternatives that were examined in the course of developing the proposed project and identify other alternatives which would achieve the same objective.

Task 7. Development of an Environmental Management Plan: to mitigate negative impacts, recommend feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels and describe the actions necessary to implement them.

Task 8. Identification of institutional needs: to implement environmental assessment recommendations.

Task 9. Development of a monitoring plan: prepare a detailed plan to monitor the implementation of mitigation measures and the impacts of the project during construction and operation.

Annexes

ESIA/ESIA Report: The report is to be kept concise and limited to significant environmental and social issues. The main text should focus on findings, conclusions, and recommended actions, supported by summaries of the data collected and citations for any references used.

4 WORK SCHEDULE AND TIMESCULE

This is the World Bank funded project and the format and contents of the ESIA/ESIA would be based on relevant government guidelines and the environmental and social standards of the WB. The ESIA/ESIA will comprise:

Executive Summary;

A. INTRODUCTION

- Project Background
- Need of the Project
- Objective and Scope of the Study
- The Project Preparation
- Structure of the Report

B. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

- World Bank Guidelines
- Clearances/Permissions Required for the Project Road
- National Standards

C. DESCRIPTION OF THE PROJECT

- Project Location
- Project Category
- Existing Road Profile
- Proposed Upgrading and Improvement of the Project Road
- Construction Materials, Sourcing and Utilities Requirements
- Land Acquisition and Resettlement
- Implementation Schedule

D. DESCRIPTION OF THE ENVIRONMENTAL AND SOCIAL BASELINE

- Physical Environment
- Ecological Environment
- Socioeconomic Condition

E. ANALYSIS OF ALTERNATIVE ALIGNMENTS

- Suitable Road Structures and Realignment Considerations
- Tree Cutting Alternatives Analysis
- Environmental Impact of A "Without Project" and "With Project" Alternatives

F. CONSULTATIONS, PUBLIC PARTICIPATION AND INFORMATION DISCLOSURE

- Relevant Stakeholders
- Key Informant Interviews (KII)
- Focus Group Discussions (FGDs)
- Stakeholder Consultations
- Dissemination of Project Related Information
- Outcomes of the Stakeholders' Consultation Meetings
- Information Disclosure

G. ENVIRONMENTAL AND SOCIAL IMPACTS, RISKS AND MITIGATION MEASURES

- Impacts and Risk Screening
- Impacts and Mitigation During Design Pre-Construction Phase
- Impacts and Mitigation During Construction phase
- Impacts and Mitigation During Operation Phase
- Cumulative Impact

H. LABOR MANAGEMENT PROTOCOL

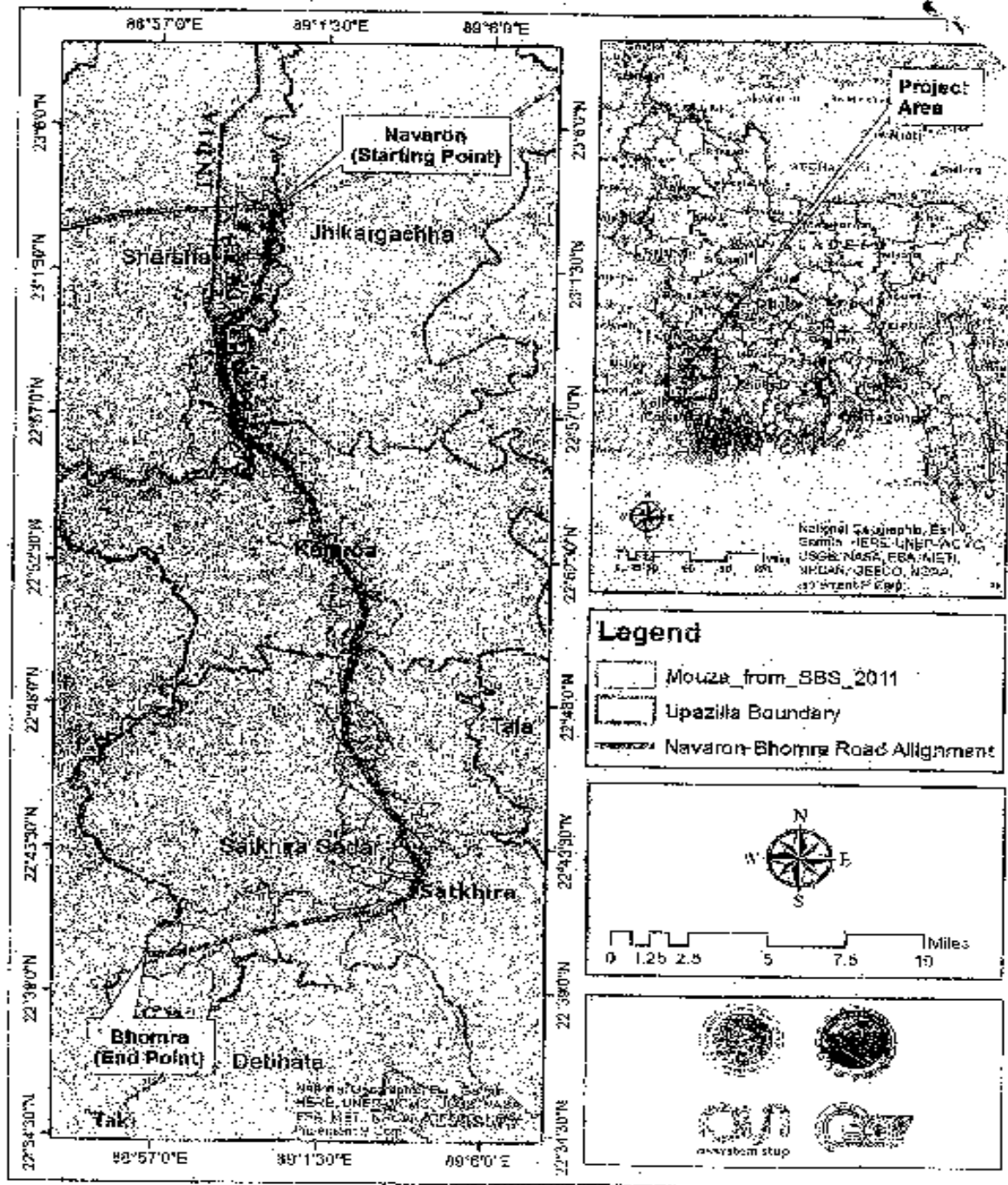
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Annexes

- Selection and Layout of Construction Camps
- Hiring and Recruitment Procedure
- Facilities at Workers' Camps
- Record Keeping and Maintenance
- Monitoring, Auditing, and Inspections
- Grievance Redress Mechanism
- Closure of The Construction Site and Construction Labor Camps
- 1. EMERGENCY RESPONSE PLAN AND DISASTER MANAGEMENT
 - Roles and Responsibilities
 - Pre-emergency Planning
 - Emergency Classification
 - Level of Priority
 - Emergency Notification & Evacuation Process
 - Emergency Response for Typical Emergencies Identified
 - Emergency Response Equipment
 - Emergency Response Training
 - Emergency Drills/Exercises
 - Emergency Communication
 - Audit and Emergency Response Plan Review
- 2. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN
 - Environmental and Social Management Plan
 - Environmental Monitoring Plan
 - Institutional Responsibility and Arrangement for ESMP Implementation
 - Reporting
 - Capacity Building
 - Checklist for Monitoring ESMP
 - Environmental Management Plan

This document will be reviewed by the WB and RUD and their observations and suggestion will be incorporated to finalize the report.

Annexes



Annexes

Certification

This is to certify that the proposed project is a road widening and improvement project. So, Layout Plan is not required for this project.

Shiraj

(Syed Aslam Naqvi)
Team Leader (ESIA, STUP-BCL JV)
WeCARE Phase-3: Bhomra-Satkhira-
Navaron Road (R-780) Project
Amtoli, Mohakhali, Dhaka

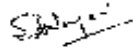
Md. Mohibul Haque
15/5
2021

(Md. Mohibul Haque)
Additional Project Director (SE, C.C RHD)
WeCARE Phase-3: Bhomra-Satkhira-
Navaron Road (R-780) Project
Altenbari, Teigaon, Dhaka-1215

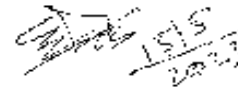
Annexes

Certification

This is to certify that the proposed project is a road widening and improvement project. Therefore, there is no requirement or usage of Process Flow Diagram under project.



(Syed Aslam Naqvi)
Team Leader (ESIA, STUP-BCL JV)
WeCARE Phase-3: Bhomra-Satkhira-
Navaron Road (R-780) Project
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(Md. Mohibul Haque)
Additional Project Director (SE, C.C RHD)
WeCARE Phase-3: Bhomra-Satkhira-
Navaron Road (R-780) Project
Amenber, Tejgaon, Dhaka-1215

Certification

This is to certify that the NoC (No Objection Certificate) of the local authorities will be provided during submission of Environmental Impact Assessment Report.

(Syed Aslam Naqvi)

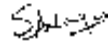
Team Leader (ESIA, STUP-BCL JV)
WeCARE Phase-3: Bhomra-Satkhira-
Navaron Road (R-780) Project
Amtoli, Mohakhali, Dhaka

(Md. Mohibul Haque)

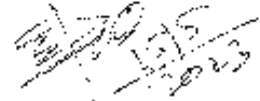
Additional Project Director (SE, G.C RHQ)
WeCARE Phase-3: Bhomra-Satkhira-
Navaron Road (R-780) Project
Allenbari, Tejgaon, Dhaka-1215

Certification

This is to certify that the Mouza Map along with Daag Number of proposed acquired land will be provided after detailed survey.



(Syed Aslam Naqvi)
Team Leader (ESIA, STUP-BCL JV)
WeCARE Phase-3; Bhomra-Satkhira-
Navaron Road (R-780) Project
Amroli, Mohakhali, Dhaka

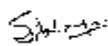


(Md. Mohibul Haque)
Additional Project Director (SE, C.C. RHD)
WeCARE Phase-3; Bhomra-Satkhira-
Navaron Road (R-780) Project
Allandari, Teigaon, Dhaka-1215

Annexes

Certification

This is to certify that the Mouza Map along with Daag Number of proposed acquired land will be provided after detailed survey.


(Syed Aslam Naqvi)
Team Leader (ESIA, STUP-BCL JV)
WeCARE Phase-3: Bhomra-Satkhira-
Navaron Road (R-780) Project
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(Md. Mohibul Haque)
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WeCARE Phase-3: Bhomra-Satkhira-
Navaron Road (R-780) Project
Allenbari, Tejgaon, Dhaka-1215

Annexes

Annex 2 : Environmental quality parameters Standard as per ECR

Annex 2.1 : Ambient Air Quality

Air Quality Standard (Subsequent Amendment in 2005)			
Sl. No.	Air Pollutants	Concentration ECR, 2023	Average Time
1.	Carbon monoxide (CO)	05 mg/m ³	8 hr.
		20 mg/m ³	1 hr.
2.	Lead (Pb)	0.25 µg/m ³	Annual
		0.50 µg/m ³	24 hr.
3.	Nitrogen dioxide (NO ₂)	40 µg/m ³	Annual
		80 µg/m ³	24 hr.
4.	Particulate Matters (PM ₁₀)	50 µg/m ³	Annual
		150 µg/m ³	24 hr.
5.	Particulate Matters (PM _{2.5})	35 µg/m ³	Annual
		65 µg/m ³	24 hr.
6.	Ozone (O ₃)	180 µg/m ³	1 hr.
		100 µg/m ³	8 hr.
7.	Sulfur dioxide (SO ₂)	250 µg/m ³	Annual
		80 µg/m ³	24 hr.
8.	Ammonia (NH ₃)	100 µg/m ³	Annual
		400 µg/m ³	24 hr.

Annex 2.2 Groundwater Quality Standards

Bangladesh Standards for GroundWater			
Sl No.	Parameters	Unit	Standard
	Fecal Coliform	CFU/100ml	0.05
	Total Coliform	CFU/100ml	0
	Free Residual Chlorine	mg/l	0.2
	NO ₃ -	mg/l	0.05
	As	mg/l	0.05
	Turbidity	NTU	2
	Al	mg/l	0.1
	NH ₃	mg/l	1.5
	Ba	mg/l	0.7
	C ₆ H ₆	mg/l	0.01
	B	mg/l	1
	Cd	mg/l	0.003
	Ca	mg/l	75
	Chloride	mg/l	250*
	CCl ₄	mg/l	0.005
	1,1 C ₂ H ₄ Cl ₂	mg/l	0.03
	1,2 C ₂ H ₄ Cl ₂	mg/l	0.03
	C ₂ H ₂ Cl ₄	mg/l	0.04
	C ₂ H ₃ Cl ₃	mg/l	0.02
	Pentachlorophenol	mg/l	0.009
	2,4,6 Trichlorophenol	mg/l	0.20
	CHCl ₃	mg/l	0.09
	Total Cr	mg/l	0.05
	Color	Hazen	15
	Cu	mg/l	1.5
	CN	mg/l	0.05
	Fluoride	mg/l	1
	Hardness as CaCO ₃	mg/l	500

Bangladesh Standards for GroundWater			
Sl No.	Parameters	Unit	Standard
	Fe	mg/l	0.3-0.1
	Total Kjeldahl Nitrogen	mg/l	1
	Pb	mg/l	0.01
	Mg	mg/l	30-35
	Mn	mg/l	0.4
	Hg	mg/l	0.001
	Ni	mg/l	0.05
	NO ₂ -	mg/l	1
	Odor	-	Odorless
	Oil & Grease	mg/l	0.01
	pH	-	6.5-8.5
	Phenols	mg/l	0.002
	K	mg/l	12
	Alpha eadiation of the Radioactive Materials	bq/l	0.1
	Bitaradiation	bq/l	1.0
	Se	mg/l	0.01
	Ag	mg/l	0.02
	Na	mg/l	200
	Suspended Solids	mg/l	10
	Sulfide as H ₂ S	mg/l	0.05
	SO ₄ -2	mg/l	250
	TDS	mg/l	1000
	Temperature	°Centigrade	20-30
	Sn	mg/l	2
	Zn	mg/l	5
	Aldrin/ Dieldrin	ug/l	0.03

Annexes

Bangladesh Standards for GroundWater			
Sl No.	Parameters	Unit	Standard
	Anionic detergents	mg/l	0.2
*For the coastal area, the limit will be 1000 mg/l			

Bangladesh Standards for GroundWater			
Sl No.	Parameters	Unit	Standard
Source: Rule 12, Schedule-3, ECR.1997, Bangladesh.			

Annex 2.3 :Surface Water Quality Standards

Bangladesh Standard for Inland Surface Water													
Sl. No.	Type of Use	Standard											
		pH	Do mg/l	BOD mg/l	NO3-N mg/l	NH4-N mg/l	PO43-P mg/l	Total Cr mg/l	Pb mg/l	Hg mg/l	Total Coliform (CFU/100ml)	TDS mg/l	COD mg/l
1	Source of drinking water for supply only after disinfecting:	6.5 – 8.5	≤6	≠2	7.0	0.1	0.1	0.02	0.03	0.001	≠100	1000	10
2	Water usable for recreational activity:	6.5 – 8.5	≤5	≠3	7.0	0.3	0.5	0.2	0.05	0.001	≠50	1000	10
3	Source of drinking water for supply after conventional treatment:	6-9	≤5	≠3	7.0	0.3	0.5	0.02	0.03	0.001	≠5000	1000	25
4	Water usable by fisheries:	6-9	≤5	≠6	7.0	0.3	0.5	0.05	0.1	0.004	≠5000	1000	50
5	Water usable by various process and cooling industries:	6.5 – 8.5	≤1	12	-	2.7	-	0.1	0.1	0.05	-	1000	100
6	Water usable for irrigation:	6.5 – 8.5	-	≠12	5.0	1.5	2.0	0.1	0.1	0.002	≠50,000	1000	100

Note: 1. Electrical conductivity for irrigation water – 2250 µmhos/cm (at a temperature of 25°C); Sodium less than 26%; boron less than 0.2%

Annex 2.4 :Surface water quality standards as per Draft ECR 2017.

Surface Water Quality Standard (Draft ECR 2017)					
Sl. No.	Best Practice-Based Classification	Parameter			
		pH	BOD (mg/l)	DO (mg/l)	Total Coliform (N/100 ml)
1.	Source of drinking water for supply only after disinfecting	6.5-8.5	2 or less	6 or above	50 or less
2.	Water usable for recreational activity	6.5-8.5	3 or less	5 or more	200 or less
3.	Source of drinking water for supply after conventional treatment	6.5-8.5	6 or less	6 or more	5000 or less
4.	Water usable by fisheries	6.5-8.5	6 or less	5 or more	-
5.	Water usable by various process and cooling industries	6.5-8.5	10 or less	5 or more	5000 or less
6.	Water usable for irrigation	6.5-8.5	10 or less	5 or more	1000 or less

Note: *Electrical conductivity for irrigation water - 2250 us/cm (at a temperature of 25°) Sodium less than 26%; boron less than 0.2%.

Annex 2.5 :Bangladesh Standards for Sewage Discharge (ECR, 2023)

Bangladesh Standards for Sewage Discharge (ECR, 2023)			
Sl. No.	Parameters	Unit	Maximum Limit Except pH
(1)	Temperature	°Centigrade	30
(2)	pH	-	6-9
(3)	BOD5 at 200C	mg/l	30
(4)	COD	mg/l	125
(5)	Suspended Solids	mg/l	100
(6)	Oil & Grease	mg/l	10
(7)	NO3	mg/l	50
(8)	PO4-3	mg/l	15
(9)	Total Coliform	CFU/100 ml	1000

Condition :

- (1) This standard applies to surface water discharge.
- (2) the treated water must be purified with chlorine before final discharge. Residual chlorine shouldn't exceed 0.2 mg/l

Annex 2.6 :Effluent Guideline (IFC, 2008)

Effluent Guideline (IFC, 2008)		
Sl. No.	Parameter	Unit (mg/L) (Except pH and Temperature)
1.	pH	6-9
2.	TSS	50
3.	Oil and grease	10
4.	Total residual chlorine	0.2
5.	Chromium -Total (Cr)	0.5
6.	Copper (Cu)	0.5
7.	Iron (Fe)	1.0
8.	Zinc (Zn)	1.0
9.	Lead (Pb)	0.5
10.	Cadmium (Cd)	0.1
11.	Mercury (Hg)	0.005
12.	Arsenic (As)	0.5
13.	Temperature increases by thermal discharge from the cooling system.	Elevated temperature areas due to discharge of once-through cooling water (i.e., maximum 30°C above ambient water temperature) should be minimized in the mixing zone (i.e., 100 m) by adjusting outfall design or by the project-specific EA depending on the sensitive aquatic ecosystems around the discharge point.

Annex 2.7 :Standard After Treated Sanitary Sewage Discharge (IFC, 2008)

Standard After Treated Sanitary Sewage Discharge (IFC, 2008)			
Sl. No.	Pollutants	Units	Guideline Value
1.	pH	--	6-9
2.	BOD5	mg/l	30
3.	COD	mg/l	125
4.	Total nitrogen	mg/l	10
5.	Total phosphorus	mg/l	2
6.	Oil and Grease	mg/l	10
7.	Total suspended solids	mg/l	50
8.	Total coliform bacteria	N/100ml	400*

Note: *Not applicable to centralized, municipal, wastewater treatment systems pincluded in EHS Guidelines for Water and Sanitation.

Annex 2.8 :Ambient Noise Level

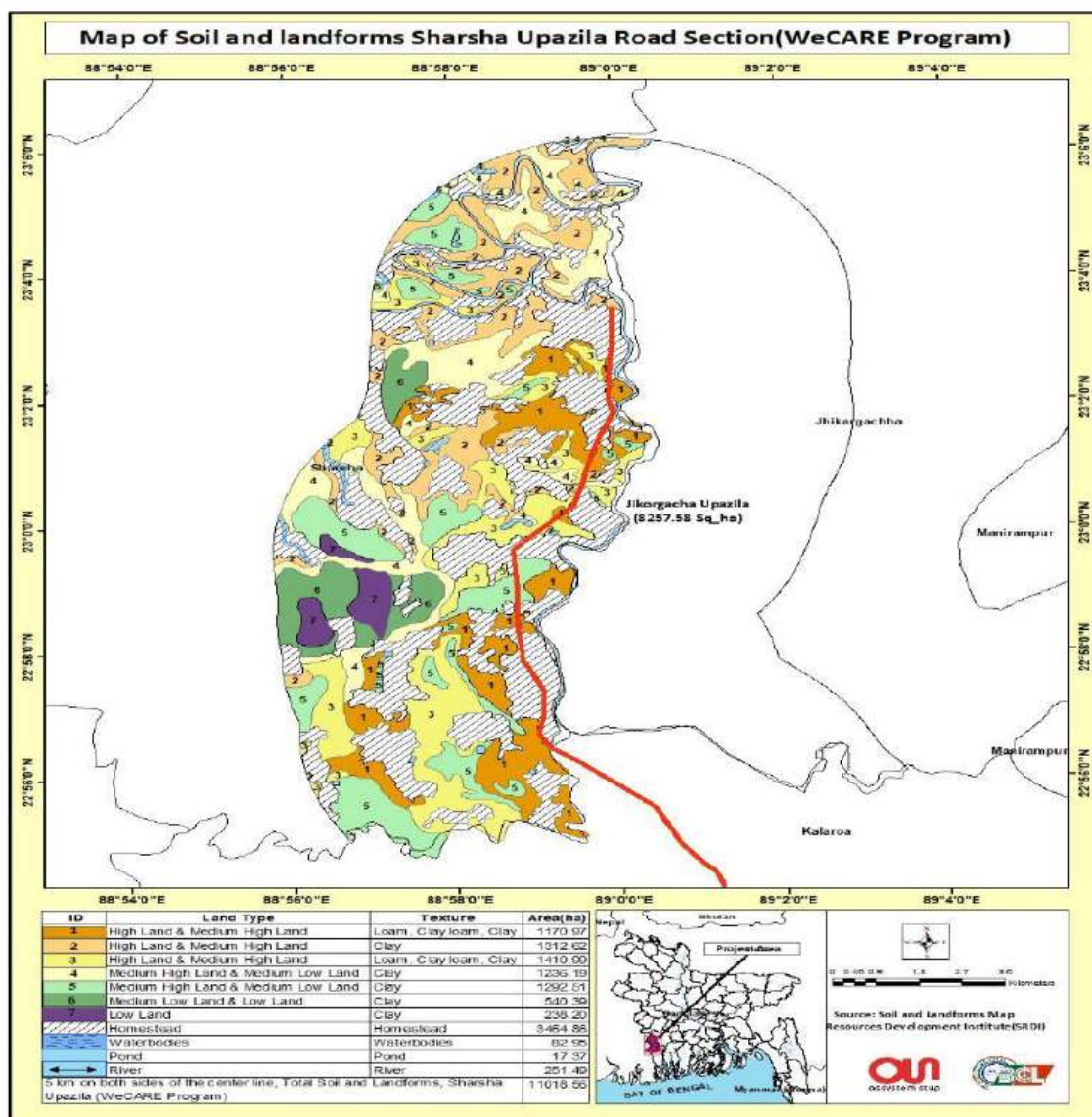
Sl. No.	Zone Categorization	Standard dB(A) Leq	
		Day (6:00 AM - 9:00 PM)	Night (9:00 PM - 6:00 AM)
1.	Silent Zone	50	40
2.	Residential Zone	55	45
3.	Mixed Zone	60	50
4.	Commercial Zone	70	60
5.	Industrial Zone	75	70

Annex 2.9 :Noise Level Guideline (IFC, 2008)

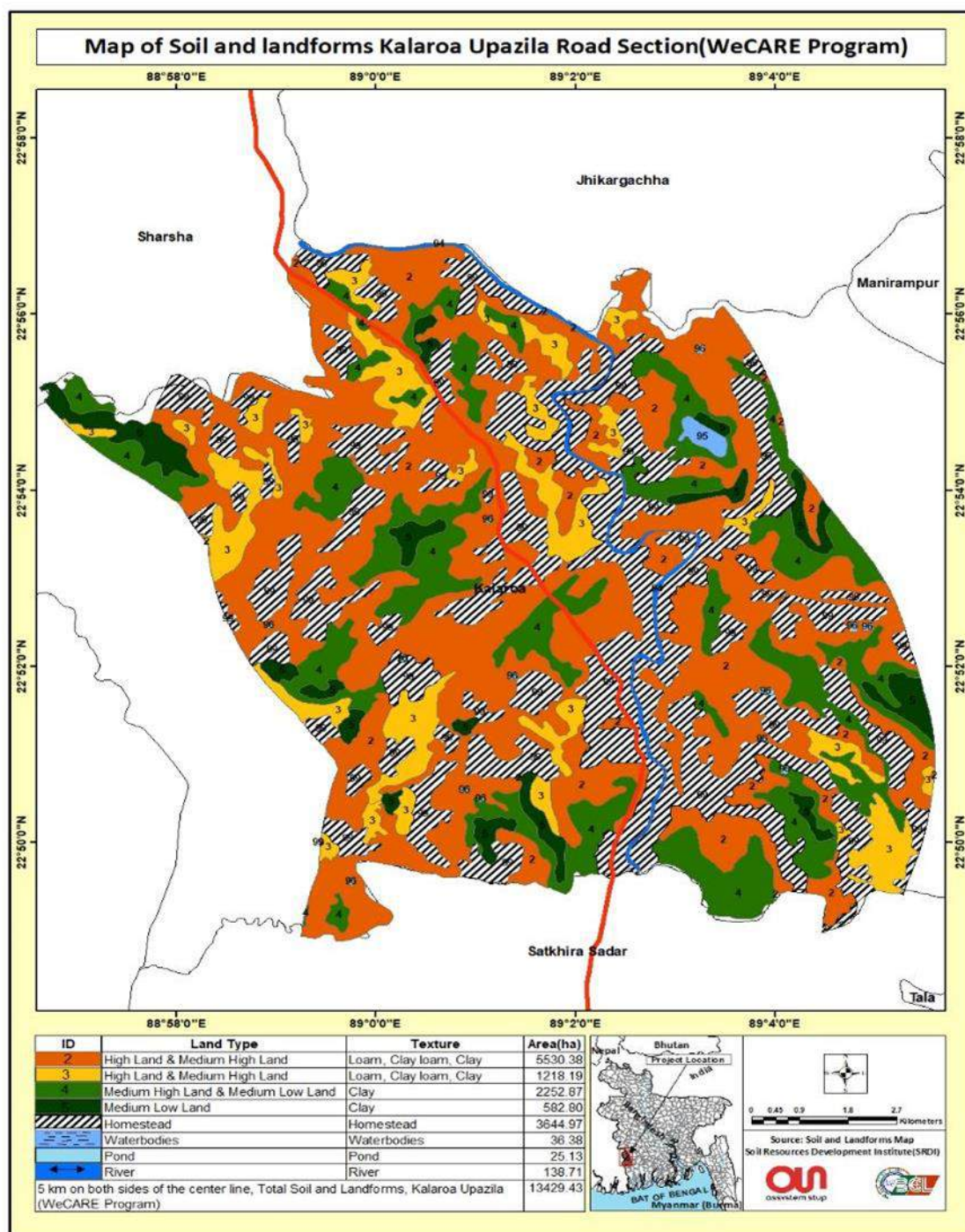
Noise Level Guideline (IFC, 2008)			
Sl. No.	Receptors	One Hour Leq (dBA)	
		Daytime (7:00-22:00)	Nighttime (22:00-7:00)
1.	Residential, Institutional, Educational	55	45
2.	Industrial, Commercial	70	70

Annex 3: Soil Characteristic

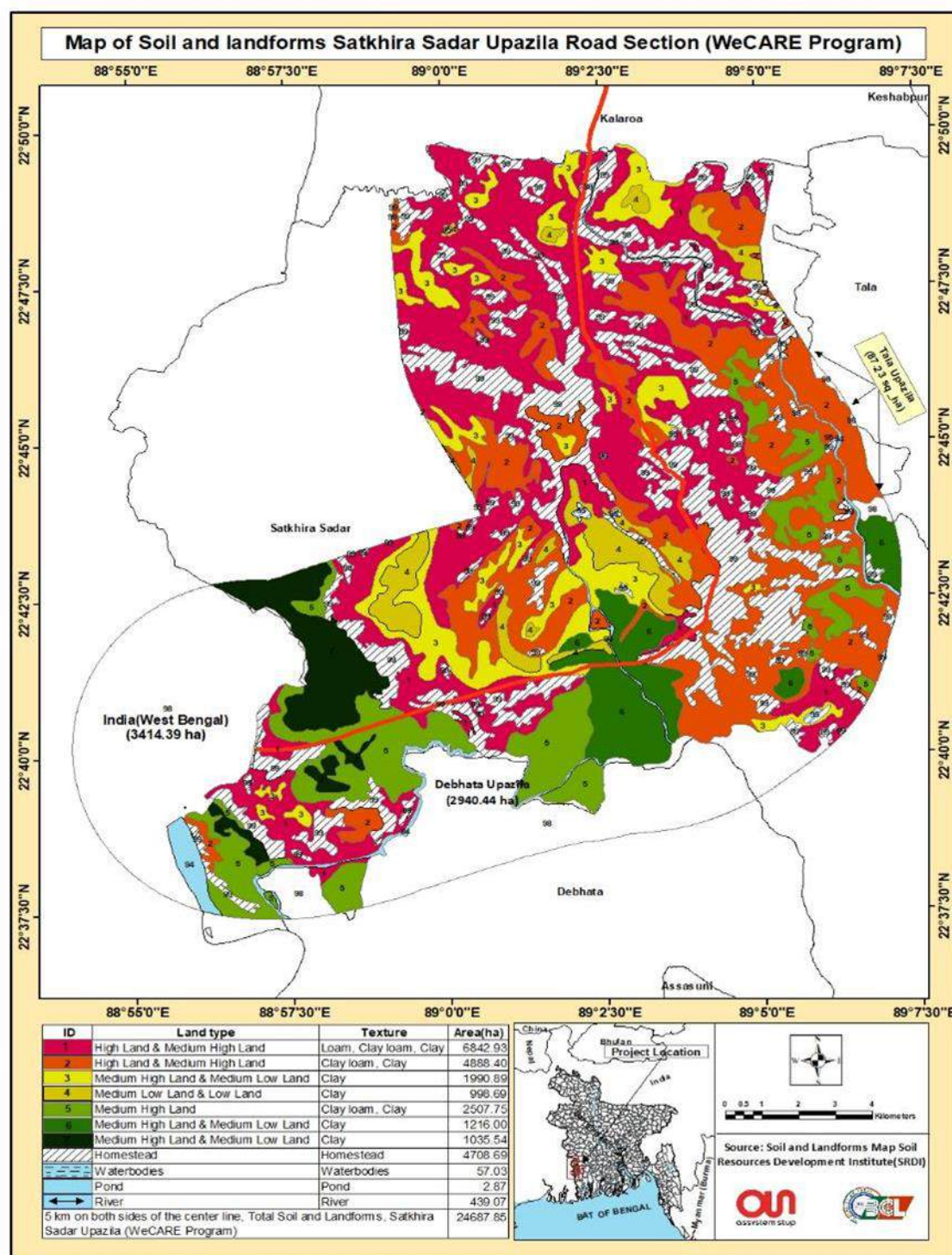
Annex 3.1 :Soils and landforms of Sharsha upazila of Bhomra – Satkhira – Navaron Road



Annex 3.2 :Soils and landforms of Kalaroa Upazila of Bhomra – Satkhira – Navaron Road section



Annex 3.3 :Soils and landforms of Satkhira Sadar Upazila of Bhomra – Satkhira – Navaron ROAD SECTION



Annex 3.4 :Soil Test Report

মৃত্তিকা, পানি ও পরিবেশ বিভাগ
 ঢাকা বিশ্ববিদ্যালয়, ঢাকা ১০০০, বাংলাদেশ



Department of Soil
 Water and Environment
 University of Dhaka, Dhaka 1000, Bangladesh

March 10, 2024

Mrs. Nadira Begum
 Soil Specialist
 BCL Associates Limited, Bangladesh,
 Noorani Tower (2nd Floor),
 1 Mohakhali C/A, Bir Uttam AK
 Khandaker Sarak, Dhaka-1212.

Ref: Updating of Environmental and Social Impact Assessment (ESIA) for Bhomra-Satkhira-Navaron Road Corridor.

As per your request, soil chemical and physical properties of the supplied samples have been given below;

Table 1: Chemical properties of the supplied soil samples

Sl No.	Code /Horizons	Elemental Contents												
		pH	EC (µS/cm)	OC* (%)	N (%)	Total P (mg/kg)	Total K (%)	Total S (mg/kg)	Total Ca (mg/kg)	Total Mg (mg/kg)	Total Na (mg/kg)	Chloride (mg/kg)	Sulphate (mg/kg)	Cr (mg/kg)
Pit 1 (Profile 1)														
1	Ap	8.03	137.9	1.29	0.17	1403	0.33	597.40	517.25	5.69	375	7.09	99.57	34.66
2	Ad	8.15	102.3	0.92	0.11	1367	0.33	575.76	1047.20	6.85	350	3.55	186.15	32.31
3	B21	8.20	120.2	0.37	0.04	1069	0.33	489.18	940.75	8.53	365	3.55	99.57	31.05
4	B22	8.07	104.6	0.26	0.03	1105	0.30	337.66	1021.17	8.01	350	7.09	229.44	29.24
5	C1	7.92	145.8	0.28	0.03	1319	0.40	467.53	1662.75	10.01	405	14.18	51.20	36.61
6	C2	8.00	98.50	0.32	0.04	1140	0.47	571.43	1890.25	11.49	480	3.55	41.19	36.45
Pit 2 (Profile 2)														
7	Ap	7.34	232.0	1.26	0.18	1522	0.40	554.11	1384.0	6.96	395	14.18	445.89	30.50
8	Ad	8.00	139.3	0.81	0.10	1212	0.35	554.11	2085.0	7.54	350	7.09	445.89	34.79
9	B21	7.06	135.3	0.29	0.03	997	0.45	445.88	784.75	8.66	480	3.55	45.99	41.96
10	B22	8.23	140.3	0.26	0.03	1140	0.30	467.53	1804.75	10.23	360	17.73	186.15	32.63
11	B23	7.95	122.3	0.36	0.04	1081	0.30	489.18	1782.25	6.82	390	7.09	89.28	32.29
12	C1	8.14	122.6	0.42	0.05	1057	0.35	465.53	507.50	7.25	370	7.09	59.19	34.12
13	C2	8.09	137.7	0.23	0.02	1021	0.30	445.88	1154.75	7.29	480	14.18	229.44	31.41
Analyzed Values		7.06-8.23	98.50-145.8	0.23-1.29	0.02-0.18	1021-1522	0.30-0.47	337.66-597.40	517.25-1890.25	5.69-11.49	350-480	3.55-17.73	41.19-445.89	29.24-41.96
BARC, 2018		SA**	Non saline	VLM***	Low	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Low

*Organic Carbon, **Slightly alkaline, *** Very low to medium

1

Telephone : 9661920-73/7470, Fax: (880-2) 9667222, e-mail: swed@du.ac.bd

Annex 3.5 :Soil Test Report

মৃত্তিকা, পানি ও পরিবেশ বিভাগ
 ঢাকা বিশ্ববিদ্যালয়, ঢাকা ১০০০, বাংলাদেশ



Department of Soil
 Water and Environment
 University of Dhaka, Dhaka 1000, Bangladesh

Methodology used for chemical properties:

pH: Soil:Water/1:2.5 by pH meter
 Organic carbon: Wet oxidation method
 Total nitrogen: Kjeldahl method
 EC: Soil:Water/1:5 by EC meter
 Total Phosphorus: Vanado-molybdate yellow color method
 Total Sulfur: Turbidimetric method
 Total potassium/Total sodium : Flame photometer
 Total Calcium/Magnesium/Chromium : Nitric acid digestion and AAS method
 Sulphate: Turbidimetric method
 Chloride: Titrimetric method

Table 2: Physical properties of the supplied soil samples

Sl No.	Sample code/Horizons	Moisture (%)	Particle density (g/cm ³)	Bulk density (g/cm ³)	Porosity (%)	WHC* (%) by volume	Permeability (cm/hr)
Pit 1 (Profile 1)							
1	Ap	19.34	2.39	1.34	44.0	65.35	1.3
2	Ad	23.88	2.45	1.53	38.0	55.97	0.1
3	B21	26.93	2.49	1.41	44.0	57.58	1.1
4	B22	26.82	2.60	1.46	44.0	61.78	0.1
5	C1	31.35	2.40	1.40	42.0	65.73	0.9
6	C2	34.23	2.51	1.29	49.0	68.06	0.2
Pit 2 (Profile 2)							
7	Ap	25.93	2.37	1.18	51.0	69.35	2.0
8	Ad	25.16	2.42	1.46	40.0	63.54	0.3
9	B21	26.37	2.09	1.37	35.0	62.59	0.8
10	B22	28.82	2.46	1.31	47.0	61.29	1.9
11	B23	30.16	2.34	1.35	43.0	61.88	0.6
12	C1	31.81	2.53	1.42	44.0	62.31	0.1
13	C2	30.46	2.54	1.46	43.0	64.76	0.1

*Water holding capacity

10.3.24

Annex 3.6 :Soil Test Report

মৃত্তিকা, পানি ও পরিবেশ বিভাগ
ঢাকা বিশ্ববিদ্যালয়, ঢাকা ১০০০, বাংলাদেশ





**Department of Soil
Water and Environment**
University of Dhaka, Dhaka 1000, Bangladesh

Table 3: Particle size analysis of the supplied soil samples

Sl No.	Soil Sample code/Horizons	Sand (%)	Silt (%)	Clay (%)	Textural class
Pit 1 (Profile 1)					
1	Ap	2.62	45.75	51.63	Silty clay
2	Ad	5.43	43.01	51.56	Silty clay
3	B21	4.09	51.75	44.16	Silty clay
4	B22	2.04	32.76	65.20	Clay
5	C1	1.16	32.86	65.98	Clay
6	C2	1.72	35.37	62.91	Clay
Pit 2 (Profile 2)					
7	Ap	4.79	42.50	52.72	Silty clay
8	Ad	4.55	39.91	55.55	Clay
9	B21	2.28	39.73	57.99	Clay
10	B22	3.16	44.70	52.14	Silty clay
11	B23	4.70	45.92	49.37	Silty clay
12	C1	2.04	31.76	66.20	Clay
13	C2	5.69	39.43	54.88	Clay

Methodology Used for physical properties:

Particle size: Hydrometer method
 Moisture: Gravimetric method
 Particle density: Pycnometer method
 Bulk Density: Core method
 Water holding capacity: 1/3 bar pressure
 Permeability: Constant Head method

Thanks and regards,



10.03.24

(Professor Dr. Md. Harunor Rashid Khan)
Chairman

Telephone : 9661920-73/7470, Fax: (880-2) 9667222, e-mail: swed@du.ac.bd

Scanned with OKEN Scanner

Annex 3.7 :Exhibit showing ambient air quality monitoring along the road

		
AAQ-1: Bhomra land port, Satkhira	AAQ-2: Infront of Doctor's quarter, Satkhira medical College, Satkhira	AAQ-3: Boro Jamtola Kashempur, Satkhira
		
AAQ-4: Infront of Masum Billah's house, Biharinagar, Jhaudanga, Satkhira	AAQ-5: Shah Aanuallah degree college, Tulshidanga, Kolaroa, Satkhira	AAQ-6: Infront of Abdur Rouf's house, Beltola Bazar
		
AAQ-7: Jamtola Bazar, Sharsha, Jashore	AAQ-8: Navaron Mor, Sharsha	

Annex 3.8 :Exhibits Show Ambient Noise Quality Monitoring



Annex 3.9 :Exhibits showing the vibration sampling



Annex 3.10 :Exhibits Showing Surface Water Quality Sampling



Annex 3.11 :Exhibits Showing Groundwater Quality Sampling



Annex 3.12 :Ambient Air Quality Test Report



BCL Associates Limited

Consulting Engineers & Planners

Noorani Tower (2nd Floor), 1 Mohakhali C/A, Bir Uttam AK Khandaker Sarak, Dhaka 1212, Bangladesh, Tel: 4881 0072-5, e-mail: bcl@bclgroup.com

BCL REF NO.: BCL/AAQ/ 24122023001

AMBIENT AIR QUALITY TESTING REPORT

Client Name : Roads and Highways Department (RHD)
Project Name : Environmental and Social Management for Bhomra-Satkhira-Navaron Road Section (Phase-3) for Bangladesh Western Economic Corridor & Regional Enhancement (WeCARE) Program
Client Address : WeCARE Phase-3, Jhenaidah-Jashore Highway (N-7) Improvement Project, Allenbari, Tejgaon, Dhaka-1215
Monitoring Time : 10:07 AM to 1:07 PM (3 hours)
Field Officer/Manager : Md. Mustafizur Rahman, Environmentalist, BCL Associates Limited
Monitoring Date : 25.12.2023
Analysis Date : 15.01.2024
Monitoring ID and Locations : AAQ1, Bhomra Land Port, Satkhira
GPS Coordinates : 22°40'8.14"N 88°56'59.20"E

Ambient Air Quality (AAQ1) Test Results

Sampling Site Description	Description of Parameters	Unit	Concentration of Ambient	*Bangladesh Standards	**WHO Standard	Methods
- This location is near the Bhomra land port. Frequent vehicular movement found around the location. - Few commercial establishments also found near to the location. - Few residential settlements also found around the location but little bit far from the location.	Particulate Matter (PM _{2.5})	µg/m ³	36.8	65 (24 hour) 35 (Annual)	15 (24 hour)	Light Scattering Nephelometer
	Particulate Matter (PM ₁₀)	µg/m ³	64.8	150 (24 hour) 50 (Annual)	45 (24 hour)	
	Nitrogen Dioxides (NO ₂)	µg/m ³	11.9	80 (24 hour) 40 (Annual)	25 (24 hour)	High Sensitivity Electrochemical
	Sulphur Dioxides (SO ₂)	µg/m ³	94.6	80 (24 hour) 250 (1 hour)	40 (24 hour)	
	Ozone (O ₃)	µg/m ³	23.8	100 (8 hour) 180 (1 hour)	100 (8 hour)	
	Carbon Monoxides (CO)	mg/m ³	0.67	05 (8 hour) 20 (1 hour)	10 (8 hour)	
	Carbon Dioxides (CO ₂)	mg/m ³	130.6	-	-	On-Site Recording
	Air Temperature	(°C)	26.2	NSE**	-	
	Relative Humidity	(%)	61.8	NSE**	-	
	Air Pressure	(hPa)	1017.6	NSE**	-	
	Wind Speed	(m/s)	0.80	NSE**	-	
	Wind Direction	(Degree)	189.03 (S)	NSE**	-	

Note: *Bangladesh Air Pollution (Control) Rules, 2022;

**WHO Ambient Air Quality Guideline Values (2021), which are also being referred in the World Bank and IFC's General EHS Guidelines

*NSE-No Standards Established yet, S-South

* Monitoring data converted to 8 hours and 24 hours according to the recognize calculation method

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Annex 3.13 :Ambient Air Quality Test Report



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BCL REF NO.: BCL/AAQ/ 24122023002

AMBIENT AIR QUALITY TESTING REPORT

Client Name : Roads and Highways Department (RHD)
Project Name : Environmental and Social Management for Bhomra-Shatkhira-Navaron Road Section (Phase-3) for Bangladesh Western Economic Corridor & Regional Enhancement (WeCARE) Program
Client Address : WeCARE Phase-3, Jhenaidah-Jashore Highway (N-7) Improvement Project, Allenbari, Tejgaon, Dhaka-1215
Monitoring Time : 2:38 PM to 5:38 PM (3 hours)
Field Officer/Manager : Md. Mustafizur Rahman, Environmentalist, BCL Associates Limited
Monitoring Date : 25.12.2023
Analysis Date : 15.01.2024
Monitoring ID and Locations : AAQ2, Infront of Doctor's Quarter, Shatkhira Medical College, Shatkhira
GPS Coordinates : 22°41'27.70"N 89° 2'43.97"E

Ambient Air Quality (AAQ2) Test Results

Sampling Site Description	Description of Parameters	Unit	Concentration of Ambient	*Bangladesh Standards	**WHO Standard	Methods
- Near the residential area of the Shatkhira medical college. - Approximately 50meter far from the Shatkhira-Bohomra road.	Particulate Matter (PM _{2.5})	µg/m ³	27.5	65 (24 hour) 35 (Annual)	15 (24 hour)	Light Scattering Nephelometer
	Particulate Matter (PM ₁₀)	µg/m ³	31.9	150 (24 hour) 50 (Annual)	45 (24 hour)	
	Nitrogen Dioxides (NO ₂)	µg/m ³	2.30	80 (24 hour) 40 (Annual)	25 (24 hour)	High Sensitivity Electrochemical
	Sulphur Dioxides (SO ₂)	µg/m ³	83.7	80 (24 hour) 250 (1 hour)	40 (24 hour)	
	Ozone (O ₃)	µg/m ³	21.1	100 (8 hour) 180 (1 hour)	100 (8 hour)	
	Carbon Monoxides (CO)	mg/m ³	0.40	05 (8 hour) 20 (1 hour)	10 (8 hour)	
	Carbon Dioxides (CO ₂)	mg/m ³	124.7	-	-	
	Air Temperature (°C)		30.4	NSE**	-	On-Site Recording
	Relative Humidity (%)		49.6	NSE**	-	
	Air Pressure (hPa)		1015.8	NSE**	-	
	Wind Speed (m/s)		0.23	NSE**	-	
	Wind Direction (Degree)		171.25 (S)	NSE**	-	

Note: *Bangladesh Air Pollution (Control) Rules, 2022;

**WHO Ambient Air Quality Guideline Values (2021), which are also being referred in the World Bank and IFC's

General EHS Guidelines

*NSE-No Standards Established yet, S-South

* Monitoring data converted to 8 hours and 24 hours according to the recognize calculation method

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BCL REF NO.: BCL/AAQ/ 24122023004

AMBIENT AIR QUALITY TESTING REPORT

Client Name : Roads and Highways Department (RHD)
Project Name : Environmental and Social Management for Bhomra-Shatkhira-Navaron Road Section (Phase-3) for Bangladesh Western Economic Corridor & Regional Enhancement (WeCARE) Program
Client Address : WeCARE Phase-3, Jhenaidah-Jashore Highway (N-7) Improvement Project, Allenbari, Tejgaon, Dhaka-1215
Monitoring Time : 1:10 PM to 4:10 PM (3 hours)
Field Officer/Manager : Md. Mustafizur Rahman, Environmentalist, BCL Associates Limited
Monitoring Date : 26.12.2023
Analysis Date : 15.01.2024
Monitoring ID and Locations : AAQ4, Infront of Masum Billah's House, Biharinagar, Jhaudanga, Satkhira
GPS Coordinates : 22°47'54.73"N 89° 2'4.92"E

Ambient Air Quality (AAQ4) Test Results

Sampling Site Description	Description of Parameters	Unit	Concentration of Ambient	*Bangladesh Standards	**WHO Standard	Methods
- This location is approximately 100m far from the proposed road. - Rural in settings and surrounded by residential houses.	Particulate Matter (PM _{2.5})	µg/m ³	21.9	65 (24 hour) 35 (Annual)	15 (24 hour)	Light Scattering Nephelometer
	Particulate Matter (PM ₁₀)	µg/m ³	26.7	150 (24 hour) 50 (Annual)	45 (24 hour)	
	Nitrogen Dioxides (NO ₂)	µg/m ³	6.6	80 (24 hour) 40 (Annual)	25 (24 hour)	High Sensitivity Electrochemical
	Sulphur Dioxides (SO ₂)	µg/m ³	73.0	80 (24 hour) 250 (1 hour)	40 (24 hour)	
	Ozone (O ₃)	µg/m ³	27.7	100 (8 hour) 180 (1 hour)	100 (8 hour)	
	Carbon Monoxides (CO)	mg/m ³	0.39	05 (8 hour) 20 (1 hour)	10 (8 hour)	
	Carbon Dioxides (CO ₂)	mg/m ³	125.0	-	-	
	Air Temperature (°C)		26.2	NSE**	-	On-Site Recording
	Relative Humidity (%)		60.0	NSE**	-	
	Air Pressure (hPa)		1016.0	NSE**	-	
	Wind Speed (m/s)		0.30	NSE**	-	
	Wind Direction (Degree)		46.00 (NE)	NSE**	-	

Note: *Bangladesh Air Pollution (Control) Rules, 2022;

**WHO Ambient Air Quality Guideline Values (2021), which are also being referred in the World Bank and IFC's General EHS Guidelines

*NSE-No Standards Established yet, NE-North East

* Monitoring data converted to 8 hours and 24 hours according to the recognize calculation method

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BCL REF NO.: BCL/AAQ/ 24122023005

AMBIENT AIR QUALITY TESTING REPORT

Client Name : Roads and Highways Department (RHD)
Project Name : Environmental and Social Management for Bhomra-Satkhira-Navaron Road Section (Phase-3) for Bangladesh Western Economic Corridor & Regional Enhancement (WeCARE) Program
Client Address : WeCARE Phase-3, Jhenaidah-Jashore Highway (N-7) Improvement Project, Allenbari, Tejgaon, Dhaka-1215
Monitoring Time : 9:07 AM to 12:07 PM (3 hours)
Field Officer/Manager : Md. Mustafizur Rahman, Environmentalist, BCL Associates Limited
Monitoring Date : 26.12.2023
Analysis Date : 15.01.2024
Monitoring ID and Locations : AAQ5, Shah Aanullah Degree College, Tulshidanga, Kolaroa, Satkhira
GPS Coordinates : 22°52'15.51"N 89° 2'5.49"E

Ambient Air Quality (AAQ4) Test Results

Sampling Site Description	Description of Parameters	Unit	Concentration of Ambient	*Bangladesh Standards	**WHO Standard	Methods
- This location is inside an educational institute boundary and 70m far from the proposed road. - Monitoring location is surrounded by agricultural filed with limited residential house.	Particulate Matter (PM _{2.5})	µg/m ³	33.5	65 (24 hour) 35 (Annual)	15 (24 hour)	Light Scattering Nephelometer
	Particulate Matter (PM ₁₀)	µg/m ³	42.8	150 (24 hour) 50 (Annual)	45 (24 hour)	
	Nitrogen Dioxides (NO ₂)	µg/m ³	14.3	80 (24 hour) 40 (Annual)	25 (24 hour)	High Sensitivity Electrochemical
	Sulphur Dioxides (SO ₂)	µg/m ³	80.8	80 (24 hour) 250 (1 hour)	40 (24 hour)	
	Ozone (O ₃)	µg/m ³	25.3	100 (8 hour) 180 (1 hour)	100 (8 hour)	
	Carbon Monoxides (CO)	mg/m ³	0.60	05 (8 hour) 20 (1 hour)	10 (8 hour)	
	Carbon Dioxides (CO ₂)	mg/m ³	321.5	-	-	
	Air Temperature (°C)		27.4	NSE**	-	On-Site Recording
	Relative Humidity (%)		59.8	NSE**	-	
	Air Pressure (hPa)		1019.1	NSE**	-	
	Wind Speed (m/s)		0.38	NSE**	-	
	Wind Direction (Degree)		165.76 (S)	NSE**	-	

Note: *Bangladesh Air Pollution (Control) Rules, 2022;

**WHO Ambient Air Quality Guideline Values (2021), which are also being referred in the World Bank and IFC's General EHS Guidelines

*NSE-No Standards Established yet; S-South

* Monitoring data converted to 8 hours and 24 hours according to the recognize calculation method

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BCL REF NO.: BCL/AAQ/ 24122023006

AMBIENT AIR QUALITY TESTING REPORT

Client Name : Roads and Highways Department (RHD)
Project Name : Environmental and Social Management for Bhomra-Shatkhira-Navaron Road Section (Phase-3) for Bangladesh Western Economic Corridor & Regional Enhancement (WeCARE) Program
Client Address : WeCARE Phase-3, Jhenaidah-Jashore Highway (N-7) Improvement Project, Allenbari, Tejgaon, Dhaka-1215
Monitoring Time : 3:25 PM to 6:25 PM (3 hours)
Field Officer/Manager : Md. Mustafizur Rahman, Environmentalist, BCL Associates Limited
Monitoring Date : 24.12.2023
Analysis Date : 15.01.2024
Monitoring ID and Locations : AAQ6, Infront of Abdur Rouf's House, Beltola Bazar
GPS Coordinates : 22°56'28.75"N 88°59'4.53"E

Ambient Air Quality (AAQ4) Test Results

Sampling Site Description	Description of Parameters	Unit	Concentration of Ambient	*Bangladesh Standards	**WHO Standard	Methods
- This location is adjacent to the local bazar named Beltola bazar. - It also adjacent to the proposed road. - Commercial and Residential structures found around the location.	Particulate Matter (PM _{2.5})	µg/m ³	24.5	65 (24 hour) 35 (Annual)	15 (24 hour)	Light Scattering Nephelometer
	Particulate Matter (PM ₁₀)	µg/m ³	33.5	150 (24 hour) 50 (Annual)	45 (24 hour)	
	Nitrogen Dioxides (NO ₂)	µg/m ³	11.4	80 (24 hour) 40 (Annual)	25 (24 hour)	High Sensitivity Electrochemical
	Sulphur Dioxides (SO ₂)	µg/m ³	163.2	80 (24 hour) 250 (1 hour)	40 (24 hour)	
	Ozone (O ₃)	µg/m ³	23.1	100 (8 hour) 180 (1 hour)	100 (8 hour)	
	Carbon Monoxides (CO)	mg/m ³	0.39	05 (8 hour) 20 (1 hour)	10 (8 hour)	
	Carbon Dioxides (CO ₂)	mg/m ³	129.0	-	-	
	Air Temperature	(°C)	24.4	NSE**	-	On-Site Recording
	Relative Humidity	(%)	69.4	NSE**	-	
	Air Pressure	(hPa)	1016.1	NSE**	-	
	Wind Speed	(m/s)	0.06	NSE**	-	
	Wind Direction	(Degree)	185.47 (S)	NSE**	-	

Note: *Bangladesh Air Pollution (Control) Rules, 2022;

**WHO Ambient Air Quality Guideline Values (2021), which are also being referred in the World Bank and IFC's General EHS Guidelines

*NSE-No Standards Established yet, S-South

* Monitoring data converted to 8 hours and 24 hours according to the recognize calculation method

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BCL REF NO.: BCL/AAQ/ 24122023007

AMBIENT AIR QUALITY TESTING REPORT

Client Name : Roads and Highways Department (RHD)
Project Name : Environmental and Social Management for Bhomra-Satkhira-Navaron Road Section (Phase-3) for Bangladesh Western Economic Corridor & Regional Enhancement (WeCARE) Program
Client Address : WeCARE Phase-3, Jhenaidah-Jashore Highway (N-7) Improvement Project, Allenbari, Tejgaon, Dhaka-1215
Monitoring Time : 12:05 PM to 3:05 PM (3 hours)
Field Officer/Manager : Md. Mustafizur Rahman, Environmentalist, BCL Associates Limited
Monitoring Date : 24.12.2023
Analysis Date : 15.01.2024
Monitoring ID and Locations : AAQ7, Jamtola Bazar, Sharsha, Jashore
GPS Coordinates : 22°59'37.92"N 88°58'42.61"E

Ambient Air Quality (AAQ4) Test Results

Sampling Site Description	Description of Parameters	Unit	Concentration of Ambient	*Bangladesh Standards	**WHO Standard	Methods
This location is on the shoulder of the existing road located at the local bazar named Jamtola bazar.	Particulate Matter (PM _{2.5})	µg/m ³	49.3	65 (24 hour) 35 (Annual)	15 (24 hour)	Light Scattering Nephelometer
	Particulate Matter (PM ₁₀)	µg/m ³	55.7	150 (24 hour) 50 (Annual)	45 (24 hour)	
	Nitrogen Dioxides (NO ₂)	µg/m ³	13.0	80 (24 hour) 40 (Annual)	25 (24 hour)	High Sensitivity Electrochemical
	Sulphur Dioxides (SO ₂)	µg/m ³	178.3	80 (24 hour) 250 (1 hour)	40 (24 hour)	
	Ozone (O ₃)	µg/m ³	21.9	100 (8 hour) 180 (1 hour)	100 (8 hour)	
	Carbon Monoxides (CO)	mg/m ³	0.60	05 (8 hour) 20 (1 hour)	10 (8 hour)	
	Carbon Dioxides (CO ₂)	mg/m ³	137.1	-	-	
	Air Temperature	(°C)	24.9	NSE**	-	On-Site Recording
	Relative Humidity	(%)	70.9	NSE**	-	
	Air Pressure	(hPa)	1018.3	NSE**	-	
	Wind Speed	(m/s)	0.55	NSE**	-	
	Wind Direction	(Degree)	155.32 (SSE)	NSE**	-	

Note: *Bangladesh Air Pollution (Control) Rules, 2022;

**WHO Ambient Air Quality Guideline Values (2021), which are also being referred in the World Bank and IFC's General EHS Guidelines

*NSE-No Standards Established yet, SSE-South-South-East

* Monitoring data converted to 8 hours and 24 hours according to the recognize calculation method

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BCL REF NO.: BCL/AAQ/ 24122023008

AMBIENT AIR QUALITY TESTING REPORT

Client Name : Roads and Highways Department (RHD)
Project Name : Environmental and Social Management for Bhomra-Satkhira-Navaron Road Section (Phase-3) for Bangladesh Western Economic Corridor & Regional Enhancement (WeCARE) Program
Client Address : WeCARE Phase-3, Jhenaidah-Jashore Highway (N-7) Improvement Project, Allenbari, Tejgaon, Dhaka-1215
Monitoring Time : 8:14 AM to 11:14 AM (3 hours)
Field Officer/Manager : Md. Mustafizur Rahman, Environmentalist, BCL Associates Limited
Monitoring Date : 24.12.2023
Analysis Date : 15.01.2024
Monitoring ID and Locations : AAQ8, Navaron Mor, Sharsha, Jashore
GPS Coordinates : 23° 3'28.57"N 88°59'59.78"E

Ambient Air Quality (AAQ4) Test Results

Sampling Site Description	Description of Parameters	Unit	Concentration of Ambient	*Bangladesh Standards	**WHO Standard	Methods
- This location is the adjacent to the Navaron mor. - Commercial settings.	Particulate Matter (PM _{2.5})	µg/m ³	62.6	65 (24 hour) 35 (Annual)	15 (24 hour)	Light Scattering Nephelometer
	Particulate Matter (PM ₁₀)	µg/m ³	72.0	150 (24 hour) 50 (Annual)	45 (24 hour)	
	Nitrogen Dioxides (NO ₂)	µg/m ³	27.1	80 (24 hour) 40 (Annual)	25 (24 hour)	High Sensitivity Electrochemical
	Sulphur Dioxides (SO ₂)	µg/m ³	132.3	80 (24 hour) 250 (1 hour)	40 (24 hour)	
	Ozone (O ₃)	µg/m ³	28.1	100 (8 hour) 180 (1 hour)	100 (8 hour)	
	Carbon Monoxides (CO)	mg/m ³	0.74	05 (8 hour) 20 (1 hour)	10 (8 hour)	
	Carbon Dioxides (CO ₂)	mg/m ³	152.0	-	-	
	Air Temperature	(°C)	20.3	NSE**	-	On-Site Recording
	Relative Humidity	(%)	83.34	NSE**	-	
	Air Pressure	(hPa)	1020.7	NSE**	-	
	Wind Speed	(m/s)	0.33	NSE**	-	
	Wind Direction	(Degree)	184.23 (S)	NSE**	-	

Note: *Bangladesh Air Pollution (Control) Rules, 2022;

**WHO Ambient Air Quality Guideline Values (2021), which are also being referred in the World Bank and IFC's General EHS Guidelines

*NSE-No Standards Established yet, S-South

* Monitoring data converted to 8 hours and 24 hours according to the recognize calculation method

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Annex 3.14 :Surface water Quality Test Report



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info.beetlsl@gmail.com **REPORT NO:AAJ210610016**



Sample Code No: BEETLSL-08-02-24,SW-01		Delivery Date: 19-02-24	
Name of Company/Organization: BEETLSL		Address: Hatkhola, Tikatuli, Dhaka	
Client Ref. No. & Date: 2024-BEETLSL- 08-02-24,SW-01		Sample Quantity: (06) Six	
Sample collected by: BCL Team		Sampling Date:08-02-24	
Name of Test: Physical/ Chemical/ Biological Analysis of Surface Water			
Service Duration: General: 5 - 7 and 15 working days; Emergency: 3 or 4 working days; Urgent: 2 or 3 working days;			
Sample ID:		Sample Location:	
SW-01	(Upstream) Bakal Canal Alipur, Satkhira 22°41'40.12"N89° 2'36.34"E		
SW-01	(Downstream). Bakal Canal Alipur, Satkhira 22°41'27.53"N 89° 2'39.68"E		
SW-02	(Upstream) Noukhal Canal Brozobaksha Bazar, Kolaroa, Satkhira 22°53'22.22"N 89° 1'29.49"E		
SW-02	(Downstream) Noukhal Canal Brozobaksha Bazar, Kolaroa, Satkhira 22°53'4.31"N 89° 1'26.69"E		
SW-03	(Upstream) Betna River Navaron, Jhikargacha, Jashore, 23° 3'35.45"N 89° 0'9.07"E		
SW-03	(Downstream)Betna River Navaron, Jhikargacha, Jashore, 23° 3'24.38"N 89° 0'10.07"E		

01. Test Report: Analysis of Surface Water (SW)

SL No	Surface Water Test Parameter	Upstream SW-01	Downstream SW-01	Upstream SW-02	Downstream SW-02	Upstream SW-03	Downstream SW-03	Unit	ECR - 2023 Standard for Surface Water	Methods of Analysis
1.1	TDS	222	355	207	200	205	213	mg/l	1000	APHA23rdED N. 2017(2540 C)
1.2	Turbidity	5.04	4.85	1.65	3.20	2.46	3.50	NTU	NYS	APHA23rdEDN.2017 (2130 B)
1.3	pH	6.89	6.78	7.01	6.89	6.04	7.14	-	6-9	APHA23rdED N. 2017(4500 O)



Annex 3.15 :Water Quality Test Report

 BCCL Associates Limited Chartered Accountants 800, 100/101, 102/103, 104/105, 106/107, 108/109, 110/111, 112/113, 114/115, 116/117, 118/119, 120/121, 122/123, 124/125, 126/127, 128/129, 130/131, 132/133, 134/135, 136/137, 138/139, 140/141, 142/143, 144/145, 146/147, 148/149, 150/151, 152/153, 154/155, 156/157, 158/159, 160/161, 162/163, 164/165, 166/167, 168/169, 170/171, 172/173, 174/175, 176/177, 178/179, 180/181, 182/183, 184/185, 186/187, 188/189, 190/191, 192/193, 194/195, 196/197, 198/199, 200/201, 202/203, 204/205, 206/207, 208/209, 210/211, 212/213, 214/215, 216/217, 218/219, 220/221, 222/223, 224/225, 226/227, 228/229, 230/231, 232/233, 234/235, 236/237, 238/239, 240/241, 242/243, 244/245, 246/247, 248/249, 250/251, 252/253, 254/255, 256/257, 258/259, 260/261, 262/263, 264/265, 266/267, 268/269, 270/271, 272/273, 274/275, 276/277, 278/279, 280/281, 282/283, 284/285, 286/287, 288/289, 290/291, 292/293, 294/295, 296/297, 298/299, 300/301, 302/303, 304/305, 306/307, 308/309, 310/311, 312/313, 314/315, 316/317, 318/319, 320/321, 322/323, 324/325, 326/327, 328/329, 330/331, 332/333, 334/335, 336/337, 338/339, 340/341, 342/343, 344/345, 346/347, 348/349, 350/351, 352/353, 354/355, 356/357, 358/359, 360/361, 362/363, 364/365, 366/367, 368/369, 370/371, 372/373, 374/375, 376/377, 378/379, 380/381, 382/383, 384/385, 386/387, 388/389, 390/391, 392/393, 394/395, 396/397, 398/399, 400/401, 402/403, 404/405, 406/407, 408/409, 410/411, 412/413, 414/415, 416/417, 418/419, 420/421, 422/423, 424/425, 426/427, 428/429, 430/431, 432/433, 434/435, 436/437, 438/439, 440/441, 442/443, 444/445, 446/447, 448/449, 450/451, 452/453, 454/455, 456/457, 458/459, 460/461, 462/463, 464/465, 466/467, 468/469, 470/471, 472/473, 474/475, 476/477, 478/479, 480/481, 482/483, 484/485, 486/487, 488/489, 490/491, 492/493, 494/495, 496/497, 498/499, 500/501, 502/503, 504/505, 506/507, 508/509, 510/511, 512/513, 514/515, 516/517, 518/519, 520/521, 522/523, 524/525, 526/527, 528/529, 530/531, 532/533, 534/535, 536/537, 538/539, 540/541, 542/543, 544/545, 546/547, 548/549, 550/551, 552/553, 554/555, 556/557, 558/559, 560/561, 562/563, 564/565, 566/567, 568/569, 570/571, 572/573, 574/575, 576/577, 578/579, 580/581, 582/583, 584/585, 586/587, 588/589, 590/591, 592/593, 594/595, 596/597, 598/599, 600/601, 602/603, 604/605, 606/607, 608/609, 610/611, 612/613, 614/615, 616/617, 618/619, 620/621, 622/623, 624/625, 626/627, 628/629, 630/631, 632/633, 634/635, 636/637, 638/639, 640/641, 642/643, 644/645, 646/647, 648/649, 650/651, 652/653, 654/655, 656/657, 658/659, 660/661, 662/663, 664/665, 666/667, 668/669, 670/671, 672/673, 674/675, 676/677, 678/679, 680/681, 682/683, 684/685, 686/687, 688/689, 690/691, 692/693, 694/695, 696/697, 698/699, 700/701, 702/703, 704/705, 706/707, 708/709, 710/711, 712/713, 714/715, 716/717, 718/719, 720/721, 722/723, 724/725, 726/727, 728/729, 730/731, 732/733, 734/735, 736/737, 738/739, 740/741, 742/743, 744/745, 746/747, 748/749, 750/751, 752/753, 754/755, 756/757, 758/759, 760/761, 762/763, 764/765, 766/767, 768/769, 770/771, 772/773, 774/775, 776/777, 778/779, 780/781, 782/783, 784/785, 786/787, 788/789, 790/791, 792/793, 794/795, 796/797, 798/799, 800/801, 802/803, 804/805, 806/807, 808/809, 810/811, 812/813, 814/815, 816/817, 818/819, 820/821, 822/823, 824/825, 826/827, 828/829, 830/831, 832/833, 834/835, 836/837, 838/839, 840/841, 842/843, 844/845, 846/847, 848/849, 850/851, 852/853, 854/855, 856/857, 858/859, 860/861, 862/863, 864/865, 866/867, 868/869, 870/871, 872/873, 874/875, 876/877, 878/879, 880/881, 882/883, 884/885, 886/887, 888/889, 890/891, 892/893, 894/895, 896/897, 898/899, 900/901, 902/903, 904/905, 906/907, 908/909, 910/911, 912/913, 914/915, 916/917, 918/919, 920/921, 922/923, 924/925, 926/927, 928/929, 930/931, 932/933, 934/935, 936/937, 938/939, 940/941, 942/943, 944/945, 946/947, 948/949, 950/951, 952/953, 954/955, 956/957, 958/959, 960/961, 962/963, 964/965, 966/967, 968/969, 970/971, 972/973, 974/975, 976/977, 978/979, 980/981, 982/983, 984/


BCL Associates Limited
Consulting Engineers and Architects

PROJECT TITLE AND BACKGROUND
Project Title: Jhenaidah-Jashore Road Section (Phase-1) and Bhomra-Satkhira-Navaron Road Section (Phase-3) for Western Economic Corridor and Regional Enhancement (WeCARE) Program
Project Location: Jhenaidah, Jashore, Bhomra, Satkhira, Navaron
Project Duration: 12 months
Project Budget: US\$ 10,000,000
Project Status: Ongoing
Project Manager: Mr. [Name]
Project Engineer: Mr. [Name]
Project Supervisor: Mr. [Name]

PROJECT DESCRIPTION
 The project is a road improvement project in the Jhenaidah, Jashore, Bhomra, Satkhira, and Navaron districts. The project aims to improve the road network and provide better connectivity between the districts. The project will involve the construction of new roads, widening of existing roads, and improvement of road infrastructure.

PROJECT OBJECTIVES
 The project has the following objectives:

- To improve the road network and provide better connectivity between the districts.
- To improve the road infrastructure and provide better road conditions.
- To improve the road safety and reduce the number of accidents.
- To improve the road environment and provide better road surroundings.

PROJECT BENEFITS
 The project will have the following benefits:

- Improved road network and better connectivity between the districts.
- Improved road infrastructure and better road conditions.
- Improved road safety and reduced number of accidents.
- Improved road environment and better road surroundings.

PROJECT RISKS
 The project has the following risks:

- Construction delays due to weather conditions.
- Construction cost overruns due to material price fluctuations.
- Construction safety incidents due to poor workmanship.
- Construction environmental impacts due to poor site management.

PROJECT IMPLEMENTATION
 The project will be implemented in the following phases:

- Phase 1: Road improvement in Jhenaidah, Jashore, and Bhomra districts.
- Phase 2: Road improvement in Satkhira and Navaron districts.
- Phase 3: Road improvement in Jhenaidah, Jashore, Bhomra, Satkhira, and Navaron districts.

PROJECT MONITORING AND EVALUATION
 The project will be monitored and evaluated in the following ways:

- Regular monitoring of project progress and quality.
- Periodic evaluation of project impact and benefits.
- Final evaluation of project success and sustainability.

PROJECT CONTACT INFORMATION
Project Manager: Mr. [Name]
Project Engineer: Mr. [Name]
Project Supervisor: Mr. [Name]

PROJECT SIGNATURE
 [Signature]

PROJECT DATE
 [Date]


BCL Associates Limited
Consulting Engineers and Architects

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Project Title: Jhenaidah-Jashore Road Section (Phase-1) and Bhomra-Satkhira-Navaron Road Section (Phase-3) for Western Economic Corridor and Regional Enhancement (WeCARE) Program
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Project Supervisor: Mr. [Name]

PROJECT SIGNATURE
 [Signature]

PROJECT DATE
 [Date]


BCL Associates Limited
Consulting Engineers and Architects

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Project Status: Ongoing
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Project Engineer: Mr. [Name]
Project Supervisor: Mr. [Name]

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- Regular monitoring of project progress and quality.
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PROJECT CONTACT INFORMATION
Project Manager: Mr. [Name]
Project Engineer: Mr. [Name]
Project Supervisor: Mr. [Name]

PROJECT SIGNATURE
 [Signature]

PROJECT DATE
 [Date]

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Annex 3.16 :Water Quality Test Report



**BANGLADESH ENVIRONMENTAL ENGINEERING
TRAINING & LAB SERVICES LTD.**

Nobarun Plaza (2st Floor), 33, Shahid Nazrul Islam Sharak, Hatkhola, Tikatuli,
 Dhaka-1203, Bangladesh. Tel- 02 9576957; Cell: +88 01729269355, Email:
info.beetls@gmail.com **REPORT NO:AA/210610016**



1.4	DO	6.02	6.08	6.97	7.01	6.80	6.14	mg/l	≥5	APHA23rdEDN.2017 (4500 O)
1.5	Phosphate (PO ₄ ³⁻)	<1.0	<1.0	<1.0	<1.0	1.1	1.3	mg/l	NYS	APHA23rdEDN. 2017 (4500 P)
1.6	Nitrate	3.1	6.2	4.4	7.2	5.3	8.2	mg/l	10	APHA23rdEDN. 2017(4500- NO3 -)
1.7	Oil and Grease	5.20	4.23	4.01	4.12	5.16	4.19	mg/l	10	APIIA23rdEDN.2017 (5520 B)
1.8	TSS	29.4	23.11	28.6	36.2	21.89	34.06	mg/l	100	APHA23rdEDN. 2017 (2540 D)
1.9	T-C	120	123	219	116	225	227	CFU/ 100ml	≤5000	APHA23rdEDN. 2017 (9222B)
1.10	F-C	17	20	15	14	21	23	CFU/ 100 ml	NYS	APHA23rdED N. 2017(9222D)
1.11	Temperature	23	25	23	24	25	24	°C	Not higher than 5 °C from the canal / inland water surface	APHA23rdED N. 2017 (2550 B)
1.12	BOD	16.9	19.2	23.1	27.3	22.4	25.3	Mg/l	30	APHA23rdED N.2017(5210 B)

Note: This report is prepared on Following the Environmental Conservation Rules, (ECR) 2023, schedule 2 (rules 31) KA section and schedule 4 (rules 32)

Test Performed & Lab Report Prepared by,



Mahadi Hasan
Executive-Lab
BEETLSL

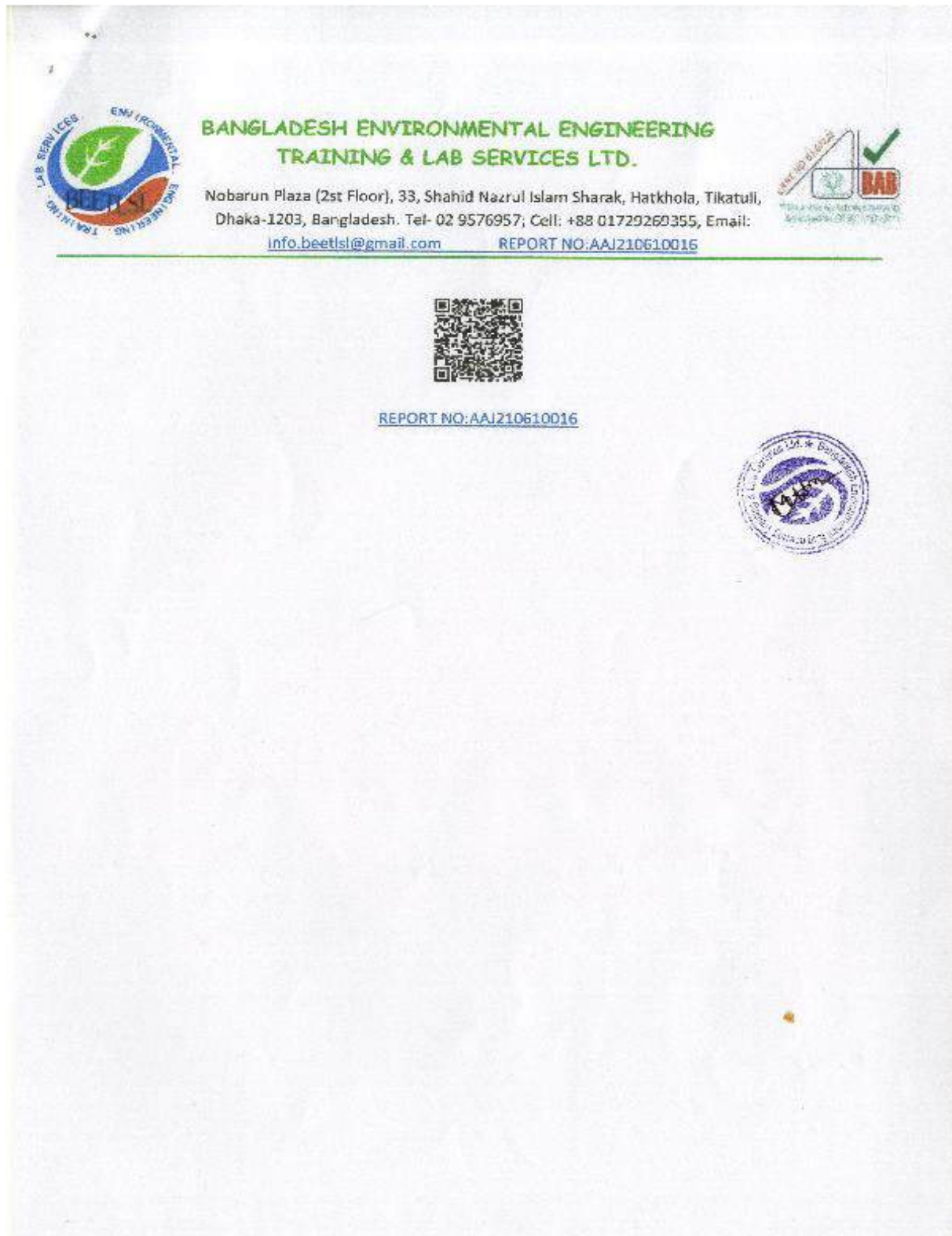
Test Supervised by,



Dr. Fatima Akter
Director, BEETLSL



Annex 3.17 :Water Quality Test Report



Annex 3.18 :Water Quality Test Report



**BANGLADESH ENVIRONMENTAL ENGINEERING
TRAINING & LAB SERVICES LTD.**

Nobarun Plaza (2st Floor), 33, Shahid Nazrul Islam Sharak, Hatkhola, Tikatuli,
 Dhaka-1203, Bangladesh. Tel- 02 9576957; Cell: +88 01729269355, Email:
info.beetls@gmail.com **REPORT NO:AAJ210610016**



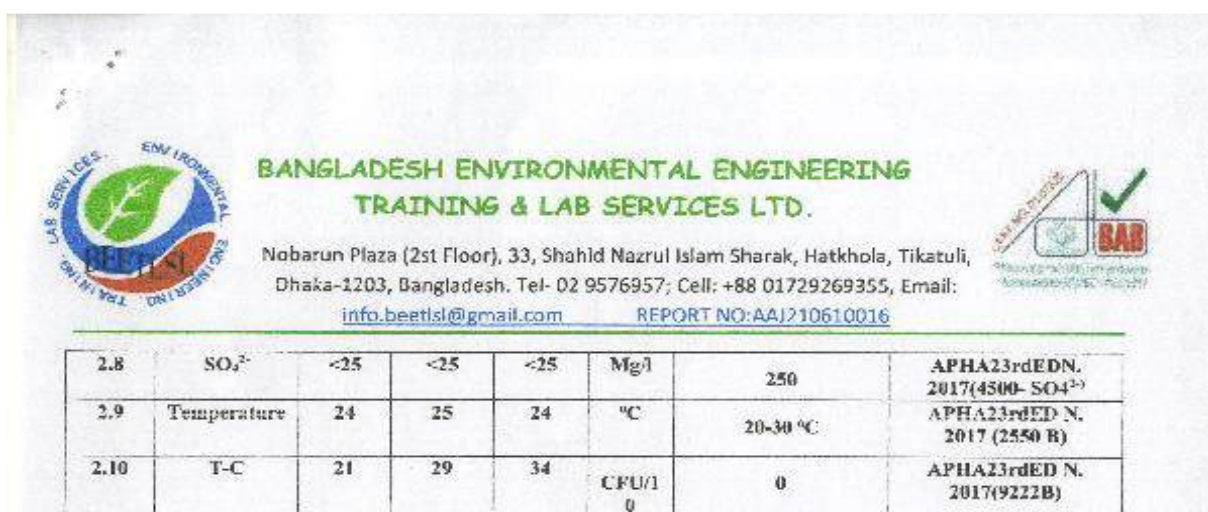
Sample Code No: BEETLSL-08-02-24,SW-01		Delivery Date: 19-02-24	
Name of Company/Organization: BEETLSL		Address: Hatkhola, Tikatuli, Dhaka	
Client Ref. No. & Date: 2024-BEETLSL- 08-02-24,SW-01		Sample Quantity: (06) Six	
Sample collected by: BCL Team		Sampling Date:08-02-24	
Name of Test:	Physical/ Chemical/ Biological Analysis of Surface Water		
Service Duration:	General: 5 - 7 and 15 working days; Emergency: 3 or 4 working days; Urgent: 2 or 3 working days;		
Sample ID:	Sample Location:		
SW-01	(Upstream) Bakal Canal Alipur, Satkhira 22°41'40.12"N89° 2'36.34"E		
SW-01	(Downstream). Bakal Canal Alipur, Satkhira 22°41'27.53"N 89° 2'39.66"E		
SW-02	(Upstream) Noukhal Canal Brozobaksha Bazar, Kolaroa, Satkhira 22°53'22.22"N 89° 1'29.49"E		
SW-02	(Downstream) Noukhal Canal Brozobaksha Bazar, Kolaroa, Satkhira 22°53'4.31"N 89° 1'26.69"E		
SW-03	(Upstream) Betna River Navaron, Jhikargacha, Jashore, 23° 3'35.45"N 89° 0'9.07"E		
SW-03	(Downstream) Betna River Navaron, Jhikargacha, Jashore, 23° 3'24.38"N 89° 0'10.07"E		

01. Test Report: Analysis of Surface Water (SW)

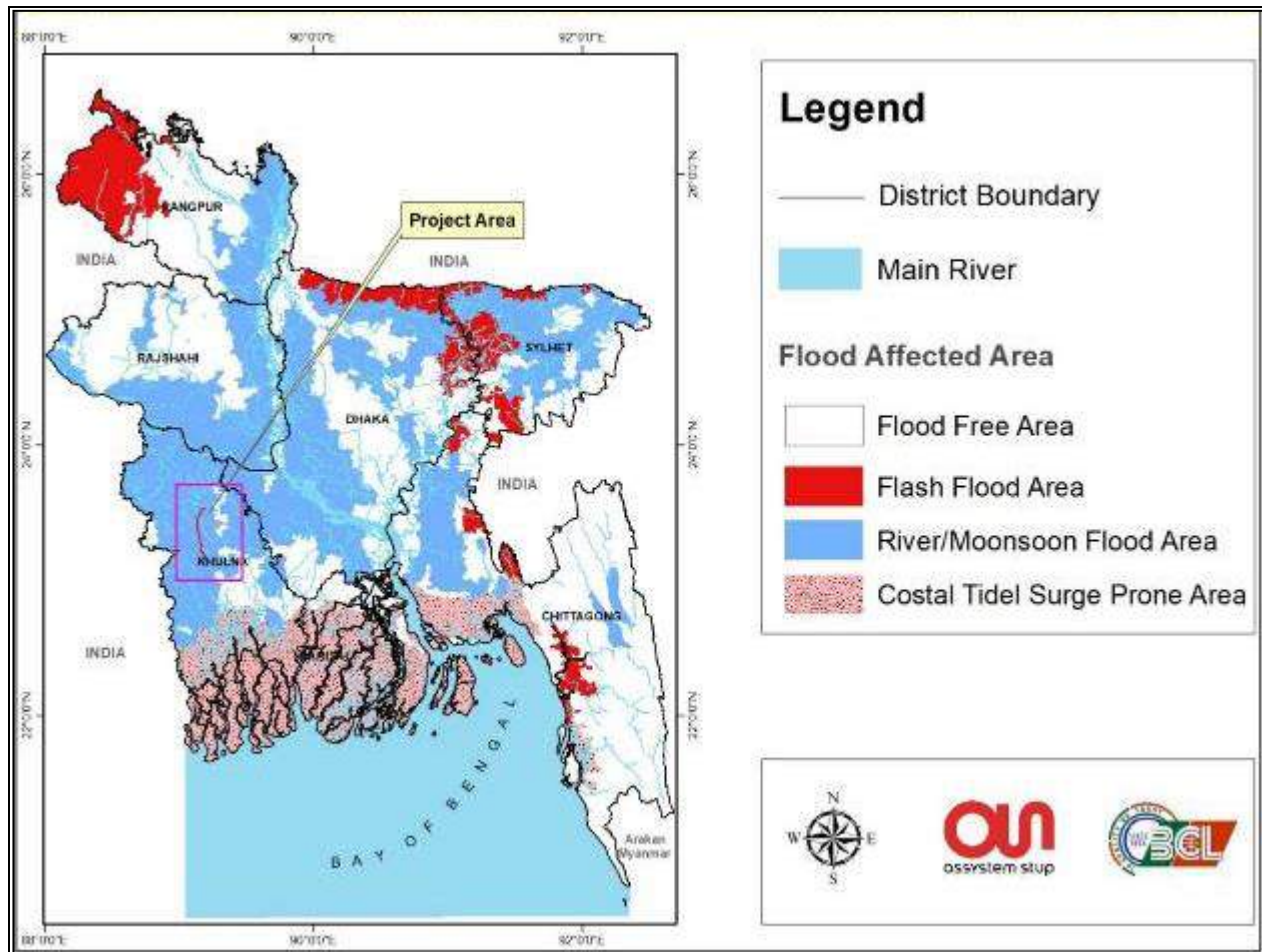
SL No	Surface Water Test Parameter	Upstream SW-01	Downstream SW-01	Upstream SW-02	Downstream SW-02	Upstream SW-03	Downstream SW-03	Unit	ECR - 2023 Standard for Surface Water	Methods of Analysis
1.1	TDS	222	355	207	200	205	213	mg/l	1000	APHA23rdED N. 2017(2540 C)
1.2	Turbidity	5.04	4.85	1.65	3.20	2.46	3.50	NTU	NYS	APHA23rdEDN.2017 (2130 B)
1.3	pH	6.89	6.78	7.01	6.89	6.04	7.14	-	6-9	APHA23rdED N. 2017(4500 O)



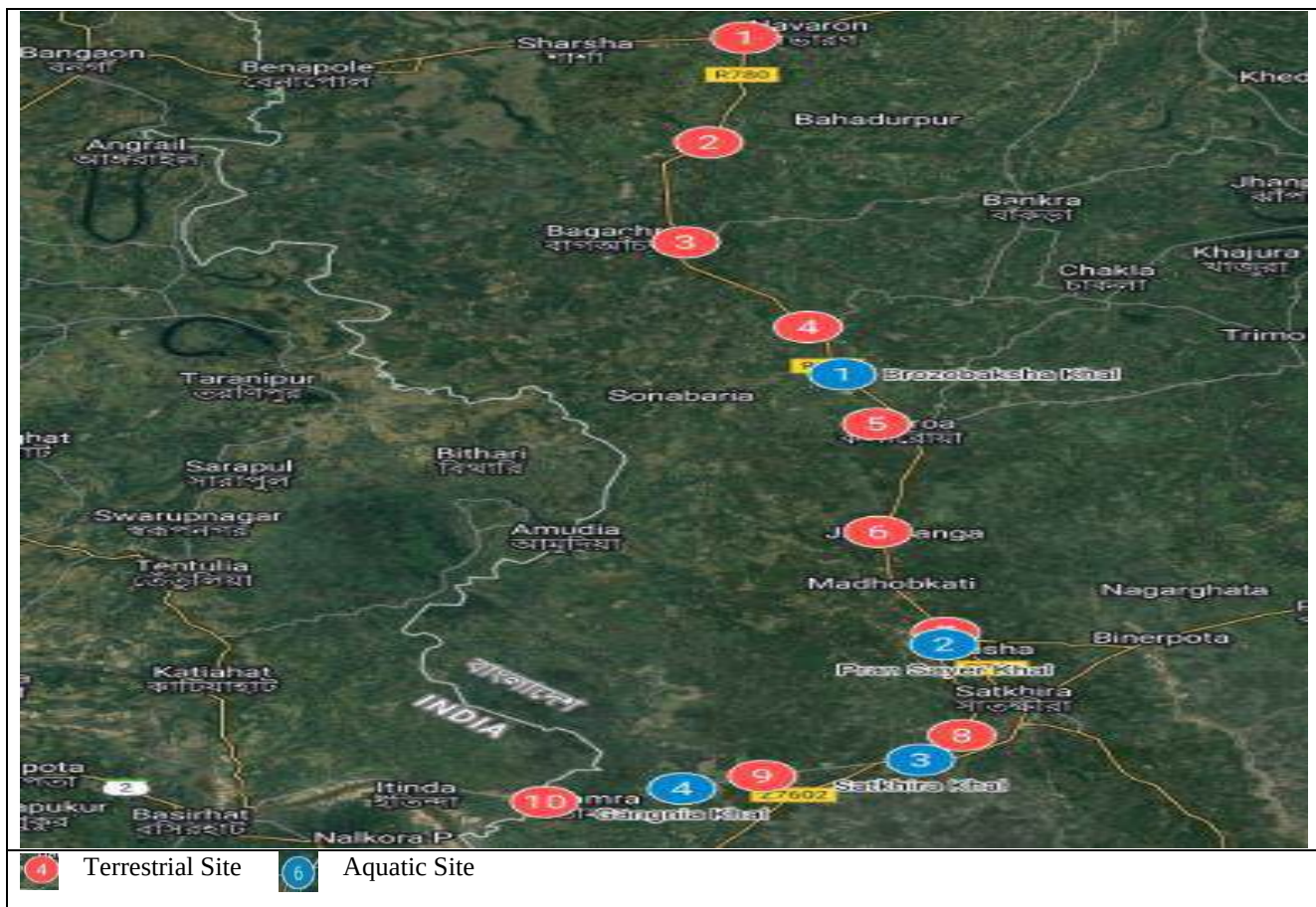
Annexes



Annex 3.19 :Flood Zone



Annex 3.20 :Location Map of Ecology Survey Sampling



Annex 3.21 :List of Terrestrial Flora Species Recorded from the Road Alignment

(F = Fruit, M = Medicinal, T = Timber, O = Ornamental)			
Scientific Name	Local Name	Family	Uses
<i>Abelmoschus esculentus</i>	Dheros	Malvaceae	F
<i>Abroma augusta</i>	Ulot Kombol	Sterculiaceae	M
<i>Acacia auriculiformis</i>	Akashmoni	Fabaceae	T
<i>Acalypha hispida</i>	Shib Jota	Euphorbiaceae	O
<i>Aegle marmelos</i>	Bel	Rutaceae	F
<i>Agremone mexicana</i>	Shialkata	Papaveraceae	M
<i>Albizia procera</i>	Sada Koro	Fabaceae	T
<i>Allamanda cathartica</i>	Ghonta Ful	Apocynaceae	O
<i>Alstonia scholaris</i>	Chatim	Apocynaceae	T
<i>Annona squamosa</i>	Ata	Annonaceae	F
<i>Aphanamixis polystachya</i>	Pitraj	Meliaceae	M
<i>Araucaria</i>	Christmas Tree	Araucariaceae	O
<i>Areca catechu</i>	Supari	Arecaceae	F
<i>Artocarpus heterophyllus</i>	Kanthal	Moraceae	F
<i>Averrhoa carambola</i>	Kamranga	Oxalidaceae	F
<i>Azadirachta indica</i>	Neem	Meliaceae	M
<i>Bambusa vulgaris</i>	Baansh	Poaceae	T
<i>Benincasa hispida</i>	Chal Kumra	Cucurbitaceae	F
<i>Bombax ceiba</i>	Shimul	Bombacaceae	T
<i>Borassus flabellifer</i>	Taal	Arecaceae	F
<i>Bougainvillea spectabilis</i>	Baganbilash	Nyctaginaceae	O
<i>Butea monosperma</i>	Polash	Fabaceae	O
<i>Caesalpinia pulcherrima</i>	Radhachura	Fabaceae	O
<i>Calotropis gigantea</i>	Akanda	Apocynaceae	M
<i>Carica papaya</i>	Pepe	Caricaceae	F
<i>Carissa carandas</i>	Koromcha	Apocynaceae	M
<i>Cayratia trifolia</i>	Goale Lota	Vitaceae	O
<i>Ceiba pentandra</i>	Burma Shimul	Malvaceae	F
<i>Citrus limon</i>	Lebu	Rutaceae	F
<i>Citrus maxima</i>	Jambura	Rutaceae	F
<i>Clerodendrum viscosum</i>	Vaat	Verbenaceae	M
<i>Coccinea grandis</i>	Telakucha	Cucurbitaceae	M
<i>Cocos nucifera</i>	Narikel	Arecaceae	F
<i>Combretum indicum</i>	Madhobi Lota	Combretaceae	O
<i>Crotalaria pallida</i>	Jhunjhuni	Fabaceae	M
<i>Cucumis sativus</i>	Shosha	Cucurbitaceae	F
<i>Cucurbita maxima</i>	Misti Kumra	Cucurbitaceae	F
<i>Dalbergia sissoo</i>	Sishu Gach	Fabaceae	T
<i>Datura metel</i>	Dhutura	Solanaceae	M
<i>Delonix regia</i>	Krishnochura	Fabaceae	O
<i>Dioscorea alata</i>	Gaach Alu	Dioscoreaceae	F
<i>Diospyros malabarica</i>	Deshi Gaab	Ebenaceae	F
<i>Dyopsis lutescens</i>	Areca Palm	Arecaceae	O
<i>Euphorbia cotinifolia</i>	Copper Gach	Euphorbiaceae	O
<i>Ficus benghalensis</i>	Lal Bot	Moraceae	F
<i>Ficus carica</i>	Teen	Moraceae	F
<i>Ficus hispida</i>	Kak Dumur	Moraceae	F
<i>Ficus religiosa</i>	Ashwatha Bot	Moraceae	M
<i>Glycosmis pentaphylla</i>	Motkila	Rutaceae	M
<i>Hibiscus rosa-sinensis</i>	Joba	Malvaceae	O
<i>Hibiscus schizopetalus</i>	Jhumko Joba	Malvaceae	O
<i>Ixora coccinea</i>	Rongon	Rubiaceae	O
<i>Jatropha curcas</i>	Bag Verenda	Euphorbiaceae	M
<i>Khaya anthotheca</i>	Lombu	Meliaceae	T
<i>Lablab purpureus</i>	Shim	Fabaceae	F
<i>Lagenaria siceraria</i>	Lau	Cucurbitaceae	F
<i>Lagerstroemia indica</i>	Choto Jarul	Lythraceae	O
<i>Lagerstroemia speciosa</i>	Jarul	Lythraceae	O
<i>Lannea coromandelica</i>	Jiga, Jeol	Anacardiaceae	T
<i>Lantana camara</i>	Putush	Verbenaceae	O
<i>Lawsonia inermis</i>	Mehedi	Lythraceae	M
<i>Leucaena leucocephala</i>	Ipil Ipil	Fabaceae	T

Annexes

(F = Fruit, M = Medicinal, T = Timber, O = Ornamental)			
Scientific Name	Local Name	Family	Uses
<i>Limonia acidissima</i>	Kodbel	Rutaceae	F
<i>Litchi chinensis</i>	Lichu	Sapindaceae	F
<i>Litsea glutinosa</i>	Menda	Lauraceae	M
<i>Madhuca longifolia</i>	Mohua	Sapotaceae	M
<i>Malus domestica</i>	Apple	Rosaceae	F
<i>Mangifera indica</i>	Aam	Anacardiaceae	F
<i>Manilkara zapota</i>	Sofeda	Sapotaceae	F
<i>Melaleuca</i>		Myrtaceae	O
<i>Melia azedarach</i>	Ghora Nim	Meliaceae	M
<i>Mikania cordata</i>	Assam Lota	Asteraceae	M
<i>Mimusops elengi</i>	Bokul	Sapotaceae	O
<i>Momordica charantina</i>	Korla	Cucurbitaceae	F
<i>Moringa oleifera</i>	Sajina	Moringaceae	F
<i>Morus alba</i>	Tut	Moraceae	F
<i>Murraya paniculata</i>	Kamini	Rutaceae	O
<i>Neolamarckia cadamba</i>	Kodom	Rubiaceae	F
<i>Nerium oleander</i>	Rokto Korobi	Apocynaceae	O
<i>Ocimum sanctum</i>	Tulshi	Lamiaceae	M
<i>Oroxylum indicum</i>	Kanaidinga	Bignoniaceae	M
<i>Passiflora foetida</i>	Jhumko Lota	Passifloraceae	O
<i>Persea americana</i>	Avocado	Lauraceae	F
<i>Phoenix dactylifera</i>	Khejur	Arecaceae	F
<i>Phyllanthus reticulatus</i>	Chitki	Phyllanthaceae	M
<i>Pithecellobium dulce</i>	Jilapi Gach	Fabaceae	F
<i>Plumeria pudica</i>	Nag Champa	Apocynaceae	O
<i>Polyalthia longifolia</i>	Debdaru	Annonaceae	T
<i>Psidium guajava</i>	Peyara	Myrtaceae	F
<i>Punica granatum</i>	Dalim	Punicaceae	F
<i>Ricinus communis</i>	Reri	Euphorbiaceae	M
<i>Rosa sinensis</i>	Golap	Rosaceae	O
<i>Samanea saman</i>	Rain Tree	Fabaceae	T
<i>Senna siamea</i>	Minjiri	Fabaceae	T
<i>Solanum melongena</i>	Begun	Solanaceae	F
<i>Solanum nigrum</i>	Tit Begun	Solanaceae	M
<i>Solanum sisymbriifolium</i>	Kata Begun	Solanaceae	M
<i>Spondias mombin</i>	Amra	Anacardiaceae	F
<i>Stephania japonica</i>	Akanodi	Menispermaceae	M
<i>Streblus asper</i>	Sheora	Moraceae	M
<i>Swietenia mahagoni</i>	Mehogoni	Meliaceae	T
<i>Syzygium cumini</i>	Jaam	Myrtaceae	F
<i>Syzygium samarangense</i>	Jamrul	Myrtaceae	F
<i>Tamarindus indica</i>	Tentul	Fabaceae	F
<i>Tecoma stans</i>	Holud Chandraprova	Bignoniaceae	O
<i>Tectona grandis</i>	Segun	Verbenaceae	T
<i>Terminalia arjuna</i>	Arjun	Combretaceae	M
<i>Terminalia catappa</i>	Kathbadam	Combretaceae	F
<i>Terminalia mantaly</i>	Nakachua	Combretaceae	O
<i>Thuja orientalis</i>	Thuja	Cupressaceae	O
<i>Trema orientalis</i>	Jibon Gach	Cannabaceae	T
<i>Trewia nudiflora</i>	Pidali	Euphorbiaceae	T
<i>Trichosanthes dioica</i>	Potol	Cucurbitaceae	F
<i>Triumfetta rhomboidea</i>	Bon Okra	Malvaceae	M
<i>Urena lobata</i>	Bon Okra	Malvaceae	M
<i>Vigna unguiculata ssp. sequipedalis</i>	Borboti	Fabaceae	F
<i>Xanthium strumarium</i>	Ghagra	Asteraceae	M
<i>Zamia pygmaea</i>	Zamia Palm	Zamiaceae	O
<i>Ziziphus mauritiana</i>	Boroi	Rhamnaceae	F

Annexes

Annex 3.22 :List of Aquatic Flora Species Recorded from the Road Alignment							
[D = Duckweed, E = Edible, F = Fodder, M = Medicinal, O = Ornamental]							
Name of the Species							
Scientific	Vernacular	Family	USes	Scientific	Vernacular	Family	USes
<i>Alternanthera sessilis</i>	Sanchi Shak	Amaranthaceae	E	<i>Nymphoides hydrophylla</i>	Panchuni Mala	Menyanthaceae	O
<i>Azolla filiculoides</i>	Azolla	Azollaceae	D	<i>Nymphoides indica</i>	Chad mala	Menyanthaceae	O
<i>Commelina benghalensis</i>	Kanchira	Commelinaceae	O	<i>Ottelia alismoides</i>	Pani Kala	Hydrocharitaceae	E
<i>Cyperus rotundus</i>	Mutha	Cyperaceae	F	<i>Persicaria hydropiper</i>	Bishkatali	Polygonaceae	M
<i>Digitaria sanguinalis</i>		Poaceae	F	<i>Pistia stratiotes</i>	Topa Pana	Araceae	D
<i>Echinochloa colona</i>	Khude Shyama Ghas	Poaceae	F	<i>Polygonum hydropiper</i>	Bishkatali	Polygonaceae	M
<i>Echinochloa crus-galli</i>	Boro Shyama Ghas	Poaceae	F	<i>Polygonum lapathifolium</i>	Bishkatali	Polygonaceae	M
<i>Eichhornia crassipes</i>	Kachuri Pana	Pontederiaceae	O	<i>Potamogeton pectinatus</i>	Ghetu	Potamogetonaceae	M
<i>Eleusine indica</i>	Malankuri	Poaceae	F	<i>Saccharum spontaneum</i>	Kaash	Poaceae	O
<i>Enhydra fluctuans</i>	Helencha	Asteraceae	E	<i>Schoenoplectus articulatus</i>	Chechra	Cyperaceae	F
<i>Hydrilla verticillata</i>	Hydrilla	Hydrocharitaceae	M	<i>Urticularia</i>	Jhanjhi	Lentibulariaceae	M
<i>Ipomoea aquatica</i>	Kalmi	Convolvulaceae	O	<i>Wolffia arrhiza</i>	Guri Pana	Lemnaceae	D
<i>Lemna minor</i>	Khudi Pana	Araceae	D	<i>Monochoria hastata</i>	Boro Nukha	Pontederiaceae	F
<i>Ludwigia adscendens</i>	Mulchi	Onagraceae	M	<i>Monochoria vaginalis</i>	Nukha	Pontederiaceae	F
<i>Monochoria hastata</i>	Boro Nukha	Pontederiaceae	F				
<i>Monochoria vaginalis</i>	Nukha	Pontederiaceae	F				
<i>Nymphaea nouchali</i>	Shapla	Nymphaeaceae	O				
<i>Nymphaea stellata</i>	Sada Shapla	Nymphaeaceae	O				

Annexes

Annex 3.23 :List of Faunal Species Observed in the Study Area

Scientific name	Common name	Status
Amphibia (6 species)		
<i>Fejervarya nepalensis</i>	Nepal Cricket Frog	Least Concern
<i>Euphylyctis cyanophlyctis</i>	Skipper Frog	Least Concern
<i>Hoplobatrachus tigerinus</i>	Indian Bullfrog	Least Concern
<i>Euphylyctis cyanophlyctis</i>	Skipper Frog	Least Concern
<i>Fejervarya asmati</i>	Asmat's Cricket Frog	Least Concern
<i>Duttaohyranus melanotictus</i>	Common Toad	Least Concern
Reptilia (8 species)		
<i>Eutropis carinata</i>	Common Skink	Least Concern
<i>Varanus bengalensis</i>	Bengal Monitor Lizard	Near Threatened
<i>Calotes versicolor</i>	Common Garden Lizard	Least Concern
<i>Xenochrophis piscator</i>	Checkered Keelback	Least Concern
<i>Hemidactylus frenatus</i>	Common House Gecko	Least Concern
<i>Ptyas mucosa</i>	Indian Rat Snake	Least Concern
<i>Enhydryis enhydryis</i>	Smooth Water Snake	Least Concern
<i>Naja naja</i>	Binocellate Cobra	Near Threatened
Aves (55 species)		
<i>Nectarinia asiatica</i>	Purple Sunbird	Least Concern
<i>Pycnonotus cafer</i>	Red-vented Bulbul	Least Concern
<i>Columba livia</i>	Rock Dove	Least Concern
<i>Dendrocitta vagabunda</i>	Rufous Treepie	Least Concern
<i>Lonchura punctulata</i>	Scaly-breasted Munia	Least Concern
<i>Athene brama</i>	Spotted Owlet	Least Concern
<i>Pelargopsis capensis</i>	Stork-billed Kingfisher	Least Concern
<i>Eudynamis scolopaceus</i>	Western Koel	Least Concern
<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	Least Concern
<i>Lonchura striata</i>	White-rumped Munia	Least Concern
<i>Merops orientalis</i>	Asian Green Bee-eater	Least Concern
<i>Cypsiurus balasiensis</i>	Asian Palm Swift	Least Concern
<i>Sturnus contra</i>	Asian Pied Starling	Least Concern
<i>Hirundo rustica</i>	Barn Swallow	Least Concern
<i>Dicrurus macrocercus</i>	Black Drongo	Least Concern
<i>Milvus migrans</i>	Black Kite	Least Concern
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	Least Concern
<i>Oriolus xanthornus</i>	Black-hooded Oriole	Least Concern
<i>Dinopium benghalense</i>	Black-rumped Flameback	Least Concern
<i>Elanus caeruleus</i>	Black-winged Kite	Least Concern
<i>Merops philippinus</i>	Blue-tailed Bee-eater	Least Concern
<i>Psilopogon asiaticus</i>	Blue-throated Barbet	Least Concern
<i>Ninox scutulata</i>	Brown Boobook	Least Concern
<i>Bubulcus ibis</i>	Cattle Egret	Least Concern
<i>Sturnus malabaricus</i>	Chestnut-tailed Starling	Least Concern
<i>Tyto alba</i>	Common Barn Owl	Least Concern
<i>Hierococcyx varius</i>	Common Hawk-Cuckoo	Least Concern
<i>Aegithina tiphia</i>	Common Iora	Least Concern
<i>Alcedo atthis</i>	Common Kingfisher	Least Concern
<i>Acridotheres tristis</i>	Common Myna	Least Concern
<i>Orthotomus sutorius</i>	Common Tailorbird	Least Concern
<i>Spilopelia chinensis</i>	Eastern Spotted Dove	Least Concern
<i>Dendrocopos macei</i>	Fulvous-breasted Woodpecker	Least Concern
<i>Centropus sinensis</i>	Greater Coucal	Least Concern
<i>Corvus splendens</i>	House Crow	Least Concern
<i>Passer domesticus</i>	House Sparrow	Least Concern
<i>Apus nipalensis</i>	House Swift	Least Concern
<i>Ardeola grayii</i>	Indian Pond Heron	Least Concern
<i>Ardea intermedia</i>	Intermediate Egret	Least Concern
<i>Turdoides striata</i>	Jungle Babbler	Least Concern
<i>Corvus leuallantii</i>	Jungle Crow	Least Concern
<i>Acridotheres fuscus</i>	Jungle Myna	Least Concern
<i>Dendrocygna javanica</i>	Lesser Whistling Duck	Least Concern
<i>Psilopogon lineatus</i>	Lineated Barbet	Least Concern
<i>Microcarbo niger</i>	Little Cormorant	Least Concern
<i>Egretta garzetta</i>	Little Egret	Least Concern
<i>Lanius schach</i>	Long-tailed Shrike	Least Concern

Annexes

Annex 3.23 :List of Faunal Species Observed in the Study Area		
Scientific name	Common name	Status
<i>Copsychus saularis</i>	Oriental Magpie-robin	Least Concern
<i>Psilopogon haemacephala</i>	Coppersmith Barbet	Least Concern
<i>Ardea alba</i>	Great Egret	Least Concern
<i>Artamus fuscus</i>	Ashy Woodswallow	Least Concern
<i>Halcyon smymensis</i>	White-breasted Kingfisher	Least Concern
<i>Motacilla alba</i>	White Wagtail	Least Concern
<i>Parus major</i>	Great tit	Least Concern
<i>Cisticola juncidis</i>	Zitting Cisticola	Least Concern
Mammalia (11 species)		
<i>Mus musculus</i>	House Mouse	Least Concern
<i>Funambulus pennantii</i>	Five-striped Palm Squirrel	Least Concern
<i>Pteropus giganteus</i>	Indian Flying Fox	Least Concern
<i>Callosciurus pygerythrus</i>	Irrawaddy Squirrel	Least Concern
<i>Bandicota indica</i>	Greater Bandicoot Rat	Least Concern
<i>Herpestes edwardsii</i>	Common Mongoose	Least Concern
<i>Suncus murinus</i>	Asian house shrew	Least Concern
<i>Felis chaus</i>	Jungle cat	Least Concern
<i>Canis aureus</i>	Golden Jackal	Least Concern
<i>Prionailurus viverrinus</i>	Fishing Cat	Endangered
<i>Paradoxurus hermaphroditus</i>	Common Palm Civet	Least Concern

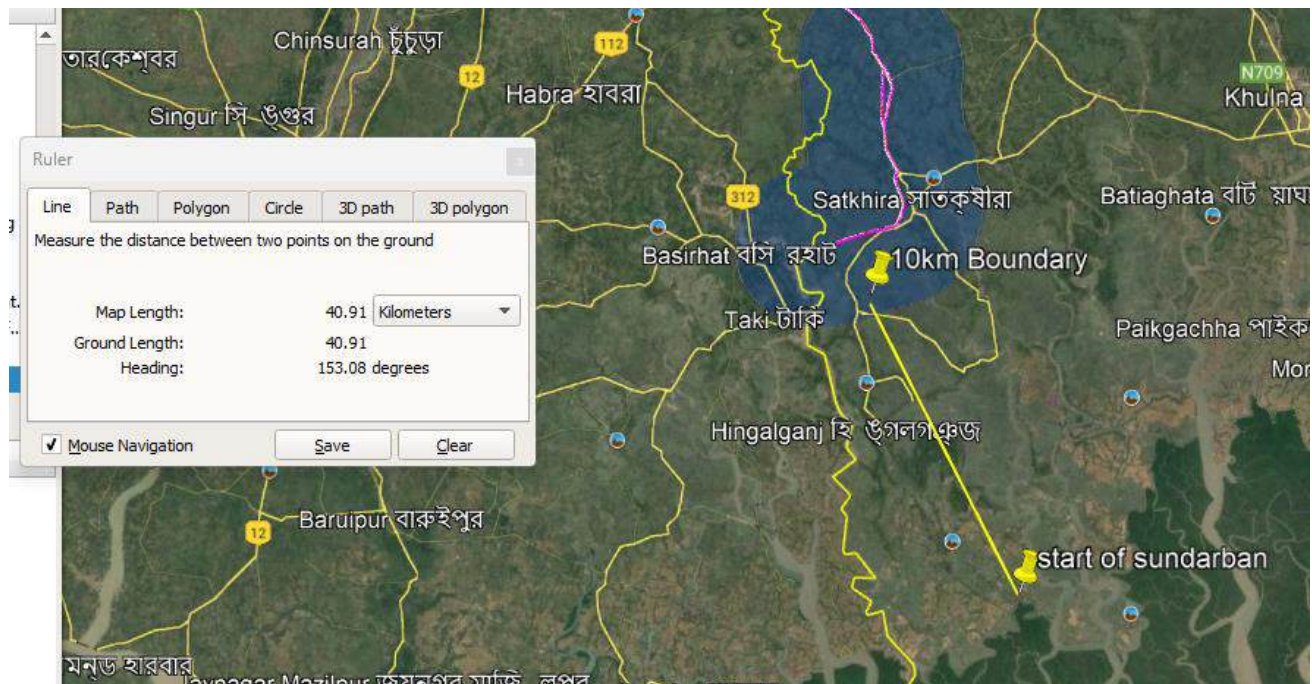
Annexes

Annex 3.24 :List of Aquatic Fauna including Fish and Crustaceans found in the study area

S#	Local name	Common Name	Scientific Name	Category
1	Mola	Mola Carplet	<i>Amblypharyngodon mola</i>	Least Concern
2	Darkina	Blackline Rasbora	<i>Rasbora daniconius</i>	Least Concern
3	Chola punti	Chola barb	<i>Puntius chola</i>	Least Concern
4	Jat punt	Spotfin swamp barb	<i>Puntius sophore</i>	Least Concern
5	Teri punti	One spot barb	<i>Puntius terio</i>	Least Concern
6	Tit punti	Two-spot Barb	<i>Pethia ticto</i>	Vulnerable
7	Gutum	Guntea Loach	<i>Lepidocephalichthys guntea</i>	Least Concern
8	Chital	Humped Featherback	<i>Chitala chitala</i>	Endangered
9	Bele	Fresh Water Goby	<i>Glossogobius giuris</i>	Least Concern
10	Chang	Dwarf Snakehead	<i>Channa gachua</i>	Least Concern
11	Gajar	Giant Snakehead	<i>Channa marulius</i>	Endangered
12	Taki	Spotted Snakehead	<i>Channa punctatus</i>	Least Concern
13	Lomba Chanda	Elongate Glass-perchlet	<i>Chanda nama</i>	Least Concern
14	Lal Chanda	Indian Glassy Perchlet	<i>Pseudambassis lala</i>	Least Concern
15	Chnada	Highfin Glassy Perchlet	<i>Pseudambassis ranga</i>	Least Concern
16	Bheda/Meni	Mottled Nandus	<i>Nandus nandus</i>	Near Thraetened
17	Koi	The Climbing Perch	<i>Anabas testudineas</i>	Least Concern
18	Bajari Tengra	Tengara Mystus	<i>Mystus tengara</i>	Least Concern
19	Tengra	Asian Striped Catfish	<i>Mystus vittatus</i>	Least Concern
20	Pabda	Pabda catfish	<i>Ompok pabda</i>	Endangered
21	Boal	Freshwater shark	<i>Wallago attu</i>	Vulnerable
22	Magur	Walking Catfis	<i>Clarias batrachus</i>	Least Concern
23	Shingi	Stinging Catfish	<i>Heteropneustes fossilis</i>	Least Concern
24	Kuchua	Gangetic mudeel	<i>Monopterusuchia</i>	Vulnerable
25	Guchibaim	Stripped Spinyeel	<i>Macrognathus pancalus</i>	Least Concern
26	Tara Baim	One-stripe Spinyeel	<i>Macrognathus aculeatus</i>	Near Thraetened
27	Baim	Tire-track Spinyeel	<i>Mastacembelus armatus</i>	Endangered
28	Ranga khailsha	Dwarf gourami	<i>Trichogaster lalius</i>	Least Concern
29	Khailsha	Stripled gourami	<i>Trichogaster fasciata</i>	Least Concern
30	Mrigal	Mrigal Carp	<i>Cirrhinus cirrhosus</i>	Near Thraetened
31	Tatkini	Reba	<i>Cirrhinus reba</i>	Near Thraetened
32	Catla	Catla	<i>Catla catla</i>	Least Concern
33	Bata	Bata	<i>Labeo bata</i>	Least Concern
34	Rui	Rohu	<i>Labeo rohita</i>	Least Concern
35	Chola punti	Chola barb	<i>Puntius chola</i>	Least Concern
36	Telapia	Telapia	<i>Oreochromis mossambicus</i>	Exotic
37	Common carp	Common Carp	<i>Cyprinus carpio</i>	Exotic
38	Grass carp	Grass Carp	<i>Ctenopharyngodon idella</i>	Exotic
39	Silver carp	Silver Carp	<i>Hypophthalmichthys molitrix</i>	Exotic
40	Nilotica	Nile Telapia	<i>Oreochromis niloticus</i>	Exotic
41	Mirror carp	Mirror Carp	<i>Cyprinus carpio</i>	Exotic
42	Thai Sarpunti	Java barb	<i>Barbonymus gonionotus</i>	Exotic
43	Black carp	Black Carp	<i>Mylopharyngodon piceu</i>	Exotic
44	Pangas	Pangas	<i>Pangasianodon hypophthalmus</i>	Exotic
45	Tora Icha	Moonsoon River Prawn	<i>Macrobrachium malcolmsonii</i>	Least Concern
46	Bagda Chingri	Giant Tiger Shrimp	<i>Penaeus monodon</i>	Least Concern
47	Golda Chingri	Giant River Prawn	<i>Macrobrachium rosenbergii</i>	Least Concern
48	Kucho Chingr	Bird Shrimp	<i>Metapenaeus lysianassa</i>	Least Concern
49	Kakra	Freshwater Crab	<i>Sartoriana spinigera</i>	Least Concern

Annexes

Annex 3.25 :Nearest Natural Ecosystem Services Sundarbans



Annexes

Annex 4 Stakeholder Consultations

Annex 4.1 : Venues, date, time frame, and participants of SCMs

Sl. No.	Venue	Date	Time	Participants			
				Male	Female	Total	
Participants of SCM							
1	10. No. Sharsha Union Parishad Office, Sharsha Upazila, Jashore	19.10.2023	11.00 am	50	45	95	
2	8. No. Bagachra Union Parishad Office, Sharsha Upazila, Jashore	22.10.2023	03.00 pm	65	6	71	
3	Four A Agro, Bankal Bridge Adjacent, Bankal, Satkhira	10.11.2023	03.00 pm	25	46	71	
4	Kazirhat, Kalaroa Upazila, Satkhira	02.01.2024	11.30 am	40	4	44	
5	Ulashi Bazar, Sharsha Upazila, Jashore	02.01.2024	05.30 pm	25	0	25	
6	Kalaroa Paurashava, Kalaroa Upazila, Satkhira	24.04.2024	11.30 am	67	51	118	
7	Helatola Union Parishad office, Kalaroa Upazila, Satkhira	25.04.2024	11.30 am	113	7	120	
8	Keralkata Union Parishad office, Kalaroa Upazila, Satkhira	26.04.2024	11.30 am	143	9	152	
9	Alipur Union Parishad office, Satkhira Sadar, Satkhira	27.04.2024	11.30 am	25	3	28	
Subtotal				553	171	724	
Participants of FGD							
1	Bagtari Majebah Jame Mashjid, Sharsha Upazila, Jashore	17.12.2023	10.00 am	12	4	16	
2	Bagachra Union Parishad Office, Sharsha Upazila, Jashore	17.12.2023	11.45 am	13	7	20	
3	Bishshash Para More, Satmile Bazar, Sharsha Upazila, Jashore (Women group)	18.12.2023	11.30 am	3	15	18	
4	Bishshash Para More, Satmile Bazar, Sharsha Upazila, Jashore	18.12.2023	12.30 pm	23	2	25	
5	Illishpur Government Colony, Keralkata Union, kalaroa Upazila, Satkhira	02.01.2024	02.00 pm	10	0	10	
6	Madhobkathi Bazar, Jhaudanga Union, Satkhira Sadar, Satkhira	04.01.2024	12.30 pm	15	0	15	
7	Tulshidanga, Kalaroa Upazila Satkhira	06.02.2024	12.20 pm	34	1	35	
8	kalaroa Paurashava, Kalaroa Upazila, Satkhira	25.04.2024	04.00 pm	0	24	24	
9	Keralkata Union, Kalaroa Upazila, Satkhira	26.04.2024	04.00 pm	0	17	17	
10	Alipur Union, Satkhira Sadar, Satkhira	27.04.2024	04.00 pm	24	0	24	
Subtotal				134	70	204	
Key Informant Interview							
1	Md. Humayun Kabir, Deputy Commissioner Satkhira	03.09.2023	3.30 pm	1	0	1	
2	Protap Mondol, Computer Operator, BADC	05.09.2023	9.00 am	1	0	1	
3	Mizanur Rahman,Upazila Engineer,	05.09.2023	10.30 am	2	0	2	
	Sonjoy Mondol, Sub-Assistant Engineer (Estimator),						
	Water Supply & Sanitation, Public Health Department						
	Satkhira District						
4	Mr. Mohammad Mamun Kobir Torofder, APD (Traffic), Land Port Authority, Bhomra, Satkhira	05.09.2023	12.30 pm	1	0	1	
5	Chairman, Bagachra Sharsha, Jashore	17.12.2023	12.30 pm	1	0	1	
6	Nayan Kumar Rajbanshi, Upazila Nirbahi Officer, Sharsha Upazila Office, Jashore	18.12.2023	9.30 am	1	0	1	
7	Mr. Sheikh Afiluddin Member of Parliament	18.12.2023	10:30AM	1	0	1	
8	Khan Hasan Ali Liton, Head teacher	18.12.2023	2.30 pm	1	0	1	
Bagachra United Secondary School, Bagachra, Sharsha, Jashore							
9	Assistant Social Welfare Officer Kalaroa, Satkhira	01.01.2024	12:00 PM	1	0	1	
10	Azizur Rahman, Shop Owner, Sharsha Bazar, Jashore,	04.01.2024	9:00 AM	1	0	1	
11	Taher Ali, Tea Stall, on the footpath of Sharsha Bazar, Jashore.	04.01.2024	10:00AM	1	0	1	
12	Pervin Begum, Tea stall Owner, on footpath of Sharsha Bazar, Jashore.	04.01.2024	11.30 am	0	1	1	
13	Rural Reconstruction Foundation, (RRF) NGO at Navaron, Sharsha, Jashore	04.01.2024	2.00 pm	1	0	1	
14	Christian Service Society (CSS), NGO, Satkhira, Jashore	04.01.2024	3:30 PM	1	0	1	
15	Md. Moniruzzaman, Mayor, Kalaroa Upazila, Satkhira	23.04.2024	3.00 pm	1	0	1	
16	Golam Mustafa, Freedom Fighter, Kalaroa, Satkhira	24.04.2024	10.00 am	1	0	1	
17	Shila Rani Halder, Musician Teacher, Kalaroa, Satkhira	24.04.2024	10.00 am	0	1	1	
18	Rofiqul Islam, Ward Commissioner, Ward no-3,Kalaroa, Satkhira	24.04.2024	10.00 am	1	0	1	
19	Md. Alfazuddin, Councilor, Ward no: 6, Kalaroa, Satkhira.	24.04.2024	10.00 am	1	0	1	
20	Sontosh Pal, Organizer of Puja udjapon Committee, Kalaroa	24.04.2024	10.00 am	1	0	1	
21	Md. Amanullah, Chairman of the Teachers Association. Kalaroa	24.04.2024	10.00 am	1	0	1	
22	Abu Naser, Professor of Kalaroa Govt. Collage, Kalaroa, Satkhira	24.04.2024	10.00 am	1	0	1	
23	Mostofa Baki Billah, Vice President of Teachers Association, Kalaroa, Satkhira	24.04.2024	10.00 am	1	0	1	
24	Mrittonjoy Saha, Project Officer, Uttoron NGO	25.04.2024	3.00 pm	1	0	1	
25	Shamim Hossain, Field Facilitator, Uttoron NGO,	25.04.2024	3.00 pm	1	0	1	
	Finish Medial Bangladesh Program, Kalaroa, Satkhira						
26	Mr. Anwar Pervez, Executive Engineer (Xen), Kalaroa, Satkhira	26.04.2024	3.00 am	1	0	1	
27	Shahanaz Akhter, Female, Welfare Assistant (FWA)	27.04.2024	3.00 pm	0	1	1	
28	Zesmin Nahar, Community Health Care Provider (CWCP)	27.04.2024	3.00 pm	0	1	1	
Key Informant Interview				25	4	29	
Total					712	245	957

Annexes

Annex 4.2 :1st Stakeholder Consultation Meeting

1st Stakeholder Consultation Meeting		
Venue : 10 no. Sharsha Union Parishad Auditorium, Sharsha Upazila, Jashore Date : 19 October 2023, Time: 11.00 am -1.30 pm Coverage : Navaron Satkhira More to Khagura Mouza almost 5km Total Participant : 95 (Male:50,Female: 45)		Type of Participant 1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives
Issue	Concerns Raised by the Participants	Replies to the Concern
Acquisition of residential and commercial land and structures	The existing mouza rate of land is not sufficient compared to the current market value of the land. -Whether compensation for land will be based on the current market value.	-Compensation and other resettlement benefits will be given as per the GoB Act ARIPA 2017 and the Entitlement Matrix of the RAP of the project to be prepared based on the ARIPA & WB's ESS5.
Loss of land	-Acquisition of private land for implementation of the project. One participant said, "Despite that, there is available government land where the road will be straightened, so why is private land to be acquired?" -The participant requested to use government land as much as possible and, conversely, reduce private land acquisition to the maximum extent possible.	-There is a curved road which requires be straight road to the possible extent. -To straighten the road private land acquisition is required along a strip that is somewhat away from the available government land adjacent to the existing bend road. In no way can the road be straightened using the available government land. -The Social Development Specialist of PIU discussed that necessary efforts had been made to minimize the acquisition of private land.
The current market price of land under Bazar	-Part of Sharsha and Ulashi mouza is included in Bazar. Whether the compensation rate for affected land under these parts will be determined considering the importance and current market price of land at the Bazar or not.	-Deputy Team Leader explained that there is a scope for updating the category of land by the Deputy Commissioner. -If the nature of land is changed in reality from the recent record of rights, the DC, at the time of preparation of joint list, shall decide about the change of the nature of the land.
Perceived compensation determination based on recorded category of land	Participants believe compensation should reflect the true nature and category of the affected land. One noted a significant disparity between the actual market prices of commercial and residential land, including CPRs, and the three times market price to be paid by the DC as compensation.	DC will determine and pay compensation as per the ARIPA 2017. Compensation, assistance, and allowances will be paid as per the RAP's Entitlement Matrix in conformity with the World Bank's ESS5. -All compensation will be paid according to the current market price following the guidelines of WB and ARIPA 2017.
Saving sensitive areas(	-Participants suggested changing the alignment to avoid sensitive areas like graveyards, madrasas, schools, mosques, and markets.	The deputy Team Leader said, would try their best to save the sensitive area or relocate them to a suitable place according to the guidelines of WB and ARIPA 2017.
Sexual Exploitation and Abuse (SEA) /Sexual Harassment (SH) And Gender-Based Violence	- Potential risks of SEA/SH due to influx of male workers. - Possibility of risks related to SEA/SH at the community level. -Women, particularly teenage girls, are vulnerable to loneliness, with recent incidents highlighting the urgent need for mitigation measures. -Any type of sexual harassment shall be dealt with strictly.-Boosting women's labor force participation and improving employment quality requires better access to job opportunities and skills development programs for women.	-Any type of sexual harassment shall be dealt strictly with as per the local law of the country and the employee shall be terminated immediately from his duties. A close circuit camera should be installed to monitor the matter and issues effectively, -Necessary arrangements and systems should be in place for effective and timely - Patrolling to ensure the safe journey of the women and girls. -A grievance redress mechanism shall be established at the site to address the issues immediately.
Vulnerable HHs/Group	-Will vulnerable households/groups get project benefits?	- vulnerable HH will receive an allowance of BDT 15,000. -Man-headed vulnerable HH will be entitled to receive an allowance of BDT 10,000.-Nominated members of vulnerable households will be trained under the income and livelihood restoration

Annex 4.3 :2nd Stakeholder Consultation Meeting

2 nd Stakeholder Consultation Meeting		
Venue : 8 No. Bagachra Union Parishad Auditorium, Jashore Date : 22 October 2023, Time: 3.00 pm -5.00 pm Coverage : Bagachra Bazar area 6km Total Participant: 71 (Male: 65, Female: 06)		1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc.
Issue	Concerns Raised by the Participants	Replies to the Concern
Right of Way (RoW)	-Participant asked, whether the road will be widened equally on both sides of the road or not.	The deputy Team Leader explained the road will be widened on both sides covering available RHD road and acquiring private land where necessary
Side Alternative/ bypass/flyover	Participants of the Bagachra Bazar area are expected to change the alignment. They want a bypass and save the bazaar Requesting to consider two alternative options including (i) constructing a bypass road or (ii) constructing a flyover around 1 Kilometer to save Bagachra Bazar instead of upgrading the existing road. Requesting to construct an underpass at Bagachra Bazar area	-Social Development Specialist said, it is possible to develop & construct a bypass road. The engineer may check and explore necessity based on traffic and other parameters. -However, we will propose for expected to change the alignment to consider if the authority allows this
Compensation without hassle	-Participant requested to receive compensation, assistance, and resettlement benefits without any harassment from the DC and RHD Office as well.	-The affected persons, households, and entities will be assisted through the implementing agency in updating Records of Rights (RORs), and receiving assistance, allowance, grants, and resettlement benefits from RHD as per Entitlement Matrix, DC Office will provide as per the ARIPA 2017
Compensation package consider current market value	-Participant requested the authority for kind consideration to determine compensation based on the actual current market value of land by taking into account of real category instead of recorded category of land due to non-updating of category of land over the decades.	-The deputy team leader reply that Compensation will be made based on the Joint verification committee according to GoB Act ARIPA 2017 and ESS5 of WB policy
Notice time	-Participant wants adequate notice time before relocation.	The deputy team leader said that enough time would be given after the compensation
Adequate Drainage system	-Participant requested to keep an adequate drainage system at the landscape of the road	-Adequate facilities for drainage on both sides with cross drains to minimize flooding and water logging will be done
Land category	-In fact, the recorded land category had been changed, especially in the bazar area over the decades. As a result, the changed land category should kindly be considered before determining compensation.	-The DC office is the concerned authority to evaluate and change land category
Tree cutting and sapling	-One school teacher raised a point to remove the old trees, he said it causes injury the pedestrians by broken down branches and requested to planting of new trees	-DTL said, old trees will be removed and sapling new trees as per Forest Rules.
Loss of small businesses, structures, and livelihoods.	-Participant said what will be the decision for the roadside tea stall shops, small enterprises, and temporary businessmen who will be displaced and lose their livelihoods	-The DC office will visit the site and recommend a compensation package for the livelihood of the affected people who have no legal documents

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2 nd Stakeholder Consultation Meeting		
Venue : 8 No. Bagachra Union Parishad Auditorium, Jashore Date : 22 October 2023, Time: 3.00 pm -5.00 pm Coverage : Bagachra Bazar area 6km Total Participant: 71 (Male: 65, Female: 06)		1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc.
Issue	Concerns Raised by the Participants	Replies to the Concern
Sexual Exploitation and Abuse /Sexual Harassment	-Sexual Exploitation and Abuse (SEA)/Sexual Harassment (SH) risks can be increased and/or emerge due to influxes of male workers from outside the project area. -New risks related to SEA/SH can emerge at the community level due to the project intervention. -The gender disparity can be attributed to structural barriers including women's domestic burden, employer discrimination, restricted mobility, limited access to training, lack of female-friendly facilities at sites, sexual harassment at work, limited childcare provisions, low paid, and low productivity.	-Increasing women's labor force participation and improving the quality of female employment will require more significant support for women's access to employment opportunities and high-quality skills development programs. Any type of sexual harassment shall be dealt strictly with as per the local law of the country and the employee shall be terminated immediately from his duties.
Gender-Based Violence	-Gender-Based Violence - Traveling alone can pose a risk of sexual harassment to women, especially adolescent girls. The rate of such incidents has increased recently, highlighting the need to take immediate mitigation measures. - It is the responsibility of the PIU/RHD to maintain a GBV-free work environment. - According to the local laws of the country, employees who commit any form of sexual harassment will be immediately terminated from their employment. -Company policy on GBV free work environment and code of conduct which was signed by the worker shall be displayed at labor camps/canteen and other contractor facilities. -Staff shall be encouraged to report suspected or actual GBV.	-Implementation of a GBV-free work environment shall be maintained by the contractor, RHD-PD Office, PIU site offices, and concerned safety regulatory organizations. -Sensitizing the communities and other stakeholders, strengthening the institutional capacities to mitigate the project-related potential risk of GBV in the project-affected population. -Any type of sexual harassment shall be dealt strictly with as per the local law of the country and the employee shall be terminated immediately from his duties. - A close circuit camera should be installed to monitor the matter and issues effectively, -Necessary arrangements and systems should be in place for effective and timely Patrolling to ensure the safe journey of the women and girls. -Gender-based discrimination shall be strictly prohibited and monitored. -Staff shall be encouraged to report suspected or actual GBV. -A grievance redress mechanism shall be established at the site to address the issues immediately.
Vulnerable HHs/Group	-Impacts of land acquisition and involuntary resettlement on vulnerable households/groups. -Whether vulnerable households/groups will get project benefits. -Trained persons of the vulnerable household will be given a seed grant of BDT 15,000.	-Woman-headed vulnerable HH will be entitled to receive an allowance of BDT 15,000. -Man-headed vulnerable HH will be entitled to receive an allowance of BDT 10,000. -Nominated members of vulnerable households will be trained under the income and livelihood restoration program.

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Annex 4.4 :3rd Stakeholder Consultation Meeting

3 rd Stakeholder Consultation Meeting		
Venue : Four A Agro, Bankal Bridge Adjacent, Bankal, Satkhira Date : 10 November 2023, Time : 3.00 pm -5.00 pm Coverage : Bashtala, Bagati, Dowlatpur area Total Participant : 71 (Male: 25, Female: 46)	Type of Participant: 1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc.	
Issue	Concerns Raised by the Participants	Replies to the Concern
Right of Way (RoW)	-Participant asked, whether the road will be widened in both sides of the road equally or not.	The deputy team leader explained the road will be widened on both sides covering available RHD road and acquiring private land where necessary
Demand for an underpass to connect the villages and main road with a bypass	-Participants asked for an underpass road -Despite being located 1/1.5 km away from the existing bypass road and Satkhira Medical College no ambulance or vehicle can enter the villages due to no connecting road or underpass -For the convenience of the common people of the villages, the local people strongly demand an underpass to be arranged under the 6-lane road at their proposed location.	-The Social Development Specialist said, it is possible to develop an underpass to connect the villages and bypass the main road for the convenience of the villagers. -The engineer may check and explore necessity based on traffic and other parameters. -However, we will propose to the authority to take necessary action in this matter
Issues regarding the new road alignment	-If the currently proposed 6-lane highway is constructed, the people of other areas will benefit. -But if this new 6-lane road is built, the people of these three and four villages will be completely cut off from the Kaliganj road, the bypass road or the government medical college due to the section from the current bypass to the Alipur check post. -As a result, they have to travel an additional 2.5 to 4 km to go to Kaliganj road, bypass road or government medical college.	-The consultant team will inform the proper authority about this problem to take necessary action
Side Alternative/ underpass	-For the civic convenience of the common people of the villages, the insistence of the residents is to arrange at least one 45-foot underpass under the 6-lane road at their proposed location. -Once the underpass is constructed, the villagers will be able to go to the Government Medical College and Kaliganj Road in just 5/10 minutes. -Otherwise these villages are already deprived of basic civic facilities, will be completely isolated from the main municipality due to the 6 lane road	-Given the discussion, the officers present visited the area and the matter on the ground. -Scrutinize the admissibility of the demands of the residents and they will inform the appropriate authorities of the reasonable demands of the residents.
Proper Lighting system	-Adequate night lighting should be provided in the underpass.	-Adequate facilities for lighting system will be included in the design
Notice time	-Participant wants adequate notice time before relocation.	-Deputy Team Leader said that enough time will be given after compensation

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3 rd Stakeholder Consultation Meeting		
Venue	: Four A Agro, Bankal Bridge Adjacent, Bankal, Satkhira	Type of Participant: 1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc.
Date	: 10 November 2023, Time: 3.00 pm -5.00 pm	
Coverage	: Bashtala, Bagati, Dowlatpur area	
Total Participant	: 71 (Male: 25, Female: 46)	
Issue	Concerns Raised by the Participants	Replies to the Concern
Adequate Drainage system	-Participant requested to keep adequate drainage system at the landscape of the road	-Adequate facilities for drainage on both sides with cross drains to minimize flooding and water logging will be done
Land category	-In fact, recorded land category had been changed, especially in Bazar area over the decades. As a result, changed land category should kindly be considered prior to determine compensation.	-DC office is the concern authority to evaluate and change land category
Tree cutting and sapling	-One school teacher raised a point to remove the old trees, he said it causes of injury of the pedestrian by broken down branches and requested to plant new trees	-DTL said, old trees will be removed and sapling new trees as per Forest Rules.
Sexual Exploitation and Abuse/Sexual Harassment	-Sexual Exploitation and Abuse (SEA)/Sexual Harassment (SH) risks can be increased and/or emerged due to influxes of male workers from outside the project area. -New risks related to SEA/SH can be emerged at community level due to the project intervention. -The gender disparity can be attributed to structural barriers including women's domestic burden, employer discrimination, restricted mobility, limited access to trainings, lack of female friendly facilities at sites, sexual harassment at work, limited childcare provisions, low-paid and low-productivity.	-Increasing women's labor force participation and improving the quality of female employment will require more significant support for women's access to employment opportunities and high-quality skills development programs.
Gender Based Violence	-Gender Based Violence -Women, especially adolescent girls can be vulnerable/prone to be sexually abused due to travel lonely. Recently, such incidences occurred somewhat frequently which underscore to undertake mitigation measures immediately. -Implementation of a GBV-free work environment shall be maintained by the PIU/RHD. - Sexual harassment will be dealt with strictly in accordance with the local law of the country and the employee will be terminated without a delay. -Company policy on GBV free work environment and code of conduct which was signed by the worker shall be	Implementation of a GBV-free work environment shall be maintained by the contractor, RHD-PD Office, PIU site offices and concerned safety regulatory organizations. Sensitizing the communities and other stakeholders, strengthening the institutional capacities to mitigate project related potential risk of GBV in the project affected population. -Any type of sexual harassment shall be dealt strictly with as per local law of the country and employee shall be terminated immediately from his duties. -Close circuit camera should be installed for monitoring the matter and issues effectively, -Necessary arrangement and system should in place for effective and timely Patrolling to ensure safe journey of the women and girls. -Gender based discrimination shall be strictly prohibited and monitored.

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3 rd Stakeholder Consultation Meeting		
Venue	: Four A Agro, Bankal Bridge Adjacent, Bankal, Satkhira	Type of Participant: 1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc.
Date	: 10 November 2023, Time: 3.00 pm -5.00 pm	
Coverage	: Bashtala, Bagati, Dowlatpur area	
Total Participant	: 71 (Male: 25, Female: 46)	
Issue	Concerns Raised by the Participants	Replies to the Concern
	displayed at labor camps/canteen and other contractor facilities. -Staff shall be encouraged to report suspected or actual GBV.	-Staff shall be encouraged to report suspected or actual GBV. -Grievance redress mechanism shall be established at site to address the issues immediately.

Annex 4.5 :4th Stakeholder Consultation Meeting

4 th Stakeholder Consultation Meeting		
Venue : Kazirhat Bazar, Kalaroa Upazila, Satkhira Date : 02.01.2024, Time : 11.30am -1.30pm Coverage : From Kazirhat Centre to Kazirhat Bazar, Kalaroa Total Participant : 44 (Male: 40, Female: 04)v1		Type of Participant 1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc.
Issue	Concerns Raised by the Participants	Replies to the Concern
Land acquisition	-What kind of Compensation the affected persons will Receive?	-In reply consultant team informed the participants that affected persons will receive compensation for affected land at the market price plus 200% premium as per ARIPA-2017, for the structures they will get compensation at market price determined by PWD and 100% premium, and more over the transfer grant and reconstruction grants. Affected persons will be allowed to take away all salvageable housing materials of the affected structures free of cost.
Compensation for business loss	-What is the Compensation for Business Loss that will be Entitled?	-Those who will lose their businesses due to the project will get entitlements from the project as per ARIPA 2017 and the entitlement matrix of the approved RAP. The affected businessmen will have to produce a Trade License, Business Identification Number, and Income tax return. etc.
Process And rate of land price, Compensation package, current market value	-What will be the process of fixing the rate of land price since the Land rate is not equal in all places?	-The consultant replied that DC determines the market price of land by mouza and class within an Upazila appears in the sale deeds registered with the Upazila Sub Registrar's Office (SRO) in connection with the transfer of landownership in one year preceding the publication of notice under section 4. Besides, the replacement cost/value (RC/RV) of land will be determined by the Property Valuation Advisory Committee (PVAC) and requires to be approved by the Ministry of Road Transport and Bridges (MoRTB).
Compensation criteria for the partially affected structure	-If any building structure is partially affected, when the remaining part is not usable to that extent, then the affected person may deserve and/or request the authority for the acquisition of the full building and to pay full compensation.	-Affected building owners require engineering design and plan from the concern authority. -Decision will be considered based on the recommendation of PWD
Compensation policies for affected CPRs	-What are the Policies for the Compensation of affected CPRs like Schools, mosques, and graveyards? Would the Government reconstruct the affected CPRs?	-The Consultant has informed the participants that only compensation for land and structures will be paid to the president/secretary of the committee of the affected CPR and they will also be allowed to take away the salvageable materials of the affected CPR structures. The government will not provide any land or construct any structure against any affected CPR structure.

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Annex 4.6 :5th Stakeholder Consultation Meeting

5 th Stakeholder Consultation Meeting		
Venue : Ulashi Bazar, Sharsha Upazila, Jashore Date : 02.01.2024, Time : 1.30pm -2.30pm Coverage : Ulashi bazar area Total Participant : 25 (Male: 25, Female: 00)		Type of Participant: 1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc
Issue	Concerns Raised by the Participants	Replies to the Concern
Compensation policy for vulnerable	-What compensation, affected vulnerable households/groups will get?	-The Consultants have informed the participants that the vulnerable households will get compensation, income restoration grants for three months, special assistance of a one-time payment, skill training and credit support as per entitlement matrix of the approved RAP of the project. They will be encouraged to start up their suitable Income Generation Activities.
Land vacating issues	-What is the participants' plan for vacating their affected area?	-In reply the affected participants said that it was too early to make plan for relocation. They came to know the matter with acquisition of private land and structures few days ago only. They argued that they would have to think a lot regarding relocation of affected structures. They narrated that they constructed and established all their structures to meet their emerged requirements over the decades. But some of the potential affected shop owners informed the consultant team that they have alternative land near by the road where they would construct structures and reopen new shops/businesses. Some of the affected owners have taken the initiative to convince neighboring landowners to construct buildings that will be used as stores so that they can rent out the newly constructed spaces. They opined that all these things will be depended on receiving adequate and proper compensation from government. A few participants said that they were planning to purchase suitable replacement land. However, current land rate is very high.
Loss of employment	-Is there any assistance for employees who will lose their employment?	-Project will consider the temporary loss of wage income issue and pay the affected wage losers grant to cover temporary loss of regular income @ the average wage rate per day in the locality for 30 days or as determined by PVAC and income and livelihood restoration, to be created by the project.
Income Generating Activities/Training for PAPs	-Do you (participants) suggest any IGA(Income Generating Idea) or training for the potentially affected wage earners/employees (including vulnerable persons)?	-They suggested for following training: Technical training on welding, Motor driving, Handy Craft (Stitching), Agro cultivation, Mango juice preparation, Beekeeping, Special grant for starting small shops. Vegetable cultivation, Cow rearing, Support for small businesses, support for the purchase of Rickshaw van, etc. Specially they requested to help them in such a way that the affected persons could be overcome the situation and not become worst of present livelihood status.
Payment Harassment	-Corruption and Harassment in DC office During compensation payment Process	-Affected business persons (participants) expressed their concerns regarding cumbersome and bureaucratic land acquisition process involving corruption and harassment in compensation payment in the DC Office. They shared their painful above-mentioned bitter experience and harassment encountered in other previous cases. They requested to take such a payment policy that could ease the total compensation payment process.

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Annex 4.7 :6th Stakeholder Consultation Meeting

6 th Stakeholder Consultation Meeting		
Venue : Kalaroa Paurashava, Kalaroa Upazila, Satkhira Date : 24.04.2024, Time: 11.30am -1.30pm Coverage : Kalaroa bazar area Total Participant : 118 (Male: 67, Female: 51)		1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc.
Issue	Concerns Raised by the Participants	Replies to the Concern
Land acquisition	-PAPs' queried why Government & RHD acquiring private lands for road development when Govt. land is available	-Consultants reply to the PAPs' that Govt. priority is to use Govt. and RHD lands for road development and after that based on the requirement Govt. is acquiring private lands by giving proper compensation
Development of the Bypass	-To alleviate traffic congestion and prevent needless property acquisition, the local community urged for a bypass in addition to the current route.	-Consultants informed them that the design team already included the bypass in their design and the rest will be decided by the design team based on the practical situation
	-This would allow the present road to be expanded to four lanes instead of six.	
Compensation for Loss of Structure, businesses	-How Govt. will decide the compensation of the loss of lands, structures, and businesses?	-Govt. will provide compensation based on the ARIPA 2017 and before that PVAC will assess the property valuation
Hassel's free compensation procedure	-Locals strongly urges for a hassle-free compensation procedure	-Consultant replies that compensation will be provided through the DC office without any complication
Proper Drainage System	-The local community proposed that to ensure appropriate drainage of water and prevent water logging, canals should be re-excavated and connected to the river. -Additionally, locals proposed adjusting the drainage system in conjunction with the paddy fields so that irrigation can use the drainage water.	-E&S consultants respond that they will provide the design team with their recommendations and that RHD and the design team will take the required steps to address the issues.
Occupational Health & Safety	-To prevent SEA/SH risk, the construction camp needs to be set up at least 500–1000 meters away from the public settlement. -For a safe environment construction material also need to be stored far away from ponds, paddy, and other agricultural fields, -Equal wage should be ensured for all laborers irrespective of gender	-These recommendations will be taken into account during the construction phase and the project authority will adhere to the safety regulations
Air, Noise, Dust & Water pollution	-During the construction period dust and noise pollution need to be under control & also need to take proper action to prevent water pollution	-To reduce noise pollution construction work will be limited during the daytime -Construction materials will be stored far away from the water bodies -Water will be sprinkled on a daily basis

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Tree plantation	-Trees should be planted on the dividers and on both sides of the road to keep the area cool.	-By World Bank guidelines, the project authority will plant trees in a 1:3 ratio.
Resting place and toilet facilities with the passenger shed	-Separate men's and women's toilet facilities are needed in the bus shelters -Pure drinking water facilities & separate female resting places for breastfeeding	-Their suggestion will be placed to the concerned project authority
Footpath and proper lighting system	-Proper Footpaths & lighting system on the road is necessary	-The design team will include those in their design
Selected place for vendors	-Roadside tea stalls create traffic problems for the passengers and the transports -Need to replace the tea stalls with proper places	-Their suggestion will be rendered to the RHD and design team
Time frame of construction work	-Road construction work need to be complete within the time period to avoid public harassment	-Consultants addressed the worries that the RHD would select a skilled construction company to perform the job, and that the completion date would be strictly adhered to.
Livelihood restoration	-Will the project provide any programs or training for the vulnerable people	-Project authority will provide training program through INGO based on the PAPS' requirement.

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Annex 4.8 :7th Stakeholder Consultation Meeting

7 th Stakeholder Consultation Meeting		
Venue	: Helatola Union Parishad Office, Kalaroa Upazila, Satkhira	
Date	: 25.04.2024, Time: 11.30am -1.30pm	
Coverage	: Kalaroa bazar area	
Total Participant	: 120 (Male: 113, Female: 07)	
Issue	Concerns Raised by the Participants	Replies to the Concern
Land Acquisition & Compensation	-Why is the same proportion of the land not acquired on both sides of the roads? -Compensation for the land and structures also need to be verified properly so that no one gets cheated	-E & S consultants explained that the reason for not acquiring the same proportion of the land is to straighten the curve of the road -DC office and PVAC will jointly verify the value of the property and after that Govt. will provide the compensation based on ARIPA 2017
Documents needed to claim compensation	-What kind of documents will be required to claim the compensation and where we will submit them	-For Business, Trade license, TIN certificate, Lease Documents, Land, Land purchase/registration deed, Mutation deed, Tax document, etc. will be required and need to submit to the DC office
Compensation for the change of land classification	-What will happen if the class of the land changes over the time? Will it be considered during compensation.	-DC office will assess and update the land class based on the latest document jointly with PVAC during the time of acquisition and based on that compensation will be provided
Compensation for both land & Structures	-Those who have structures on their land how they will be compensated	-Based on the ARIPA 2017 compensation will be provided for both land and structure. For land compensation will be given 200% over the current market price and for structure 100% over the current market price.
Compensation for CC loan	-One local businessman Mr. Amir Ali (Businessman) said- “Beside the road alignment I have Warehouse and brick fields. I took loans from the bank to build this Warehouse and brickfields, if these structures get demolished then how I will pay my loan? -Does the Government have any skim or plan for the CC loan holders?	-Based on the ARIPA 2017, World Bank Standard, and GOB Resettlement Action Plan, the affected owner will get compensation for land and structures. -However, the loaner is required to repay the CC loan.
How land price will be decided for compensation	-Based on which rate land price will be decided for compensation	-The DC office will decide the land price based on the ARIPA 2017 and PVAC will verify the current market price of the lands. Based on that price additionally, 200% will be provided to the PAPs as compensation
Compensation for Incomplete structure	-How and at what rate compensation will be provided for incomplete structures	-According to ARIPA 2017 compensation will be provided for the incomplete structures
Compensation payment time	-When compensation will be provided before or after land acquisition	-According to ARIPA 2017 the Compensation will be provided through procedure

Annex 4.9 :8th Stakeholder Consultation Meeting

8 th Stakeholder Consultation Meeting		
Venue : Keralkata Union Parishad Office, Kalaroa Upazila, Satkhira Date : 26.04.2024, Time : 11.30am -1.30pm Coverage : (Keralkata bazar area) Total Participant : 152 (Male: 143, Female: 09)		1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc.
Issue	Concerns Raised by the Participants	Replies to the Concern
Land Acquisition & Compensation	- Land acquisition causes potentially affected households to lose agricultural land, homesteads, water bodies including pond, residential and commercial structures. - They requested fair & adequate compensation against affected land and loss of income & livelihoods. - Compensation will be paid for affected trees and standing crops.	Cash Compensation under Law (CCL) for agriculture land, homesteads & commercial land includes (i) market price of land & 200% premium, (ii) market price of structures includes market price and 100% premium, (iii) compensation for affected trees and standing crops includes market price and 100% premium. That is, compensation will be determined based on the GoB Act ARIPA 2017 and in conformity with WB ESS5.
Resettlement issues	- Participants assumed that involuntary displacement and resettlement would be problematic and challenging due to low rates of compensation as opposed to residential and commercial land.	- Compensation for affected land and structures will be paid at Replacement Cost. - Costs for stamp duty, Tax, Value Added Tax, Registration fees, etc., will also be provided to affected persons after purchasing replacement land.
Cut-off-Date	- What is the cut-off date?	- According to ARIPA 17, the Section 4 notice will be the cut-off date. After receiving the Section 4 notice, the landowner shall not carry out any construction or other related work on his land
Problems related to road construction Air, Water, and Dust pollution	- There will be dust, air, and noise pollution during road construction. - Inflow of workers from outside - Social problems will arise - Water logging on the roadside. - Contaminated water by the construction waste - Difficulties of local people to move on the road - Traffic congestion due to construction work.	- There will be a structural system to reduce the problem - Water should be sprinkled regularly to prevent dust pollution - Construction camp will be outside the local area to avoid social problems - GRM will be in place to prevent any type of wrongdoing. - Adequate facilities for drainage on both sides with cross drains to minimize flooding and water logging will be done - Necessary safety measures with cautionary signs including road safety, and pedestrian crossing especially at Bazar areas and nearby mosques, madrasas, schools, colleges, etc., will be displayed during the construction and operation

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8 th Stakeholder Consultation Meeting		
Venue : Keralkata Union Parishad Office, Kalaroa Upazila, Satkhira Date : 26.04.2024, Time : 11.30am -1.30pm Coverage : (Keralkata bazar area) Total Participant : 152 (Male: 143, Female: 09)		1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc.
Issue	Concerns Raised by the Participants	Replies to the Concern
		phase of the project. More specifically, cautionary measures and public awareness will reduce accidents.
Vulnerable Households/ groups	-It is anticipated that disadvantaged, marginalized, and vulnerable families/groups may be adversely affected by the project. -The participants expressed their concerns regarding environmental and social risks and impacts on vulnerable households/groups.	-Vulnerable households/groups will be compensated, and eligible member of each household will be trained and given additional cash grant and seed grants so as to restore their income and livelihood. -Skill Development Plan has also been included in LRP. Special support for the disadvantaged/marginalized groups has been kept in the RAP
Tree cutting issues	-The participants agreed to remove these trees in return for effective mitigation measures, including planting new trees where appropriate.	-As per guidelines of the Department of Environment and Forest, GoB, the new plantation (1:3 ratio) will be ensured against the removal of trees. Based on this RHD principle the greenery will be given back to the locality by RHD. Thus, planting three trees for each removed tree.
Gender based Violence	-Women, especially adolescent girls may be sexually vulnerable/prone to solo travel. Recently, such incidents have occurred frequently which underscores the need for immediate mitigation measures. -Implementation of a GBV-free work environment will be maintained by the PIU/RHD. -Any form of sexual harassment will be dealt with strictly according to the local laws of the country and the employee will be immediately dismissed from his duties. -Company policy on GBV-free work environment and code of conduct signed by the workers will be displayed in the labor camp/canteen and other contractor facilities. -Employees will be encouraged to report suspected or actual GBV.	-Any form of sexual harassment will be dealt with strictly according to the local laws of the country and the employee will be dismissed from his duties immediately. -Close circuit cameras should be installed so that issues and problems can be effectively monitored, -Necessary measures and arrangements should be in place for effective and timely patrolling to ensure the safe passage of women and girls. -Gender-based discrimination will be strictly prohibited and monitored. -Employees will be encouraged to report suspected or actual GBV. -Grievance redressed mechanism will be set up on-site to resolve issues immediately.

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8 th Stakeholder Consultation Meeting		
Venue	: Keralkata Union Parishad Office, Kalaroa Upazila, Satkhira	1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc.
Date	: 26.04.2024, Time: 11.30am -1.30pm	
Coverage	: (Keralkata bazar area)	
Total Participant	: 152 (Male: 143, Female: 09)	
Issue	Concerns Raised by the Participants	Replies to the Concern
	-The women of the area need to engage them in the Project road construction work.	
Sexual Exploitation and Abuse/Sexual Harassment	-There may be a higher risk of sexual exploitation and abuse (SEA) and/or sexual harassment (SH) as a result of an inflow of male workers from outside the project region. -Gender inequality can be attributed to structural barriers including women's domestic burden, employer discrimination, limited mobility, limited access to training, lack of women-friendly facilities on site, sexual harassment at work, limited child care provision, low pay, and low productivity.	-Increasing women's labor force participation and improving the quality of female employment will require more significant support for women's access to employment opportunities and high-quality skills development programs.
Graveyards, Madrassas, Schools, Mosques	-People said that the proposed alignment needs to bypass sensitive areas and structures like graveyards, madrasas, schools, mosques, and markets.	-The project will try its best to save the sensitive areas or relocate them to a suitable place -The DC office and RAVC will determine the compensation

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Annex 4.10 :9th Stakeholder Consultation Meeting

9 th Stakeholder Consultation Meeting		
Venue : Alipur Union Parishad Office, Satkhira Sadar, Satkhira Date : 27.04.2024, Time : 11.30 am -1.30 pm Coverage : Keralkata bazar area Total Participant : 28 (Male: 25, Female: 03)	Type of Participant 1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc	
Issue	Concerns Raised by the Participants	Replies to the Concern
Land Acquisition and Compensation	Actual market price of commercial and residential land including land of CPRs and three times of market price of these lands, which will be paid as compensation by the DC; -According to the perception of the participants, the amount of compensation for affected land will be determined by DC based on mouza rate of the recorded category of land. -They deserved that compensation should be determined based on the real nature and category of the affected land.	-Compensation will be made based on the proper documents following the guidelines of WB and ARIPA 2017. A separate RPF is being prepared for the project to ensure smooth implementation of the project -Compensation will be made based on the proper documents following the guidelines of WB and ARIPA 2017.
Relocation and resettlement	-Participants anticipated that involuntary relocation and resettlement would be problematic and challenging due to the lower rate of compensation against residential and commercial land.	-Compensation for affected land and structures will be paid at Replacement Cost. -Costs for stamp duty, Tax, Value Added Tax, Registration fees, etc., will also be provided to affected persons after purchasing replacement land.
Compensation package consider the current market value	-Participant requested the authority for kind consideration to determine compensation based on the actual current market value of land by taking into account of real category instead of the recorded category of land due to non-updating of the category of land over the decades.	-Compensation will be made based on the Joint verification committee, GoB Act ARIPA 2017 and ESS5 of WB policy -All compensation will be paid according to the current market price following the guidelines of WB and ARIPA 2017.
Setting a Temporary market for small shopkeepers	-Create a temporary market by selecting a location for the livelihood of the affected small shopkeepers	-Necessary steps will be taken by the DC office
Problems related to road construction Air, Water, Dust pollution.	-There will be dust, air, and noise pollution during road construction.	-There will be a structural system to reduce the problem -Water should be sprinkled regularly to prevent dust pollution

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9 th Stakeholder Consultation Meeting		
Venue : Alipur Union Parishad Office, Satkhira Sadar, Satkhira Date : 27.04.2024, Time : 11.30 am -1.30 pm Coverage : Keralkata bazar area Total Participant : 28 (Male: 25, Female: 03)		Type of Participant 1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc
Issue	Concerns Raised by the Participants	Replies to the Concern
	-Inflow of workers from outside -Social problems will arise -Water logging on the roadside. -Contaminated water by the construction waste -Difficulties of local people to move on the road -Traffic jams due to construction work	-Construction camp will be outside the local area to avoid social problems -GRM will be in place to prevent any type of wrongdoing. -Adequate facilities for drainage on both sides with cross drains to minimize flooding and water logging will be done -Necessary safety measures with cautionary signs including road safety, and pedestrian crossing especially at Bazar areas and nearby mosques, madrasas, schools, colleges, etc., will be displayed during the construction and operation phase of the project. More specifically, cautionary measures and public awareness will reduce accidents.
Passenger shelter and public toilet	-Roadside shelters should be set up for commuters, along with male and female public toilets.	- The design team will be informed about these issues by E&S consultants
Underpass/ Foot over Bridge	-Participant requested to set up necessary underpass/foot over bridge at places like schools, colleges, madrasas, mosques, markets, etc.	-The necessity of underpass and Foot-over bridges reported in the stakeholders' consultation meeting will be reviewed by engineers and the Detailed Design team for necessary pragmatic decisions. Provision for compensation for squatters and encroachers has been made in the RAP.
CC Loan	-Participant asked, what will be done for the CC loan holders.	-Those affected persons who took micro-credit/micro-finance/loans from NGOs should contact implementing INGO. They will provide necessary assistance regarding such matters during implementation of the RAP.
Vulnerable HH group	-Impacts of land acquisition and involuntary resettlement on vulnerable households/groups. -Whether vulnerable households/groups will get project benefits.	-Woman-headed vulnerable HH will be entitled to receive an allowance of BDT 15,000. -Man-headed vulnerable HH will be entitled to receive an allowance of BDT 10,000. -Nominated members of vulnerable households will be trained under the income and livelihood restoration program. -Trained persons of the vulnerable household will be given a seed grant of BDT 15,000.
Biodiversity and wildlife	-Participants voiced worry about the environmental issue of huge birds, such as falcons and bats, losing their habitat in old	-Wetland will be created automatically at the roadside by digging soil as a result, the faunal species will get back their habitat The tree plantation program will be taken by the sponsor

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9 th Stakeholder Consultation Meeting		
Venue : Alipur Union Parishad Office, Satkhira Sadar, Satkhira Date : 27.04.2024, Time : 11.30 am -1.30 pm Coverage : Keralkata bazar area Total Participant : 28 (Male: 25, Female: 03)		Type of Participant 1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc
Issue	Concerns Raised by the Participants	Replies to the Concern
	trees, and numerous animal species, including kingfishers, frogs, and snakes, living in roadside marshes. Are there any plans by the authorities to restore them?	-A Bio-diversity Management Plan will be prepared for the wildlife and biodiversity habitation
Quality control of the construction material	-Will there be any scope for raising voices by the local people if the quality of construction works is not maintained during construction works accurately?	An international contractor will be appointed for the construction work
Gender-related issues	-Women, especially adolescent girls may be sexually vulnerable/prone to solo travel. Recently, such incidents have occurred frequently which underscores the need for immediate mitigation measures. -Implementation of a GBV-free work environment will be maintained by the PIU/RHD. -Any form of sexual harassment will be dealt with strictly according to the local laws of the country and the employee will be immediately dismissed from his duties. -Company policy on GBV free work environment and code of conduct signed by the workers will be displayed in the labor camp/canteen and other contractor facilities. -Employees will be encouraged to report suspected or actual GBV. -The women of the area need to engage them in the Project road construction work.	-Any form of sexual harassment will be dealt with strictly according to the local laws of the country and the employee will be dismissed from his duties immediately. -Close circuit cameras should be installed so that issues and problems can be effectively monitored, -Necessary measures and arrangements should be in place for effective and timely patrolling to ensure safe passage of women and girls. -Gender based discrimination will be strictly prohibited and monitored. -Employees will be encouraged to report suspected or actual GBV. -Grievance redressed mechanism will be set up on-site to resolve issues immediately.

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9 th Stakeholder Consultation Meeting		
Venue : Alipur Union Parishad Office, Satkhira Sadar, Satkhira Date : 27.04.2024, Time : 11.30 am -1.30 pm Coverage : Keralkata bazar area Total Participant : 28 (Male: 25, Female: 03)		Type of Participant 1. Local community, 2. Media persons Journalists, 3. District Truck/Bus Owners Association representatives, 4. NGO representatives, 5. Women representatives etc
Issue	Concerns Raised by the Participants	Replies to the Concern
Source of filling materials and the female worker safety	-Women's representatives said that a large amount of soil filling materials will be needed for the road, where is the source of the materials? Women will be involved in construction work, please ensure their safety and accommodation who will come from outside areas	-Soil material should be collected from roadside pits adjacent to the road alignment or imported from nearby sites (not within 500m of the road). Borrowed pits will be barren or abandoned land and can no longer be used for agricultural production. This could be dredging materials, clay soil instead of topsoil, or fish ponds cultivated after excavation. -All the things will be done in consultation with local people so that it would not impact the surrounding environment

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Annex 4.11 :Details of Focus Group Discussions (FGD)

Summary of FGD			
Sl. No.	Place & Date	Major Issues	Demand & Expectations
1.	Bagtari Majebah Jame Mashjid, Sharsha Upazila, Jashore, 17.12.2023	-A group discussion was held with people from different professions of the area near Bagtari Masjid. -land will be required around 150 to 180 feet (4 km) to widen the existing Bagchra road The participants raised their concerns about environmental and social issues such as pollution from construction activities, loss of --livelihood, houses, various diseases, etc. - Roadside drainage facilities should be provided at several locations where the road passes through markets and local markets to avoid water logging Cutting trees will affect the environment Many shops, jute houses, and other infrastructures will be damaged if the existing road (Amtala to Beltala) is constructed with a newly designed 6-lane road	-To avoid this huge amount of loss a group of people demanded for a bypass on the vacant agricultural land -Another group is in favor of widening the existing road because land acquisition will increase land prices and they will get better price for their land. . According to the ESMP 1:3 ratios i.e., three (3) saplings will be planted for every tree cutting. -According to the land will be acquired for road widening, whether it's agricultural land or vacant land and we have to let go of our lands so it will be better for us to get a good price for resettlement purposes -To avoid waterlogging problems they demanded for proper drainage system Cutting trees will harm the environment and local birds and other animals. New trees need to be planted.
2.	Bagachra Union Parishad Office, Sharsha Upazila, Jashore 18.12.2023	The consultant team explained the reason for visiting this area. In this discussion, they explained the design of the existing highway from Amtala to Beltala (4.00 km) and the bypass over agricultural land (4.4 km) -Social and Environmental issues -Land acquisition issues -Livelihood restoration issues -Resettlement issues - OHP during construction work	The people are concerned about various waterborne diseases like typhoid, hepatitis, skin diseases, stagnant water, and mosquito breeding. They ask for a proper drainage system to drain out the wastewater. Participants raised points on environmental and social risks and impact on the disadvantaged and marginalized Vulnerable Groups and Labor Health and Safety (LHS) Has to be maintained special assistance for marginalized and underprivileged communities. During the construction phase, vulnerable PAPs will be taken into account. Proper Operational health and safety plan should be made to avoid harassment The majority of the locals are impoverished and rely only on this property for their livelihood. -They further said that during the RAP's implementation, the livelihood restoration program will help them maintain a better standard of living. To expand both sides of this road and reconstruct it, the Government of Bangladesh ordered all building owners to remove their residential and commercial buildings in 2010 -It is the estuary or catchment area of three unions Sharsha, Kalaroa, and Jhikargacha. -Bypassing will reduce traffic flow on the existing road, which will affect businesses in the area.

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Summary of FGD			
Sl. No.	Place & Date	Major Issues	Demand & Expectations
			-The majority of the participants in the meeting, including the chairman, want the existing road to be used for widening. So that the present market can be developed and the people of the area can enjoy its benefits.
3.	Bishash Para more, Satmile, Sharsha, Jashore (with women group) 18.12.2023	-The purpose of the project was explained to the people presented in the meeting -Environmental issues -Land acquisition-related issues -Resettlement related issues -A group discussion was conducted to get the views of the local women where apart from the project discussion, their other daily life problems were also discussed -Social security and road safety-related issues -Occupational health and safety-related issues -Gender based violence -Human trafficking	- Cutting trees will have a negative impact on the environment - During construction work, several problems will occur like air and dust pollution, noise pollution, labour influx, etc. Which will affect their daily life and health also. -If the road is developed on the agricultural land, then the residual agricultural land will become unusable for cultivation -There will be no family/social ties, relatives will move away. -Poverty will increase, food crisis will occur (as land, ponds, and gardens will be damaged). -Family and social cemeteries will be affected -Due to scarcity of land, new land is not available in this area (nobody sells). -Even if new land is available, it is difficult to cultivate in a new way -Local women think that there should be enough lights and guards on the roads for safe walking -They also said that if this highway is improved, their condition will also improve along with the development of the area -They said that the main road needs to be widened since there are occasional accidents -They go to the local Matri Sadan for the treatment of pregnant or post-partum mothers. In case of additional problems, they seek treatment at the city hospital -No child or maternal death -If there is any incident happening to women (alienation, remarriage, love between boy and girl, etc.), if there is a family disturbance, they try to solve it by themselves, if it is not solved, they take shelter of the local chairman, member. If the problem is not resolved even there, they resort to litigation. -When asked if a woman is trafficked or if it has happened in the past, they say they have heard about it but not witnessed it. -They gave their opinion to widen the existing road for the implementation of the highway widening and development project. -As the amount of agricultural land is decreasing day by day, they are against bypassing the use of agricultural land as it will lead to food shortage. -According to them no one has the right to harass or torture a woman, and it must be a punishable offense. -They feel that women's participation in the family decision-making process is important. -In response to the question of whether there is any problem in getting their share of the property as heirs, they say that it is not a problem if the father/mother passes it on but in other cases, there is a problem (brothers sometimes cause problems). -Women can work outside the home if necessary. There is no obstacle from the family in this regard

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Summary of FGD			
Sl. No.	Place & Date	Major Issues	Demand & Expectations
4.	Bishash Para more, Satmile Bagachra, Sharsha, Jashore 18.12.2023	-A Group Discussion (FGD) was conducted with the local people of Biswas Para. The subject of the project is presented to them in general. -Land acquisition-related issues -Compensation -Issues related to road widening through bypass or existing roads -Relocation and rehabilitation-related issues -Loss of Infrastructure and businesses -Livelihood restoration program	-PAP's want proper compensation for the damage to agricultural land -They also want to know how land prices will be decided -The District Commissioner's Office will provide compensation of three times the market value of the land. -Mr. Saiful Islam (local businessmen) said, why should three crop agricultural land be wasted for bypass, when roads are existing. Two passes of the existing road should be widened. -They also said bypass in agricultural areas will destroy the market, business and trade will suffer, widening of the existing road will improve the market. -Bypass on agricultural land will improve Jamtala market. The present market (Baghachra market) will not remain, as people will directly use bypass Jamtala market. -Khadija Khatun, a woman entrepreneur, said many poor people in this area are making a living by taking loans from the association and doing small-scale business. She is one of them, their lives and livelihood will be lost due to land acquisition. -She demanded for livelihood restoration training beside proper compensation -Another local people Mr. Montu said that the solution is not possible even if the value of the land is tripled -There is no land to sell in the area -Cash is not on hand -Social bonds will be broken, the people of the area will be in uncertainty
5.	Illichpur Government Colony, Keralkata Union, kalaroa Upazila, Satkhira 02.01.2024	-The social consultant team visited a cluster where the 8 poor households live at Illichpur Government Colony -They discussed issues related to this project and their current problems -Livelihood restoration related issues -Compensation issues -Resettlement related issues	-All 8 families requested for support for their resettlement on a government land -They have also demanded adequate and proper compensation for their affected livelihoods. -For livelihood restoration they have suggested for the followings: a. Support for cow rearing, b. Training and support for vegetable cultivation, c. Training on motor driving d. Support for small businesses e. Support for rickshaw van, and training for hand stitch
6.	Madhobkathi Bazar, Jhaudanga Union, Satkhira Sadar, Satkhira 04.01.2024	-A Focus Group Discussion (FGD) with the shop owners and the employees of the different shops was conducted at Madhabkathi Bazar. -Informed the participants about the Project & why road widening needed -Land acquisition-related issues -Resettlement & relocation issues -Compensation for affected land and structures -CPR related issues -Loss of livelihood and restoration training	-The proposed highway will be widened up to between 50 meters and 55 meters. -Consequently, there will be a requirement for private land acquisition along with procuring khas/government land through an inter-ministering transfer for implementation of the project -As a result, all the existing road side shops/businesses and households will have to be relocated from the proposed RoW. -PAPS complained about the land acquisition that lands are not equally acquired in both sides of the road - The consultant team explained that more lands are acquired on the curved side of the road rather than the opposite side of the road to straighten the road -PAPs asked, based on which rate compensation will be given and if the compensation rate decided on the mouza rate then it will not be enough -Consultant team assures them that Compensation for affected land will be considered as per ARIPA 2017. Compensation for the land includes the market price and 200% premium.

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Summary of FGD			
Sl. No.	Place & Date	Major Issues	Demand & Expectations
			-What kind of documents will be required for taking compensation? -All update documents (title deeds, records of rights/khatians/Porcha, mutation documents, dakhila (receipts of payment land development tax (LDT), etc.) -What will be the rate of compensation for affected structures? -Compensation for the affected structures will be at market price determined by PWD and 100% premium to the owners of the affected structures -Who will give the compensation? -Compensation will be provided from the DC office -Is there any compensation for CPR? -Affected Community Property Resource (CPR) will be entitled to get compensation for land and structures as per existing law ARIPA 2017. -What will happen to the temporary loss of employment of Labor working in the shops? -The affected employees will receive grant to cover temporary loss of regular wage income for 30 days and income and livelihood restoration to be created by project authority.
7.	Tulshidanga, Kalaroa Upazila, Satkhira, 06.02.2024	-Noise, dust, air pollution -Water logging problem -Road safety-related issues -Occupational health and safety-related issues -Work opportunities for local people -Construction waste management issue	-Construction area should be barricaded so that construction noise cannot hamper the local people -Construction work should be limited during the daytime to avoid noise pollution in the nighttime -To control dust on the road, need to emphasize water spraying. - An adequate and systematic drainage system needs to be implemented during the construction phase -Ensure the safety of the local women and girls. -Ensure the safe passage for the school-going children. -Construction camp should be constructed far from the locality -Should give extra concern during construction work besides the school, college, hospital, etc. -To avoid accidents skilled drivers and operators need to be appointed by contractors. -Local manpower needs to be engaged as labor and other positions according to their skill -Local woman workers need to be included in the construction workforce -Construction waste and construction camp-related waste should be managed properly, so that the locality does not polluted by extra waste generation -Construction waste should be dumped in designated areas declared by local authority -Keep concerned that local water bodies are not polluted by construction-related solid and liquid waste.
8.	Kalaroa Paurashava, Kalaroa Upazila, Satkhira (with women group) 25.04.2024	-Social issues -Bad effects of entertainment media -Health & sanitary awareness -Human trafficking -Land Acquisition & Resettlement Issues	-Divorce rate & reasons- -Dowry-related problems, and poor economic conditions caused family problems -Infidelity between husband and wife -Depreciate women's opinions both in family and society -Lack of awareness of women's rights -Eve teasing -Mitigation measures: -Education rate should be increased -Women should be made aware of their rights in the society -Apply laws strictly to stop violation against women

Annexes

Summary of FGD			
Sl. No.	Place & Date	Major Issues	Demand & Expectations
			-Build social morality to prevent bad impacts of the entertainment media -Parents need to maintaining good relationship with children and build morality among them -There is a system available called GRM. People can place their complaints here than local Govt. representatives should solve those problems -Human welfare organization of Jashore, has brought back those who was trafficked -Now women are more aware of this matter -Proper compensation for every loss will be given by the Govt. -Also other facilities will be provided by the project through NGO for resettlement purposes -Relocation place needs to be selected by the PAPs
9.	Keralkata Union, Kalaroa Upazila, Satkhira (with women group) 26.04.2024	-Social issues -Bad effects of entertainment media -Women's employment issues -Women's rights and awareness issues -Health and sanitation facilities -Land Acquisition and relocation issues	-Divorce rate & reasons- -In this union mainly women appealed for divorce compared to men -Divorce ratio between women and men is 8:2 - Causes of divorce are extramarital affairs of husband and wife -Disregard of women's opinions by both family and society -Cases of eve-teasing -Online scam -Imitation of foreign culture -Local women need to be involved in the road construction work on priority base -Discrimination in payment of wages to men and women should be stopped -They also demanded livelihood restoration training for the vulnerable women -Lack of awareness about women health -Local community Clinique and health workers providing health facilities for teenage girls and pregnant women -If the roads get developed, then more hospitals and Clinique's will be established in here and health facilities will improve -Compare to past the mortality rates are low at present. In the past year only one or two cases happened -We have built our home with love and affection. It will be very hard for us to go elsewhere no matter how much compensation the govt. provides us -We want over passes and foot over bridges in front of the schools, colleges etc. because these are accident prone areas -Mitigation measures: -Education rate should be increased -Women should be made aware of their rights in the society -Apply laws strictly to stop violation against women -Build social morality to prevent bad impacts of the entertainment media -Parents need to maintain good relationships with children and build morality among them -There is a system available called GRM. People can place their complaints here than local Govt. representatives should solve those problems -Human welfare organization of Jashore, has brought back those who were trafficked

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Summary of FGD			
Sl. No.	Place & Date	Major Issues	Demand & Expectations
			-Now women are more aware of this matter -Proper compensation for every loss will be given from the Govt. -Also other facilities will be provided by the project through NGO for resettlement purposes -Relocation place needs to be selected by the PAP's
10.	Alipur Union, Satkhira Sadar, Satkhira (with Transport Worker Union Association) 27.04.2024	-Road development related issues -Benefits of road widening -Traffic system -Causes and rate of accidents -Problems of existing road condition -Implementation of the traffic and road laws and regulation -Tree plantation -Water logging issues	-Mr. Md. Abdul Aziz (General Secretary) said- "If the condition of the road improved, then communication of the entire Bangladesh with this region will improve" -Distance between Kolkata and Satkhira is short most of the products exported and imported through this road -So if the road gets widen then goods transport services will be better -It will take less time to transport the goods and -Also reduce the risk of spoilage of perishable goods -There is no doubt that if the access road of this Bhomra land port developed then export import business will also be improved and Bangladesh will benefit economically -Compare to transport traffic road capacity is low -Truck overload should be reduced -Due to poor road condition traffic jam, accident is a common scenario of current situation -For this reason, in the past one year nearly 1000 accidents happened -Most of the accidents happened in the Navaron to Lapsa bypass area -In some points drivers and transport owners are also responsible for accidents i.e. -Poor maintenance of the vehicles, recruitment of unskilled, underage drivers etc. -Even if the drivers informed their owners about the poor condition of the vehicles, owners are not always interested to repair their vehicles -Illegal vehicles like Nasimon, Karimon also run on the main road which needs to be stopped immediately and there should be a separate lane for these slow moving vehicles -Laws need to implement properly to prevent the accidents -People also need to be aware about traffic and road laws and regulations to prevent road accidents -During the construction time alternative roads need to be prepare for transportation and to prevent traffic jam -To prevent waterlogging, proper drainage system need to be implemented and drains should be connected to the river during construction so that water can easily flow into the river and waterlogging does not occur. -Trees need to be plant beside and among the road divider

Annex 4.12 :Key Informant Interview

Key Informant Interview (KII) with Key Stakeholders		
Sl.#	Stakeholders	Comment Suggestion and Key issues
	Md. Humayun Kabir Deputy Commissioner & District Magistrate Satkhira (03.09.2023)	Md. Humayun Kabir said that mobility is an important factor for economic development. Padma Bridge connects the western region with other parts of the country. Economic progress will go a long way in this way. Bhomra, Benapole land ports and Mongla sea ports will benefit if road connectivity is improved. Also Jhaudanga is an important place for paddy market, which located along with Navaron-Bhomra road. The area has numerous ponds for culturing fish like shrimps, prawns, and crabs, distributed in various districts and exporting abroad. However, government rules prohibit new ponds beside roads. Satkhira is known for mango production, but the system is inadequate, resulting in insufficient exports and income. A large production of mangoes is wasted due to improper storage, necessitating the need for a proper cold storage system to store surplus mangoes and other agro-products like shrimp, prawn etc. We can establish juice industry in here so that we can also export mango juice, besides raw mangos. GCMs are both private and public in nature but mostly in public.
	Protap Mondol Computer Operator, BADC Satkhira (05.09.2023)	He informed that main crops and vegetables of this region are Paddy, Wheat, Maize, Sugarcane, Mango, Panifal, Mustard, Sesame, Mugdal, etc. Total cultivated land is 39800 hectares. Total farmer family no. is 85489 including women farmers. Nontitle farmer's family no. is 8370. GOB give 1500tk per farmer for fertilizer, seeds etc. There is a food warehouse in Satkhira, where farmers sell their produce. The government buys from them at high prices and reserves the crop for emergencies. Mangoes are exported from this district to other districts. There is no agricultural market here. This area is one/two crops cultivation land the cropping pattern of this area are; Boro- fallen-fallen, Boro-Aush-Aman paddy Sesame-boro-Jute/Aman paddy. Vegetables are produced as season based. Water logging, salinity are the main problems. Proper drainage system both side of the road to drain out the water and longevity of the drain is needed to solve the problem
	Mizanur Rahman Upazila Engineer, Sonjoy Mondol Sub-Assistant Engineer (Estimator), Water Supply & Sanitation, Public Health Department Satkhira District (05.09.2023)	He informed that Salinity problem is higher in Assasuni, Kaliganj, Shyamnagar upazila. The skims are taken as follows; -Rain water harvesting -Build tanks in various places for storing rain water from the ponds -Using Aro technology -Also use Pond Sand Filter technology -For high salinity problem 6th no. hand pump is also an effective technology -The water level is 1000 feet in Satkhira -Working in coordination with LGED -Built the primary school toilets with the coordination of LGED
	Zakir Hossen, Sub-divisional Engineer, BWDB, Satkhira	The flood control, drainage, and protection department plays a crucial role in preventing floods and ensuring the safety of roads and structures. They prioritize sustainable dams, monitor water flow patterns, and work to prevent river erosion, relying on land acquisition for dam construction. There is no coordination between LGED and RHD department for the construction of dams. LGED is constructing canal embankment using palaslighting technology, but this method is ineffective. To maintaining the slope is more effective. He also informed that a BWDB project is underway in Gabura Union. He suggested that Inter-ministerial meetings are needed for better coordination and decision implementation.

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Key Informant Interview (KII) with Key Stakeholders		
Sl.#	Stakeholders	Comment Suggestion and Key issues
	Mr. Mohammad Mamun Kobir Torofder, APD (Traffic), Land Port Authority, Bhomra, Satkhira	Additional Project Director, informed that, 23 land ports are in Bangladesh, among them only 13 are currently in operation. APD said the short distance between Kolkata and Bhomra will reduce transportation cost for traders. The distance between Satkhira and Dhaka via the Padma bridge will also be reduced by about 100km. At Present, Bhomra land port does not offer much to importers. Although there is scope to import 56 products through this port, only 30-35 products are imported. The road will be 8 lanes at the starting point of the port (two lanes for vehicle parking). Separate passenger lane will be developed. The culvert at the periphery of the border will be 10 lanes. Vehicle will not be allowed over 20-ton load. RHD site having 60 ft. land and need to be acquired 90 ft. additional land. APD informed that the Camp of the Border Guard is situated on the North side which will be required to dismantle; the authority sat with them and made a plan to shift the camp in another place. APD ensured all sorts of cooperation from his side for the implementation of the project. Improper drainage system is the main problem at the land port area's road. Dust and noise also a problem due to heavy traffic on port area. Approximately 1000 vehicles move through the port area. Previously Human trafficking rate was high but now the rate is in nearly zero level because of the strict border guard security. Black marketing is also reduced because of the same reason but still going on but in less amount. Suggestions: -Need to construct proper drainage system. Drainage outline may fall into the Ichamati river near the port area. -Service road should construct for local people's easy movement near the port area. -Black marketing can be reduced in full pleasure if we can establish a holiday market in the land port area. -It will be benefited in two ways When imported products will be available in here with comparatively cheap rate local people will buy them frequently and 2. Will not be interested to buy black market products and products selling will be also increase
	Chairman, Bagachra Sharsha, Jashore	The bypass problem was not brought up by project officials during a meeting with the project consultants on October 15, 2023. Peoples are aware that the highway will pass through the existing road. He urges that the usage of three-crop agricultural land is strictly forbidden by law, farmers are not interested in losing their three-crop land. They will face certain death if the agricultural land is acquired. The area's impoverished population depends on agriculture. A large number of people are migrated from India. The majority of the locals are impoverished and rely only on this property for their livelihood. They need the highway alignment pass through the existing roads. They further said that during the RAP's implementation, the livelihood restoration program will help them maintain a better standard of living. In order to expand both sides of this road and reconstruction it, the Bangladeshi government ordered all building owners to remove their residential and commercial buildings in 2010. As a result, the property owners removed their buildings, freeing up enough space to expand this route. -It is the estuary or catchment area of three unions like Sharsha, Kalaroa and Jhikargacha. Bypassing will reduce traffic flow on the existing road, which will affect businesses in the area. -The chairman and participants advised to take measures to ensure that there is no corruption in the price of land.

Annexes

Key Informant Interview (KII) with Key Stakeholders		
Sl.#	Stakeholders	Comment Suggestion and Key issues
		-If the highway is widened along the existing road, everyone will move their structures back because most landowners have space behind them. -They are ready to tender or discuss the value of the land with the DC office and appropriate authorities which will be in the form of a resolution. -The majority of the participants in the meeting, including the chairman, want the existing road to be used for widening.
	Nayan Kumar Rajbanshi, Upazila Nirbahi Officer, Sharsha Upazila Office Jashore	Upazila Nirbahi Officer Nayan Kumar Rajbanshi said at the end of the discussion and review that, while consulting with the people, whoever has the interest will ask for it, but while taking the opinion, what is cost-effective, reasonable and acceptable for the government should be taken. Parties with vested interests shouldn't become involved in this.
	Mr. Sheikh Afiluddin Member of Parliament Afil Uddin Jute Mill, Sharsha, Jashore	Local Member of Parliament Mr. Shiekh Afiluddin suggested If a fly over is made from Bagachra Bazar to Beltola starting point, land acquisition, destruction of infrastructure and disorder can be avoided. The alignment of the highway can be drawn parallel to the road which will go towards Munshiganj from Navaran Railway Junction. As land has to be acquired for railways, the amount of land acquired there can be slightly increased. Then the markets will not be affected and problems will be avoided.
	Khan Hasan Ali Liton head teacher Baganchra United Secondary School, Baganchra, Sharsha, Jessore	Headmaster Khan Hasan Ali Liton said that; In order to continue the trend of development, it is necessary to support development. In spite of the loss, the course of development must be maintained. The existing market should be improved without damaging the Agriculture land. In case of bypass on agricultural land, the financial loss is less but arable land is not available. In that case existing roads should be used for road preparation. The school has no objection if some land of the school is acquired for development.
	Assistant Social Welfare Officer Kalaroa, Satkhira	Social Welfare Office is working for the betterment of the hard core poor and distress population of this Upazila. The target groups are -Elderly people -Widow -Disable -Disable Education Support -Sickness and -Beggar Rehabilitation -After the individual personal interview upazila parishad selects the most eligible persons for the support. -Total process is under Upazila Chairman's jurisdiction and final decision for selection lies with Upazila Chairman with the assistance and support of Social Welfare Officials. -He suggested that Livelihood restoration could be organized through trainings on income generating activities like, Bee keeping, shrimp cultivation, and food processing. shrimp cultivation is one of the main economic activities of this area
	Azizur Rahman, Shop Owner, Sharsha Bazar, Jashore, Date: 04.01.2024, Thursday. 9:00am	In his shop he sells all kinds of sanitary items. There are 6 labours working full time here on monthly basis salary. He invested about 1.5 crore taka and has a bank loan of Tk: 50 lacs. He told that on an average his monthly income from this shop is around 1.5 lac. He is paying Tk. 42000 per month as labours salary and TK: 18000 for monthly rent. Mr. Aziz is fully aware of the upcoming road development project and he has to shift his running shop to another place and also planning to manage a suitable shop for renting to re-open his shop and also planning and trying to purchase a piece of land for construction a shop. He wants to keep his business running forward as he has no other alternatives and wants to keep all his working labours with him because he does not want to lose all experienced employees.

Annexes

Key Informant Interview (KII) with Key Stakeholders		
Sl.#	Stakeholders	Comment Suggestion and Key issues
		Mr. Aziz suggested to pay the proper government compensation timely for his own livelihood restoration as well for the labours.
	Taher Ali Tea Stall at Sharsha Bazar on Bhomra-Satkira-Navaron, Seller on footpath	Mr. Ali is running a road side tea stall and selling local nut on Navaron –Jashore high way. He is from Navaron area, 1km away from his tea stall. He has two sons, elder one is working as agriculture day labor and younger one is a student of class-VII. His old father and mother live with him who are suffering from old age complications. He has invested about Tk. 50,000 and he earns Tk. 1000 to 1500 per day. He is paying Tk. 30 per day to market committee as toll for the position. This tea stall is the only source of income by which he is maintaining his household. He is well aware of future consequence and worried for disruption in his livelihood during implementation of the project. He is planning to buy one rickshaw van to set up his tea stall on the same after receiving compensation.
	Ms. Pervin Begum Tea Stall at Sharsha Bazar on Bhomra-Satkira-Navaron, Satkhira.	Ms. Pervin Begum, W/O Zahangir Alam is running a road side tea stall on footpath of Navaron – Jashore road. She was well aware of project intervention and impacts during the project implementation period. They paid Tk. 30 per day as toll to bazar management committee for using the possession. They have invested around Tk. 50,000 and earning Tk. 1,000-1,200 per day. She took loan amount TK. 50,000 from a local NGO and have to repay on the weekly instalment. For relocation purpose she said that the road will be developed after construction of the project. They will try to open their tea stall in a labor intensive road side area for restoring livelihood for survival during the construction period. She shared her expectation to get adequate/proper and timely compensation from the project authority for restoring their livelihood.
	Rural Reconstruction Foundation (RRF), NGO, Satkhira, Jashore	RRF is working in this area for a long period of time. Mainly they are providing credit support to the local poor community of the area. In addition to the credit operation, the NGO has the following programmatic activities: - Education Program, - Water and Sanitation Program, - Adolescent Health Program, - Livelihood Program, - Housing Program, and - Sports Program for the Adolescents Also raising awareness among the credit groups on the followings: - Adolescent reproductive health, - Impact on divorce and dowry - Impact, consequence and measures to prevent women trafficking - They are also providing support for involving kids in sports Regarding support to the affected persons of WeCARE project they replied, RRF is open to all poor people. If the affected person wants to take part in any of our program, they are welcomed.
	Christian Service Society (CSS), NGO Satkhira, Jashore	This is a Cristian organization working in the area for a long covering all poor people of the area. CSS has the Following Activities: - Credit operation - Education - Health care and The NGO has the following Training Programs: - Cow rearing - Vegetable cultivation

Annexes

Key Informant Interview (KII) with Key Stakeholders		
Sl.#	Stakeholders	Comment Suggestion and Key issues
		-Prevention of female oppression -Control and manage arsenic Contamination -Awareness building regarding women trafficking The NGO representative also assured for all possible support and if anyone want to participate in their ongoing activities they will welcome them.
	Md. Moniruzzaman Mayor, Kolaroa Upzilla, Kalaroa, Satkhira.	The Mayor said that the bypass is better to avoid economic losses. It will save many government, private and business structures. We need a bypass but the existing road also needs to be widened as it is too narrow for traffic and road accidents are frequent. Widening of existing roads will facilitate smooth movement of vehicles and prevent road accidents. Plantation will be implemented along with proper drainage system for water drainage on both sides of the road. Drains will be connected to river Betravati to prevent water logging. There are many big holes beside the existing main road which occurs accident, it should be repaired
	Golam Mustafa Freedom Fighter Kolaroa, Satkhira	Mr. Mostofa said that by pass is the demands of time. The existing road need to be widened to prevent the accident. There are so many small shops both side of the road. Small roadside markets should be properly inspected for proper compensation of PAP. Must check mouza rate.
	Shila Rani Halder Musician Teacher Kolaroa, Satkhira	Shila Rani Halder said, due to climate change, it is very important to plant trees on both sides of the road. There should be passenger shelters with seating, water facilities and women-friendly toilets. A healthy environment requires recreational areas (parks).
	Rofiqul Islam Ward Commissioner Ward no-3 Kolaroa, Satkhira	Land price is increasing day by day so what will be the process to determine the value of land? What should be the price? After the bypass road, is it possible to construct one connecting road up to Munshiganj?
	Md. Alfazuddin Councilor, Ward no: 6 Kolaroa, Satkhira.	After the road Construction all kind of vehicles like containers, cars, bus, can move easily. In addition to the bypass, we need to widen the existing main road to at least 4 lanes. Accidents and traffic jams are a normal occurrence on this road.
	Sontosh Pal Organizer, Puja udjapon Committee, Kolaroa	Kalaroa, Jhawdanga, and Madhobdi all upzillas are traffic jam prone area. After Construction of bypass traffic jam will not solved, some transport will use the existing road so that the existing road is need to be widen. Tree plantation both side of the road A scheme should be adopted to bring water from nearby channels for agricultural purposes and to keep the flow of water flowing.
	Md. Amanullah Chairman of the Teachers association. Kolaroa	A Connecting road is needed from Munshiganj to Sundarbans. Kalaroa is famous for produce of various agricultural products like tomato, date, palm, mango, potal etc. and flowers. So that communication system should be developed for easy travel. Bypass road will be reducing the traffic jam and road accident.
	Prof. Abu Naser Professor, Kolaroa Govt. Collage Kolaroa, Satkhira	Bypass is needed to reduce traffic jam and accident, beside bypass existing road is need to be repair and widen. Tree cutting is a threat to climate, plantation is very important.
	Mostofa baki billah Vice President of Teachers Association Kolaroa Satkhira	Due to the presence of tong shopkeepers on the road, there is a problem in the movement of vehicles and cause of traffic jam. Tong shopkeepers need to be relocation.
	Mr. Anwar Pervez	The environment is changing day by day due to climate change, urgent program for tree plantation is situation demand.

Annexes

Key Informant Interview (KII) with Key Stakeholders		
Sl.#	Stakeholders	Comment Suggestion and Key issues
	Executive Engineer (X-en), Kolaroa, Satkhira	Road accidents often occur due to narrow roads and traffic jams. Lack of professionalism, lack of awareness of human movement also causes accidents. The road should be properly widened to prevent road accidents. Service roads should be constructed for easy movement of locals. Strict penalties for accidents will help reduce accidents. GOB should be strict in this regard to improve the law and order situation.
	Shahanaz Akhter Female, Welfare Assistant (FWA) Zesmin Nahar Community Health Care Provider (CWCP)	The activities of the Clinic are to Consult pregnant mother and child on health related issues provide maternal and child health examination, counselling, supply of medicines. Check health of child till 5 years of age. Assist in risk assessment, in abnormal case refer to senior doctor at nearest hospital, or MCWC Received midwifery training Provide adolescent health education, The CWCP received 3-month training on Child Nutrition. Got refresher training every year. Assess the nutrition level according to age up to 5 years' child Provide Growth Monitoring Card to assess the nutrition level. The main aim of the EPI was to reduce mortality. In the last two years only one mother and one Child had died. The mother and child mortality rate is under 1%
	Mrittonjoy Saha Project Officer Shamim Hossain Field Facilitator Uttoron NGO Finish Mential Bagladesh Program Kolaroa, Satkhira	Uttoron has worked on Child Safeguard Dos and Don'ts. In this area there is a project called Uttoron Finnish Mential Bangladesh which is running in 6 countries. The objective of this program is to create awareness among people to improve sanitation and health. They have motivational program. Assess demand model, generate demand for sanitation. Public Private Partnership (PPP) program Collect waste from public to treatment plant for recycling as organic fertilizer. Working in joint collaboration with Union Parishad

Annex 4.13 :Pictures of Stakeholder Consultation meetings



Pictures of Stakeholder Consultation Meetings



Picture: Consultation Meeting at Helatola Union Parishad office



Picture: Consultation Meeting at Keralkata Union Parishad office



Picture: Consultation Meeting at Alipur Union Parishad office, Satkhira Sadar, Satkhira

Pictures of the Focus Group Discussion



Picture: Bagtari, Bagachra, Sharsha, Jashore



Picture: Bagachra, Union Parishad Office Sharsha, Jashore



Picture: Bishshash Para more, Satmile bazar, Sharsha Upazila, Jashore (with female group)



Picture: Lishpur Government Colony, Keralkata Union, Kalaroa Upazila, Satkhira

Picture: Madhobkathi Bazar, Jhaudanga Union, Satkhira Sadar, Satkhira



Picture: Kalaroa Pourosova, Kalaroa Upazila, Satkhira (with female group)

Annexes



Picture: Keralkata Union, Kalaroa Upazila, Satkhira (with female group)



Picture: Alipur Union, Satkhira Sadar, Satkhira (Transport workers Union Association)

Annex 4.14 :Pictures of KII Meetings



Picture: KII in Kalaroa Pouroshova, Satkhira with Mayor



Picture: KII in Alipur Union, Satkhira with Community Clinique Staff



Picture: KII in Helatala Union, Kalaroa, Satkhira with Uttaran NGO



Picture: KII in Satkhira RHD office with Executive Engineer



Picture: KII with Mr. Mohammad Mamun Kobir Torofder, APD (Traffic), Land Port Authority, Bhomra, Satkhira

Picture: Md. KII with Mr. Humayun Kabir District Commissioner of Shatkhirra



Picture: KII with Water Supply & Sanitation, Public Health Department, Satkhira



Picture: KII with Zakir Hossen Sub-Divisional Engineer, BWDB, Satkhira



Annexes

Picture: KII with Protap Mondol Computer Operator, BADC, Satkhira **Picture: 8. No. Bagachra Union Office, Sharsha Upazila, Jashore**



Consultancy Services for Environmental and Social Management for Bhomra-Satkhira-Navaron Road Section (Phase-3) for Bangladesh Western Economic Corridor & Regional Enhancement (WeCARE) Program

Time: 25.00

Location: ১০ নং কাটা ইন্টেরিয়র পলিওপ, আকাশা; মালেশিয়া
Date: ১৫-১০-২০২৩

Date: 6-9-20-2023

Time: 55:00

Name	Occupation	Mobile No.	Signature
DR. Md. Nazrul Islam	Manager, Milk Vita	01711-086300	Dr. Nazrul Islam
DR. Md. Nazrul Islam	DR. Md. Nazrul Islam	01918014141	Dr. Nazrul Islam
DR. Md. Nazrul Islam	DR. Md. Nazrul Islam	01712266049	Dr. Nazrul Islam
DR. Md. Nazrul Islam	DR. Md. Nazrul Islam	01806090820	Dr. Nazrul Islam
MDR MAHABUB	SECRETARY	01718896259	MDR MAHABUB
MD. Saifuddin Islam	General Manager	01711-414556	MD. Saifuddin Islam
MD. Saifuddin Islam	MD. Saifuddin Islam	01930-090030	MD. Saifuddin Islam
MD. Saifuddin Islam	MD. Saifuddin Islam	01922-309862	MD. Saifuddin Islam
MD. Saifuddin Islam	MD. Saifuddin Islam	01420071029	MD. Saifuddin Islam
MD. Saifuddin Islam	MD. Saifuddin Islam	01302099608	MD. Saifuddin Islam
MD. Saifuddin Islam	MD. Saifuddin Islam	012068686060	MD. Saifuddin Islam
MD. Saifuddin Islam	MD. Saifuddin Islam	013033402986	MD. Saifuddin Islam
MD. Saifuddin Islam	MD. Saifuddin Islam	9822-642879	MD. Saifuddin Islam
MD. Saifuddin Islam	MD. Saifuddin Islam	017555102502	MD. Saifuddin Islam
MD. Saifuddin Islam	MD. Saifuddin Islam	01688219000	MD. Saifuddin Islam
MD. Saifuddin Islam	MD. Saifuddin Islam	01941067379	MD. Saifuddin Islam

Name	Occupation	Mobile No.	Signature
মোহাম্মদ হাফিজ আলী	মুজির	০১৪০৪৬০২৫৫২২	হাফিজ
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মুজির আলী	মুজির	০১২৬৬৬২০৪০৪	মুজির
মোহাম্মদ হাফিজ	মুজির	০১২০২৫ ২৬ ২০২০	মুজির
মুজির আলী	"	০১২৪৬৬৬০২৫৫২	মুজির
মোহাম্মদ হাফিজ	মুজির	০১২৫ ২৪৬৬ ২৬৫৫	মুজির
মুজির আলী	মুজির	০১২৬৬৬৬৭২৪৫২	মুজির
মুজির আলী	মুজির	"	"
মুজির আলী	মুজির	০১২৬৬৬৬৭২৪৫২	মুজির
মুজির আলী	মুজির	০১৭৫৫২৬৬৬০৪	মুজির
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মুজির আলী	মুজির	০১২৬০৩২০১২	মুজির
মুজির আলী	মুজির	০১৭২২২৬৭৫৬	মুজির

List of Participants

Time: 22:00

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List of Participants:

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Venue:
Upazila: Satkhira Sadar
District: Satkhira

Date: 10/11/2023
Time: 3:30 PM

List of Participants

Sl. No.	Name	Occupation	M/F	Mobile No	Signature
১	কাজিম আলী মুন্সি		M		
২	মিলি আলী		M		
৬	মুহাম্মদ আলী	জাহাজদার	M	০২০৮৬৬৭৬৬৬	মুহাম্মদ আলী
৪	আবদুল কাদের	ড্রাইভার	M	০২০২৬৪৫৬৬৬	আবদুল কাদের
৫	সহা: আবদুল	চাচা	M	০২৭৫০২০০৬৭	আবদুল
৬	মাহবুব	সুইচ	F		মাহবুব
৭	মাহবুব	সুইচ	F		মাহবুব
৮	মাহবুব	চাকর	F		মাহবুব
৯	মাহবুব	সুইচ	F		মাহবুব
১০	মাহবুব	সুইচ	F		মাহবুব
১১	মাহবুব	সুইচ	F	০২৭৫০২০০৬৭	মাহবুব
১২	মাহবুব	সুইচ	F		মাহবুব
১৬	মাহবুব	সুইচ	F	০২৭৫০২০০৬৭	মাহবুব
১৮	মাহবুব	সুইচ	F		মাহবুব
১৯	মাহবুব	সুইচ	F		মাহবুব
২০	মাহবুব	সুইচ	F	০২০২০২০২০	মাহবুব
২১	মাহবুব	সুইচ	F	০২০২০২০২০	মাহবুব
২২	মাহবুব	সুইচ	F	০২০২০২০২০	মাহবুব
২৩	মাহবুব	সুইচ	F	০২০২০২০২০	মাহবুব
২৪	মাহবুব	সুইচ	F	০২০২০২০২০	মাহবুব
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৩০	মাহবুব	সুইচ	F	০২০২০২০২০	মাহবুব
৩১	মাহবুব	সুইচ	F	০২০২০২০২০	মাহবুব
৩২	মাহবুব	সুইচ	F	০২০২০২০২০	মাহবুব
৩৩	মাহবুব	সুইচ	F	০২০২০২০২০	মাহবুব
৩৪	মাহবুব	সুইচ	F	০২০২০২০২০	মাহবুব
৩৫	মাহবুব	সুইচ	F	০২০২০২০২০	মাহবুব

[illegible]

Date: 10/11/2023
Time: 3:30 PM

List of Participants

[illegible]

Date: 10/11/2023
Time: 3:30 PM

List of Participants

Sl. No.	Name	Occupation	M/F	Mobile No	Signature
	ମନି	ମାଧ୍ୟମିକ	M	୦୯୮୦୦୮୨୨୦୨	ସାହୁ
	ମାଧବ	ଟାଣ୍ଡିଆ	M	୦୯୭୭୭୦୫୭୪୪	ସାହୁ
	ସୁଧା	ମାଧ୍ୟମିକ	M	୦୯୮୦୦୮୨୦୪୮	ସାହୁ
	ହରିହରାଣ୍ଡା	ମାଧ୍ୟମିକ	F		ସାହୁ
	ସାହାବୁଦି	ମାଧ୍ୟମିକ	F		ସାହୁ
	ମୁନୀନ୍ଦ୍ର	ମାଧ୍ୟମିକ	F		ସାହୁ
	କଳିନ୍ଦ୍ର	ମାଧ୍ୟମିକ	F		ସାହୁ
	ଉତ୍ତମ	ମାଧ୍ୟମିକ	F		ସାହୁ
	ସୁଜାତା	ମାଧ୍ୟମିକ	F		ସାହୁ
	ମିନା	ମାଧ୍ୟମିକ	M	୦୯୮୦୮୨୪୦୪	ସାହୁ
	ପ୍ରଦୀପ	ମାଧ୍ୟମିକ	M	୦୯୮୦୮୨୪୦୪	ସାହୁ

Annexes

Annex 4.16 :FGD Participants

ROADS AND HIGHWAYS DEPARTMENT
Environmental and Social Management for Jhenaidah-Jashore Road Section (Phase-1) and Bhomra-Satkhira-Navaron Road Section (Phase-3) for Western Economic Corridor and Regional Enhancement (WeCARE) Program

Meeting with P.A.Ps (FGD)

List of Participants

Location: Dagteri, Matwara, Hazrat Shah Jami Masjid Date: 19.12.2023
Venue: Dagteri, Bagachra, Sharsha, Dahanu Time: 10:30 am

Sl. No.	Name of Participant	Male/Female	Occupation	Mobile Number	Signature
1.	আবদুল হকমান	M	কর্মী	01700542705	আবদুল হক
2.	আবদুল হকমান	M	কর্মী	01714266434	হক
3.	নারী বেগম	F	হুস্বা		বেগম
4.	মো. আমজাদ হোসেন	M	কর্মী	01981672472	আমজাদ
5.	মো. হিরাইনামা	M	অ্যা. অ্যা.	01716687793	হিরাইনামা
6.	আমাদ হোসেন	M	কর্মী	01946	আমাদ
7.	আমির হোসেন	M	ইলেক্ট্রিশিয়ান	0121314316	আমির
8.	মো. কবিরুল হোসেন	M	কল্যাণ কৃষক	0167308282	কবিরুল
9.	মো. কবিরুল হোসেন	M	কল্যাণ কৃষক	01923682012	কবিরুল
10.	আবদুল হকমান	M	কর্মী	01725316771	আবদুল হক
11.	সালেহা বেগম	F	হুস্বা	01766781232	সালেহা
12.	মো. হাদিসুল্লাহ	M	কর্মী	01763985532	হাদিসুল্লাহ
13.	মো. হাদিসুল্লাহ	M	কর্মী	0172480176	হাদিসুল্লাহ
14.	আবদুল হকমান	F	Resettlement Specialist	01718010405	আবদুল হক
15.	Exadul Hossain	M	Consultant BCL	01919165256	Exadul
16.	Farid Gromes	M	fr. Consultant	01710548631	Farid
17.	Ayesha Akter	F	Consultant BCL	01670795668	Ayesha
18.					
19.					

ROADS AND HIGHWAYS DEPARTMENT
Environmental and Social Management for Jhenaidah-Jashore Road Section (Phase-1) and Bhomra-Satkhira-Navaron Road Section (Phase-3) for Western Economic Corridor and Regional Enhancement (WeCARE) Program

Meeting with Project affected people (FGD)

List of Participants

Location: Bagachra, Sharsha, Jashore Date: 19.12.2023
Venue: Chhatra Pura, Dahanu Time: 11:30 am

Sl. No.	Name of Participant	Male/Female	Occupation	Mobile Number	Signature
1.	আবদুল হকমান	M	কর্মী	0174530836	আবদুল হক
2.	মো. হাদিসুল্লাহ	M	কর্মী	01983232639	হাদিসুল্লাহ
3.	মো. আমজাদ হোসেন	M	কর্মী	01744417283	আমজাদ
4.	মো. হাদিসুল্লাহ	M	কর্মী	01754712298	হাদিসুল্লাহ
5.	মো. হাদিসুল্লাহ	M	কর্মী	0176777084	হাদিসুল্লাহ
6.	মো. হাদিসুল্লাহ	M	কর্মী	01930580117	হাদিসুল্লাহ
7.	মো. হাদিসুল্লাহ	M	কর্মী	01904699043	হাদিসুল্লাহ
8.	মো. হাদিসুল্লাহ	M	কর্মী	01906811543	হাদিসুল্লাহ
9.	মো. হাদিসুল্লাহ	M	কর্মী		হাদিসুল্লাহ
10.	মো. হাদিসুল্লাহ	M	কর্মী	01724325604	হাদিসুল্লাহ
11.	মো. হাদিসুল্লাহ	M	কর্মী	01756467715	হাদিসুল্লাহ
12.	মো. হাদিসুল্লাহ	M	কর্মী	01933182390	হাদিসুল্লাহ
13.	মো. হাদিসুল্লাহ	M	কর্মী	01	হাদিসুল্লাহ
14.	মো. হাদিসুল্লাহ	M	কর্মী	01718834741	হাদিসুল্লাহ
15.	মো. হাদিসুল্লাহ	M	কর্মী	01931279423	হাদিসুল্লাহ
16.	Ayesha Akter	F	Consultant BCL	01670795668	Ayesha
17.	Mt. Hossainur Rahman	M	Res. Specialist	01712780126	Mt. Hossainur Rahman
18.	Hanina Hossain	F	Resettlement Specialist	01718010405	Hanina Hossain
19.	Exadul Hossain	M	Consultant BCL	01919165256	Exadul

Annex 5: CoC, Checklist of Contractor's/ Subcontractor's/Primary Supplier's and other Forms

Annex 5.1 :Code of Contact (CoC)

1. As part of the Environmental and Social Management Plans (ESMP), the E&S consultant has committed to developing a Code of Conduct on behalf of the Project Executing Agency, RHD. The Code of Conduct for the Environmental and Social Code of Practice (ESCOP) will be prepared by the Contractor (referred to as “the Company” in this document) with support from the based on this guidance and will be implemented during construction activities.
2. The Code of Conduct establishes daily business and ethical behavior guidelines. Each employee shall be informed of this document and bound by it while employed by the Project (including employment by Project partners/subcontractors). The Code of Conduct shall be publicly disclosed and available to local communities in appropriate locations.

Introduction, Purpose, and Scope

3. The purpose of the Code of Conduct of the Bhomra-Satkhira-Navaron Project Road is to guide all employees (including those of sub-contractors) on how the Company expects them to behave in the workplace, and how they should conduct themselves with Project stakeholders (employees, customers, suppliers and members of the public). The purpose and scope of the Code of Conduct will outline the Company management commitments, values and core operating principles. The Code shall make reference to other relevant management plans (e.g., Health and Safety).

Responsibilities and Implementation of The Code of Conduct

- ▶ Describe how the Company will implement the Code and detail the responsibilities of managers and employees.
- ▶ Commitment that the Code will be shared with employees during onboarding and training (i.e., that the Code is not read only once).
- ▶ Include a requirement for all employees to sign an Acknowledgement Form attached to the Code.
- ▶ Commitment to promptly communicate changes/updates to the Code.
- ▶ Commitment to training and continuous improvement.
- ▶ Include a list of other policies and procedures linked to the Code of Conduct.

Violations and Feedback

- ▶ Describe how violations of the Code of Conduct will be handled and provide feedback about them.
- ▶ Commitment for all personnel to prevent violation of the Code, to identify and raise potential issues before they lead to problems, to seek guidance when necessary, and to report circumstances that violate the Code.
- ▶ Describe feedback mechanisms and encourage employees to raise concerns or provide feedback. Develop safe and confidential ways to report misconduct concerns and ensure zero retaliation tolerance.
- ▶ Describes the action that will be taken against those who violate the Code. These may include performance or disciplinary consequences, including termination of employment, and are subject to local laws and regulations. Where an action is also in breach of the law, the employee may be subject to prosecution under civil or criminal law. Include a commitment to value the help of employees who identify possible legal or ethical business misconduct. This will include whistleblowing (i.e., reporting wrongdoing in the public interest, such as a criminal offense, danger posed by an H&S risk, or a miscarriage of justice).

Human Rights and Labor Practices

4. We will protect human rights as defined in the Universal Declaration of Human Rights (UDHR). No person shall be subject to any discrimination in employment, including hiring, compensation, advancement, discipline, termination or retirement, on the basis of gender, race, religion, age, disability, sexual orientation, nationality, political opinion, social group or ethnic origin.
5. We will treat all employees and community members with dignity, respect and justice, taking into consideration their different cultural sensitivities.
6. We will not permit any form of violence, harassment or abuse at the workplace or local community.
7. We will work with public and private security providers to avoid security arrangements that cause or contribute to human rights violations.

Health and Safety

8. The Company will provide a clean, safe, and healthy work environment, taking reasonable measures to maximize the prevention of occupational risk. Measures will be taken to continuously improve Health and Safety (H&S) performance. Violence and threatening behavior are not permitted.

9. All Project partners, consultants, agents, subcontractors, and suppliers will be required to respect and adhere to the Company's H&S requirements.

10. Please include specific rules around H&S practices (e.g., from ESMP/ESCAP), such as:

- ▶ All of us will commit to our roles and responsibilities to ensure a healthy and safe working environment.
- ▶ We will report incidents and accidents. These will be investigated and corrective actions will be taken.

Environment

▶ The Company will conduct work-related activities in an environmentally sound manner, benefiting all Project stakeholders and the environment in which the Project operates and provides service. The Company will adhere to any environmental management plans and programs throughout all activities performed and share any environmental management plans with its employees.

522. Please include a list of key commitments, e.g.

We will not do informal harvesting of plants or plant products (such as fruits and nuts);

- ▶ We will not dispose of solid and liquid wastes of any kind in an unauthorized manner while in transit on company business or while living in Project-provided accommodation of any kind; and
- ▶ We will not deal with artefacts that may be of cultural heritage value.

Fair Dealing / Supplier and Client Relationships

11. The Company will deal responsibly, honestly and fairly with other project stakeholders the customers, suppliers, authorities, competitors and other third parties.

523. Please include specific commitments related to:

- ▶ Bribery and corruption;
- ▶ Conflicts of interest;
- ▶ Fair competition;
- ▶ Confidential information; and
- ▶ Insider trading.

12. The Company will not establish business relationships with companies or individuals that are not in compliance with ethical, H&S, and human rights standards compatible with those adopted by the Company.

Relations with the Communities Neighboring the Project

13. The Company will engage, cooperate and maintain good neighbor relations with local communities.

14. Please include specific commitments, e.g.:

- ▶ Prohibition of illegal substances, weapons and firearms;
- ▶ Prohibition of harassment or abuse (physical or verbal);
- ▶ Prohibition of nuisance and disturbance in or near communities.
- ▶ Respecting the diversity of ethnic or cultural minorities and acknowledging their unique and important interests in lands, waters, and environment as well as their history and traditions; and
- ▶ Maintaining appropriate standards of dress and personal hygiene.

Communication

15. We will communicate with each other in a fair, open, respectful, and responsible manner. This Code of Conduct will be disclosed to all workers at the site in the relevant languages. It will also be shared with the company's subcontractors and partners for them to distribute in their organizations accordingly.

Contact

16. Please provide the contact details of the person responsible for implementing the Code of Conduct.

Acknowledgment & Commitment to the Workforce Code of Conduct

17. I acknowledge that I have received, read and will comply with the Code of Conduct as it may be amended occasionally. I also acknowledge that I will read and comply with all policies and management plans referenced in this Code, as they may be amended from time to time, to the extent that they apply to my employment activities.

First Name	Last Name	Signed	Date DD/MM/YY	Location	Company	Direct Manager

Sample Labor Code of Conduct (CoC) Covering the GBV/SEA/SHA Related Risks

1. The company is committed to ensuring a work environment which minimizes any negative impacts on the local environment, communities, and its workers. The company also strongly commits to creating and maintaining an environment in which Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH) have no place, and where they will not be tolerated by any employee, sub-contractor, supplier, associate, or representative of the company. The purpose of this Code of Conduct is to:

- ▶ Create a common understanding of what constitutes Sexual exploitation and abuse, and sexual harassment
- ▶ Create a shared commitment to standard behaviors and guidelines for company employees to prevent, report, and respond to SEA and SH, and
- ▶ Create understanding that breach of this code of conduct will result in disciplinary action.

2. The Labor Code of Conduct (CoC) covering the GBV/SEA/SHA Related Risks of the project involve during construction work in the project implemented areas which may have the potential risks in four areas:

Sexual Exploitation and Abuse (SEA)

3. Is defined as any actual or attempted abuse of a position of vulnerability, differential power, or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another.

Sexual Abuse

4. The actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions.”

Sexual Harassment

5. Unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature.

Sexual Harassment versus SEA

6. SEA occurs against a beneficiary or member of the community. Sexual harassment occurs between personnel/staff of an organization or company and involves any unwelcome sexual advance or unwanted verbal or physical conduct of a sexual nature. The distinction between the two is important so that agency policies and staff trainings can include specific instruction on the procedures to report each. Consent is the choice behind a person’s voluntary decision to do something. Consent for any sexual activity must be freely given, ok to withdraw, made with as much knowledge as possible, and specific to the situation. If agreement is obtained using threats, lies, coercion, or exploitation of power imbalance, it is not consent.

7. Under this Code of Conduct consent cannot be given by anyone under the age of 18, regardless of the age of majority or age of consent locally. Mistaken belief regarding the age of the child is not a defense.

8. There is no consent when an agreement is obtained through:

- ▶ the use of threats, force or other forms of coercion, abduction, fraud, manipulation, deception, or misrepresentation
- ▶ the use of a threat to withhold a benefit to which the person is already entitled, or
- ▶ a promise is made to the person to provide a benefit.

9. While all forms of violence against a community resident or a co-worker are forbidden, this code of conduct is mainly concerned with the prevention and reporting of sexual exploitation and abuse (SEA) and sexual harassment which constitute gross misconduct, are grounds for termination or other consequences related to employment and employment status:

10. Examples of sexual exploitation and abuse include, but are not limited to:

- ▶ A project worker tells women in the community that he can get them jobs related to the work site (cooking and cleaning) in exchange for sex.
- ▶ A worker that is connecting electricity input to households says that he can connect women headed households to the grid in exchange for sex.

Annexes

- ▶ A project worker gets drunk after being paid and rapes a local woman.
 - ▶ A project worker denies passage of a woman through the site that he is working on unless she performs a sexual favor.
 - ▶ A manager tells a woman applying for a job that he will only hire her if she has sex with him.
 - ▶ A worker begins a friendship with a 17-year-old girl who walks to and from school on the road where project related work is taking place. He gives her rides to school. He tells her that he loves her. They have sex.
11. (2) Examples of sexual harassment in a work context include, but are not limited to:
- ▶ Male staff comment on female staffs' appearances (both positive and negative) and sexual desirability.
 - ▶ When a female staff member complains about comments male staff are making about her appearance, they say she is "asking for it" because of how she dresses.
 - ▶ A male manager touches a female staff members' buttocks when he passes her at work.
 - ▶ A male staff member tells a female staff member he will get her a raise if she sends him naked photographs of herself.
12. Individual signed commitment (to be translated in a language understood by the person signing):
13. I, _____, acknowledge that sexual exploitation and abuse (SEA) and sexual harassment, are prohibited. As an (employee/contractor) of (contracted agency / sub-contracted agency) in (country), I acknowledge that SEA and SH activities on the work site, the work site surroundings, at workers' camps, or the surrounding community constitute a violation of this Code of Conduct. I understand SEA and SH activities are grounds for sanctions, penalties or potential termination of employment. Prosecution of those who commit SEA and SH may be pursued if appropriate.
14. I agree that while working on the project I will:
- ▶ Treat all persons, including children (persons under the age of 18), with respect regardless of sex, race, color, language, religion, political or other opinion, national, ethnic or social origin, gender identity, sexual orientation, property, disability, birth or other status.
 - ▶ Commit to creating an environment which prevents SEA and SH and promotes this code of conduct. In particular, I will seek to support the systems which maintain this environment.
 - ▶ Not participate in SEA and SH as defined by this Code of Conduct and as defined under (country) law (and other local law, where applicable).
 - ▶ Not use language or behavior towards women, children or men that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
 - ▶ Not participate in sexual contact or activity with anyone below the age of 18. Mistaken belief regarding the age of a child is not a defense. Consent from the child is also not a defense. I will not participate in actions intended to build a relationship with a minor that will lead to sexual activity.
 - ▶ Not solicit/engage in sexual favors in exchange for anything as described above.
 - ▶ Unless there is full consent by all parties involved, recognizing that a child is unable to give consent and a child is anyone under the age of 18, I will not have sexual interactions with members of the surrounding communities. This includes relationships involving the withholding or promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex—such sexual activity is considered "non-consensual" under this Code.
15. I commit to:
- ▶ Adhere to the provisions of this code of conduct both on and off the project site.
 - ▶ Attend and actively partake in training courses related to preventing SEA and SH as requested by my employer.
 - ▶ If I am aware of or suspect SEA and SH, at the project site or surrounding community, I understand that I am encouraged to report it to the Grievance Reporting Mechanism (GRM) or to my manager. The safety, consent, and consequences for the person who has suffered the abuse will be part of my consideration when reporting. I understand that I will be expected to maintain confidentiality on any matters related to the incident to protect the privacy and security of all those involved.
 - ▶ Sanctions: I understand that if I breach this Individual Code of Conduct, my employer will take disciplinary action which could include:
 - ▶ Informal warning or formal warning
 - ▶ Additional training
 - ▶ Loss of salary
 - ▶ Suspension of employment (with or without payment of salary)
 - ▶ Termination of employment

► Report to the police or other authorities as warranted

16. I understand that it is my responsibility to adhere to this code of conduct. That I will avoid actions or behaviors that could be construed as SEA and SH. Any such actions will be a breach this Individual Code of Conduct. I acknowledge that I have read the Individual Code of Conduct, do agree to comply with the standards contained in this document, and understand my roles and responsibilities to prevent and potentially report SEA and SHA issues. I understand that any action inconsistent with this Individual Code of Conduct or failure to act mandated by this Individual Code of Conduct may result in disciplinary action and may affect my ongoing employment.

Signature: _____

Printed Name: _____

Title: _____

Date: _____

N.B.: Project Grievance Mechanism to address SEA/SH Allegations 18 (this model will be further tailored to the project needs)

17. Operating Procedures and Response Protocol for SEA/SH Allegations

Uptake the Case	•Review the case through reporting channels (need to decide on them). •Need to ensure confidentiality of the case and handle it with respect and care.
Sorts and Process	•Register the case. •Document only the following information: •The nature of the allegation; •if, to the best of the survivor's knowledge, the perpetrator is associated with the project; •the age of the survivors; •information about whether the survivor is referred to services.
Acknowledge and Follow Up	Refer to relevant GBV service providers Consent of survivors must be documented; It is up to the survivors whether to take up the proposed referral.
Verify and Instigate the Act	Provide support services to survivors. Determine the likelihood that allegation is project related. Implement sanctions to perpetrator, if needed.
Monitor and Evaluation	DPM compiles data about reported project related allegations while making sure the confidentiality. PM issues monthly report to IPU with detail data such as allegation, alleged perpetrators.
Provide Feedback	•Respond to survivor •Allegation recipient needs to provide ongoing feedback to the survivor throughout the process; •Investigation's conclusions are communicated to the offender, particularly when sanctions will be taken by the survivors

Annexes

Annex 5.2 : Checklist of Contractor's/ Subcontractor's/Primary Supplier's Employees/Workers Profile

CHECKLIST OF CONTRACTOR'S/SUBCONTRACTOR'S/PRIMARY SUPPLIER'S EMPLOYEES/WORKERS PROFILE													
Name of Contractor:											Code:		
Date of Submission:											Issued date:		
*Note: Please tick as “√” if the document is provided and check “X” if the document is NOT provided											Version:		
No.	Name of Employee	Position	Gender	Date of Birth	Date Hired	Nationality	If personnel have been hired locally	Copy of labor contract	Copy of Identity Card	Copy of Health Certificate	Copy of Insurance Certificate	Copy of relevant Health and Safety (H&S) Training Certificate (Please specify what kind of H&S training certificates are provided)	
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													

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Annex 5.3 :Investigation Form

INVESTIGATION FORM		Code: Issued date: Version:		
Date of investigation				
Reference Number				
Employee Full Name (who causes the damage)				
Damage Investigation and consultation	Description of Damage			
	Employee Opinion			
	Proposed Resolution			
Statement to accept the resolution and close out the case	The investigation and consultation undertaken involved the employee, other affected people, and relevant parties. The following resolution is proposed: This record is made with the related parties to demonstrate investigation and consultation have been undertaken. And that the employee has agreed with the resolution stated above.			
Signature				
Agreed	Acknowledged	Acknowledged	Acknowledged	Others
(Employee)	(Investigation team)	(Related Unit/ Department)	(Related External Parties)	(Name)

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Annex 5.4 :Employees' Information

No.	Full Name	Gender	Date of Birth	Nationality	Address	Identity Card (NID) Number	Qualification	Job Title	Labor Contract			Date of Hiring	Gross Salary	Number of annual leave	Occupational Health and Disease	Remarks
									Type	Starting Date	Termination Date					

Annex 5.5 :Contractor Subcontractor/Supplier Management Audit Checklist

CONTRACTOR/SUBCONTRACTOR/SUPPLIER MANAGEMENT AUDIT CHECKLIST																
	Name of Contractor: Date of Audit: Auditor:											Code: Issued date: Version:				
No.	Findings											Compliance (Yes/No)	Description			
1.	Are employees provided with the term of the labor contract in compliance with the legal requirement? Note: In-defined term-labor contract shall be provided after two (02) defined term-labor contracts.															
2.	Are employees provided with a copy of the labor contract in a language the employee understands?															
3.	Do/does the contractor and its subcontractors/supplier maintain sufficient employee profiles, including a copy of the aging document?															
4.	Do/does the contractor and its subcontractors/supplier's practices on child labor are in line with the Projects' Labor-Management Plan and Applicable Standards?															
5.	Do/do the contractor and its subcontractors/supplier's practices on prison labor or slave labor are in line with the Projects' Labor-Management Plan and Applicable Standards?															
6.	Do/does the contractor and its subcontractors/supplier's practices on human trafficking are in line with the Projects' Labor-Management Plan and Applicable Standards?															
7.	Do/do the contractor and its subcontractors/supplier not retain original documents of employees?															
8.	Do employees not pay a deposit during the recruitment process?															
9.	Do/do the contractor and its subcontractors/supplier not withhold any part of the worker's salary, benefits, properties, or documents?															
10.	Do employees have the right to leave the workplace premises after completing the standard working hours?															
11.	Do employees free to terminate their employment that they inform the contractor promptly in line with legal requirements?															
12.	Do/dose the contractor and its subcontractors/supplier's practices on non-discrimination are in line with the Projects' Labor-Management Plan and Applicable Standards?															
13.	Do/does the contractor and its subcontractors/supplier's practices on gender equity are in line with the Projects' Labor-Management Plan and Applicable Standards?															
14.	Do/does the contractor and its subcontractors/supplier provide employees with equal opportunities?															

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15.	Do/does the contractor and its subcontractors/supplier's practices on harassment and abuse are in line with the Projects' Labor-Management Plan and Applicable Standards?		
16.	Do/does the contractor and its subcontractors/supplier's practices on freedom of association and workers' organization are in line with the Projects' Labor-Management Plan and Applicable Standards		
17.	Do employees free to join their union or workers' organization?		
18.	Are employees paid at least meet the regional minimum wage?		
19.	Are employees provided with sufficient compulsory benefits? Confirm insurance coverage of all employees/workers.		
20.	Are employees paid on time?		
21.	Is overtime payment sufficient?		
22.	Does the contractor maintain adequate timesheets and payrolls for the past 05 years?		
23.	Are employees' working hours recorded sufficiently?		
24.	Are employees provided with an adequate break?		
25.	Are employees' overtime hours in compliance with the legal requirement? Note: Not excess 4 hours/day, 40 hours/month, 300 hours/ year.		
26.	Are employees provided with adequate monthly rest days? (at least 4 days/month)		
27.	Do/does the contractor and its subcontractors/supplier develop a worker grievance mechanism in line with the Projects' Labor-Management Plan and Applicable Standards		
28.	Do/does the contractor and its subcontractors/supplier record all employees' grievances adequately?		
29.	Are all employees' grievances resolved promptly?		
30.	Are all labor-related incidents/issues (including employee relations and occupational health and safety) resolved?		
31.	Do the termination practices of the contractor and its subcontractors/supplier follow the legal requirement and the Project's Applicable Standards?		
32.	Have/has the contractor and its subcontractors/supplier not been involved in retrenchment practices during the past 05 years? If yes, does the contractor follow legal requirements and the Project's Labor-Management Plan and Applicable Standards of doing retrenchment?		
33.	Do/does the contractor and its subcontractors/supplier use safety equipment to separate around project sites to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odors, or other emissions?		
34.	Do/does the contractor and its subcontractors/supplier apply locally regulated or internationally recognized building codes to ensure structures are constructed following sound architectural and engineering practice, including aspects of fire prevention and response?		
35.	Are the contractor and its subcontractors/supplier's engineers and architects responsible for constructing facilities, buildings, plants, and other structures certified for the applicability and appropriateness of the structural criteria employed		
36.	Do/does the contractor and its subcontractors/supplier use hazardous material? If yes, does the contractor they're a procedure for handling hazardous material properly?		
37.	Do/does the contractor and its subcontractors/supplier have a pre-employment screening process to check the health of workers before recruiting?		
38.	Do the contractor and its subcontractors use a worker's camp? If yes, do the contractor develop and implement a worker's camp management procedure in place?		
39.	Do/does the contractor and its subcontractors/supplier prepare an EPRP corresponding to their risks and impacts and in line with the Projects' EPRP and Applicable Standards? Is the EPRP's drill conducted promptly?		

Annex 5.6 :Subcontractor's/ Primary Supplier's Monthly Performance Report

SUBCONTRACTOR'S/PRIMARY SUPPLIER'S MONTHLY PERFORMANCE REPORT		
(Construction Phase)		
Name of Contractor/Primary Supplier:		Code:
Date of Submission:		Issued date:
		Version:
Prepared by:	Position:	
Approved by:	Position:	
CONTRACTOR'S/PRIMARY SUPPLIER'S LABOR AND WORKING CONDITION PERFORMANCE		
The number of workers working on the Projects in the reported period:	Total:	
	No. of male:	No. of female:
The number of workers working on the Projects in the reported period is local people:	Total:	
	No. of male:	No. of female:
The number of workers working on the Projects in the reported period is members of ethnic minority groups:	Total:	
	Name of ethnic minority group 1:	
	No. of male:	No. of female:
	Name of ethnic minority group 2:	
	No. of male:	No. of female:
	(Please add more rows when needed)	
The number of workers working on the Projects who have conducted health check-ups in the reported period:	Total:	
	No. of male:	No. of female:
The number of workers working on the Projects who have been vaccinated against diseases:	Total:	
	No. of male:	No. of female:
Type of diseases that workers have been vaccinated for:		
The number of workers working on the Projects in the reported period who are under 18 years old:	Total:	
	No. of male:	No. of female:
The number of workers working for the Projects in the reported period is members of Trade Union/Workers' Organization:	Total:	
	No. of male:	No. of female:
The number of workers working for the Projects in the reported period who have signed labor contracts:	Total:	
	No. of male:	No. of female:
The number of workers working for the Projects in the reported period is under probation period:	Total:	
	No. of male:	No. of female:
The number of workers working on the Projects in the reported period has been provided with compulsory insurance:	No. of workers provided with Social, Health, and Unemployed Insurance:	
	No. of workers provided with Accident Insurance:	
The number of workers working for the Projects in the reported period working excess legal monthly overtime hours and what department:	Total:	
	No. of male:	No. of female:
The number of workers working for the Projects in the reported period is paid under the regional minimum wage:	Total:	
	No. of male:	No. of female:
The number of grievances in the reported period:	The total number of grievances: Number of resolved grievances: Number of pending grievances:	
The number of workers working for the Projects provided with accommodation:	Total:	
	No. of male:	No. of female:
The number of security guards working for the Projects:	Total:	
	Please specify the location of monitoring:	
Hazardous material being used for the Projects:	Please specify the name of hazardous material, and location of use (which area) and provide a full safety data sheet in both English and the local language.	

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What kind of disease was identified related to the contractor's operation concerning the Projects? Please list all activities taken by the contractor during the reporting period to prevent disease exposure to the community.	
Date and type of emergency drills taken. Please attach drill minutes and photo evidence.	
CORRECTIVE ACTIONS TAKEN AND TIMELINE	

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Annex 5.7 :Internal Labor and Working Conditions Management Audit Checklist

INTERNAL LABOR AND WORKING CONDITIONS MANAGEMENT AUDIT CHECKLIST			
Name of the Projects:		Code:	
Date of Audit:		Issued date:	
Auditor:		Version:	
No.	Findings	Compliance (Yes/No)	Description
1	Do the Projects have an updated ILR approved by the local authority?		
2	Do the Projects have an updated wage scale approved by the local authority?		
3	Do the Projects have valid C&B Procedures in compliance with the legal requirements?		
4	Do the Projects have valid R&T Procedures in compliance with the legal requirement?		
5	Do the Projects have valid CBA in compliance with the legal requirement?		
6	Are employees provided with the term of the labor contract in compliance with legal requirements? Note: In-defined term-labor contract shall be provided after two (02) defined term-labor contracts.		
7	Are employees provided with a copy of the labor contract?		
8	Do the Projects maintain sufficient employee profiles, including a copy of the aging document?		
9	Do the Projects not employ child labor?		
10	Do the Projects not employ prison labor or slave labor?		
11	Do the Projects not involve human trafficking?		
12	Do the Projects not retain the original document of employees?		
13	Do employees not pay a deposit during the recruitment process?		
14	Do the Projects do not withhold any part of the worker's salary, benefits, properties, or documents?		
15	Do employees have the right to leave the workplace premises after completing the standard working hours?		
16	Are employees free to terminate their employment that they inform VAPCO promptly in line with legal requirements?		
17	Do the Projects recruit employees with no discrimination?		
18	Do the Projects provide employees with equal opportunities?		
19	Do the Projects free from harassment and abuse?		
20	Do employees free to join their union or workers' organizations?		
21	Are employees paid at least the legal minimum wage?		
22	Are employees provided with sufficient compulsory benefits?		
23	Are employees paid on time?		
24	Is overtime payment sufficient?		
25	Do the Projects maintain adequate timesheets and payrolls for the past 05 years?		
26	Are employees' working hours recorded sufficiently?		
27	Are employees provided with adequate breaks?		
28	Are employees' overtime hours in compliance with the legal requirement? Note: Not more than 4 hours/day, 40 hours/month, 300 hours/ year.		
29	Are employees provided with adequate monthly rest days? (at least 4 days/month)		
30	Do the Projects monitor their contractor in terms of labor and working condition management and maintain the records?		
31	How many percentages of female employees work for the contractor/ subcontractors?		

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INTERNAL LABOR AND WORKING CONDITIONS MANAGEMENT AUDIT CHECKLIST								
32	How many percentages of local people work for the contractor/ subcontractors? In which, how many percentages of female employees?							
33	How many percentages of members of ethnic minority working for the contractor/ subcontractors? In which, how many percentages of female employees?							
34	Are all labor-related incidents/issues (including employee relations and occupational health and safety) resolved?							

Annex 5.8 :Template of Corrective Actions Implementation Status Report

CORRECTIVE ACTIONS IMPLEMENTATION STATUS REPORT								
Name of the Projects/Contractor/Subcontractor/Primary Suppliers: Date of Audit:							Code:	
Auditor name:							Issued date:	
							Version:	
No.	Audit/Assessment	Identified Issue	Root causes	Corrective Actions				Status (In process/ Closed)
				Action	Person In-charge	Starting Date	Completion Date	

Annex 5.9 :Template of Corrective Actions Implementation Status Report

CORRECTIVE ACTIONS IMPLEMENTATION STATUS REPORT								
Name of the Projects/Contractor/Subcontractor/Primary Suppliers: Date of Audit:							Code:	
Auditor name:							Issued date:	
							Version:	
No.	Audit/Assessment	Identified Issue	Root causes	Corrective Actions				Status (In process/ Closed)
				Action	Person In-charge	Starting Date	Completion Date	

Annex 5.10 :Incident Reporting as per Bangladesh Labor Rule 2015

The Bangladesh Labour Act (BLA) 2006 and Bangladesh Labour Rules (BLR) 2015 outline specific procedures for incident notification to relevant government agencies in case of accidents or occupational diseases.

Steps Involved in Incident Notification:

1. Immediate Action:

- o First Aid: Administer first aid to injured persons.
- o Secure the Area: Isolate the accident site to prevent further incidents.
- o Inform Relevant Authorities: Notify the factory manager, safety officer, and other designated personnel.

2. Initial Investigation:

- o Gather Information: Collect details about the incident, including date, time, location, and cause.
- o Record Statements: Interview witnesses to gather their accounts.
- o Document Evidence: Take photographs and collect physical evidence.

3. Notification to Government Agencies:

- o Within 24 Hours: Notify the Inspector General of Factories and Establishments (IGFE) or the designated authority within 24 hours of the incident.
- o Mode of Notification:

§ Written Notification: Submit a formal written report to the relevant authority.

§ Online Portal: Use the government's online portal for incident reporting, if available.

§ Phone Call: Make an initial phone call to inform the authority.

4. Detailed Report:

- o Within 7 Days: Submit a detailed written report to the IGFE or designated authority within 7 days of the incident.

o Report Contents:

§ Date, time, and location of the incident

§ Nature of the incident (accident or occupational disease)

§ Number of persons injured or affected

§ Details of injuries or illnesses

§ Cause of the incident

§ Actions taken to prevent similar incidents

§ Any other relevant information

5. Cooperation with Investigations:

- o Provide Information: Cooperate with the investigating authorities and provide all necessary information.
- o Facilitate Inspections: Allow inspectors to access the workplace and conduct investigations.
- o Implement Corrective Actions: Take immediate corrective actions to address the root causes of the incident.

By following these steps and adhering to the guidelines outlined in the BLA-2006 and BLR-2015, organizations can ensure timely and effective incident notification, which can help prevent future accidents and protect the well-being of workers.

Under section 90A of the Bangladesh Labour Act (BLA) 2006 mandates the formation and functioning of a safety committee in every factory where 50 or more workers are employed.

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Key Points about Safety Committee Formation and Functioning are given below:

Mandatory for Factories with 50+ Workers: The law specifically requires factories with 50 or more workers to establish a safety committee.

Composition: The committee should consist of representatives from both management and workers. The exact composition and number of members can be determined based on the size of the factory and the nature of work.

Responsibilities: The safety committee is responsible for:

- o Identifying potential hazards and risks in the workplace
- o Recommending preventive measures and safety practices
- o Conducting regular safety inspections
- o Investigating accidents and incidents
- o Promoting safety awareness among workers
- o Collaborating with the management to implement safety measures
- **Meetings:** The committee should hold regular meetings to discuss safety issues and take necessary actions.
- **Training:** Members of the safety committee may need to undergo training to enhance their knowledge and skills in occupational safety and health.

Annex 6: Emergency Responses

Annex 6.1 :Emergency Contact Numbers

Incident Command Center (ICC)			
Name	Designation	Designation in ICC (Incident Command Center)	Contact No.

Site Emergency Response Team SERT (First Aid Team)			
Name	Designation	Department	Contact Number

Ambulance Contact Number	

Site Emergency Response Team SERT (Fire Fighting and Rescue Team)			
Sl. No.	Name	Designation	Fire Control Room Number.
			0130-7773525; 30156

Annex 6.2 :Emergency Scenario

1. Hazardous materials that are generally used at construction project as below:

- ▶ LPG gas cylinders
- ▶ Paints
- ▶ Solvents
- ▶ Petroleum products, including:
 - Fuel
 - Oil
 - Grease
- ▶ Curing compounds
- ▶ Soil stabilizers and binders
- ▶ Plaster
- ▶ Asphalt components and concrete components
- ▶ Pesticides and herbicides.

2. Storage: The site has stored some diesel for construction purposes. Repeated or prolonged contact with diesel may result in defatting, inflammation, and possible secondary infection. This is a potential carcinogenic agent and triggers slip-trip hazards as well.

Identification of Potential Sources of Spills

3. The hazard management process requires the identification of reasonably foreseeable hazards. A risk assessment must be completed once a potential chemical spill hazard has been identified. This risk assessment is intended to identify risk control measures to reduce the risk and harm to people and the environment.

4. The Site EHS Manager shall primarily identify specific areas on the worksite that could potentially cause spill-related incidents during construction and commissioning operations.

5. Below are the identified areas that need to be focused because of high hazards:

- ▶ Area
 - Fuel Storage
 - Oil Storage
- ▶ Hazardous Material and Waste Accumulation
- ▶ Fuel Delivery and Handling
- ▶ Electrical Switch Yard and Transformer
- ▶ Equipment
 - Crane, Excavator, Rig Machine
 - Grease at equipment's
 - Other Mobile Equipment or Plant

6. The utmost potential for hazardous material spills will be at tanks/containers' storage, loading/unloading areas, and spills from plant and equipment (e.g., hydraulic leaks, and liquid fuel spills).

Gas Leakage / Fire Scenarios

7. For the construction sites the following Gas leakage/fire scenarios are anticipated:

LPG Gas Leakage from Cylinder and Fire

- ▶ The site has storage of approximately 9-10 numbers LPG cylinders at the construction site for hot work.
- ▶ Any LPG cylinder that develops a leak should be promptly removed to an isolated open place away from any source of ignition;
- ▶ Area Supervisors will inform the fire station on the phone.
- ▶ The firefighting crew will reach the incident site as per the Area Supervisor's guidance.
- ▶ Cylinder with valve leakage needs must be capped immediately and tagged by mentioning the defect;
- ▶ In case of leak from the LPG pipe, the cylinder regulator knob/ valve needs to be close;
- ▶ Do not try to repair the appliance or any part of the system when pipe line or appliance in use;
- ▶ Use adequate PPEs;
- ▶ Do not use naked lights to detect the leak;
- ▶ In case of heavy Leak, stop all ignition sources in the vicinity and evacuate all the people to a safe area.
- ▶ In case of outbreak of fire, trigger the firefighting procedures as specified in section 6.1 of this manual.
- ▶ Call first aid team and get medical attention as quickly as possible. In case of any accident such as burn and

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asphyxiation send the affected people to the OHC and hospital.

► Medical Emergency

8. The site has identified the sudden onset of a medical condition manifesting itself by acute symptoms of sufficient severity including severe pain as medical emergency scenario. The following medical emergencies as identified by the site, resulting from:

- Major injuries caused by traffic accident caused by on-site vehicular movement.
- Fall from height.
- Burn injury from electrocution, fire, exposure to hot steam and lightening.
- Exposure to gas and other chemical.
- Apart from the above-mentioned medical emergencies, the site has also identified following health crisis:
- Difficulty and shortness of breathing.
- Fainting.
- Chest pain or and high/ fluctuation in blood pressure.
- Uncontrolled bleeding after injury.
- Sudden severe pain.
- Anthropogenic Emergency Sources
- The following emergencies have been identified under this section:
- Terrorist attack.
- Workers and local community agitation;
- Malicious act such as theft and vandalism.
- Natural Calamities

9. The following emergencies have been identified under this section:

- Earthquake: Earthquakes are unpredictable natural disasters of short duration, but their consequences can be severe. The information available in the public domain and research publications indicates that the Jashore district falls under the seismic zone II, which indicates that this district falls under the 'Low Damage Risk Zone'.

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Annex 6.3 :The Emergency Contact Numbers for External Agencies

Emergency Telephone Numbers:	
Police Contact Number	
Police Helpline	999
Police Headquarter (Operation control Room)	01769-690033
Police control Room Jashore	0421-65031 01320-144098
Superintendent of Police, Jashore (SP)	0421-68622, 0421-66713, 0421-73004, 01320-143100
Addl. SP (Crime & Ops)	0421-66139; 01320-143104
RAB	
Fire Service	
Fire Service Head Quarter	02-223355555, 02-95555555, 9556666-7, 01713-038181
Jashore Fire Station	0421-65114
Hospital Contact Number	
Jashore 250 bed General Hospital	042161090, 01730324795
Jashore Medical College Hospital	01714812092

Annex 6.4 :List of Emergency Equipment

Sl. No.	Equipment Name	Unit	Total
List of Equipment for Fire Emergency			
	Fully Equipped Water Fire Truck	Set	10
	Fully Equipped Foam Fire Truck	Set	08
	Torch Light	PCS	04
	Lock Cutter	PCS	03
	Fire Hydrant	Liter	41
	Fire Bitter	Liter	12
	Fire Blanket	NOS	12
	Fire Hook	Liter	12
	Fire Bucket	PCS	24
	Fire Drum	PCS	6
	DCP Fire Extinguisher	Liter	498
	Co2 Fire Extinguisher	Liter	68
	Foam Fire Extinguisher	Liter	18
	Fixed Fire Foam (Tank Farm Area)	Liter	01 ()
	Riser Point	NOS	73
	Fire Hose	NOS	185
	Hose Box	NOS	140
	Fire Water Pump	Set	2
Medical Aid			
	Ambulance	NOS	4
	First Aid Box	PCS	25
Safety Device & Equipment's			
	Life Jacket	PCS	20
	Life Buoy	PCS	8
	Multi Gas Detector (O2, LEL, H2S, CO)	NOS	03
	Single Gas Detector (VOC)	NOS	03
	Single Gas Detector (Cl2)	NOS	02

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Annex 7: Traffic Management Plan, Road Plantation and others

Annex 7.1 : Guidelines for Developing Construction Phase Traffic Management Plan

The road construction activities require construction zones to be created at site for undertaking various activities such as movement of construction vehicles/equipment and workers. During the construction phase due to such construction zones are the source of nuisance to normal traffic without proper traffic management plan. The traffic management plan will ensure not only smooth flow of construction activities on the road but also provide conflict free environment with the normal traffic or pedestrian movement. Thus, contractor must prepare and get approved, from CSC, a traffic management plan before commencement of the work or creating construction zones and contractor must plan activities in advance.

While preparing traffic management for carrying out the construction work the following shall be kept in mind that good signage WARNS, INFORMS and DIRECTS the traffic or road user. Thus, the contractor shall adopt the following good practices⁵³ while demarcating the construction zones.

Plan: It is the responsibility to sign construction works safely, so plan what signs and cones are needed for carrying out the work. Get Police advice in difficult or dangerous situations.

Be seen: All persons working on or near the road must wear brightly-colored clothing, preferably an orange or yellow waistcoat

Face the traffic when setting out signs - Put the Road Works Ahead warning sign out first and then move towards the works site, and always try and face the traffic when set out the signs and cones.

Check the signs carefully - Check it before “Will someone coming along the road in either direction understand exactly what is happening and what is expected of them?” As the works proceed, alter the signing so that it is always consistent with the work that is going on.

Fix the signs properly - In most cases it will be best to fix the signs on upright poles set in heavy, concrete block bases. This will help prevent theft and stops the signs from being blown over or dislodged by moving traffic. If the works are to last more than a few weeks fix the sign poles into proper concrete foundations. Check the signs regularly to see if they are all still in place and clean them if they get dirty.

Ensure the signs are visible at night - Use reflective signs and cones, and preferably supplement them with flashing lights.

Remove unnecessary signs - Never leave signs on the road once they are no longer needed. , It will help prevent any nuisance/annoyance to/among the road users.

Keep the site tidy - Take up as little road space as possible, and store construction materials and equipment off the road if you can. When you have finished make sure that the road surface has been properly reinstated and that there are no dangerous holes or trenches. Clean away any mud or gravel.

Always use the standard signs as recommended in Bangladesh Road Sign Manual and do not design your own

During the rainy season water stagnates water in different section of the road and pavement badly damage and cause of traffic congestion on the road, this time special care to be taken by the contractor.

In the festivals traffic volume increases on the road and causes congestion in different intersection and urban area. The contractor will take special measure for traffic and co-ordinate with the local authority of Roads and Highways and Local Thana Police.

Necessary equipment, manpower (flagman), sign, etc. will be deployed by 24 x 7 hours at site.

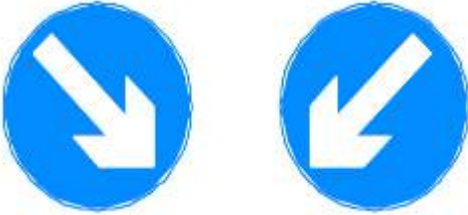
The related cost will be included under the pay item 1/1/1a Protection of Traffic & Traffic Management during construction phase

The signs, not limited to the following shall be used to define the work zones or construction sites, etc.

List of Minimum/basic Signs required at construction Site ⁵³	
Pictorial View of Sign	Description about the Sign
	The Road Works Ahead sign is the first sign to be seen by the driver, so place it well before the work site - about 45 meters in town and 90 meters on rural roads - but on a high-speed National Highway it should be at least 150 meters away. Put the sign where it can be seen from a distance. For example, if the works are just after a bend in the road, put the sign before the bend. This sign has a black symbol on a white background, all within a red triangle.
	The Road Narrows Ahead sign warns drivers which side of the road is obstructed. Place it midway between the Road Works Ahead sign and the works site. Make sure you use the appropriate sign on each approach to the obstruction. This sign has a black symbol on a white background within red triangle

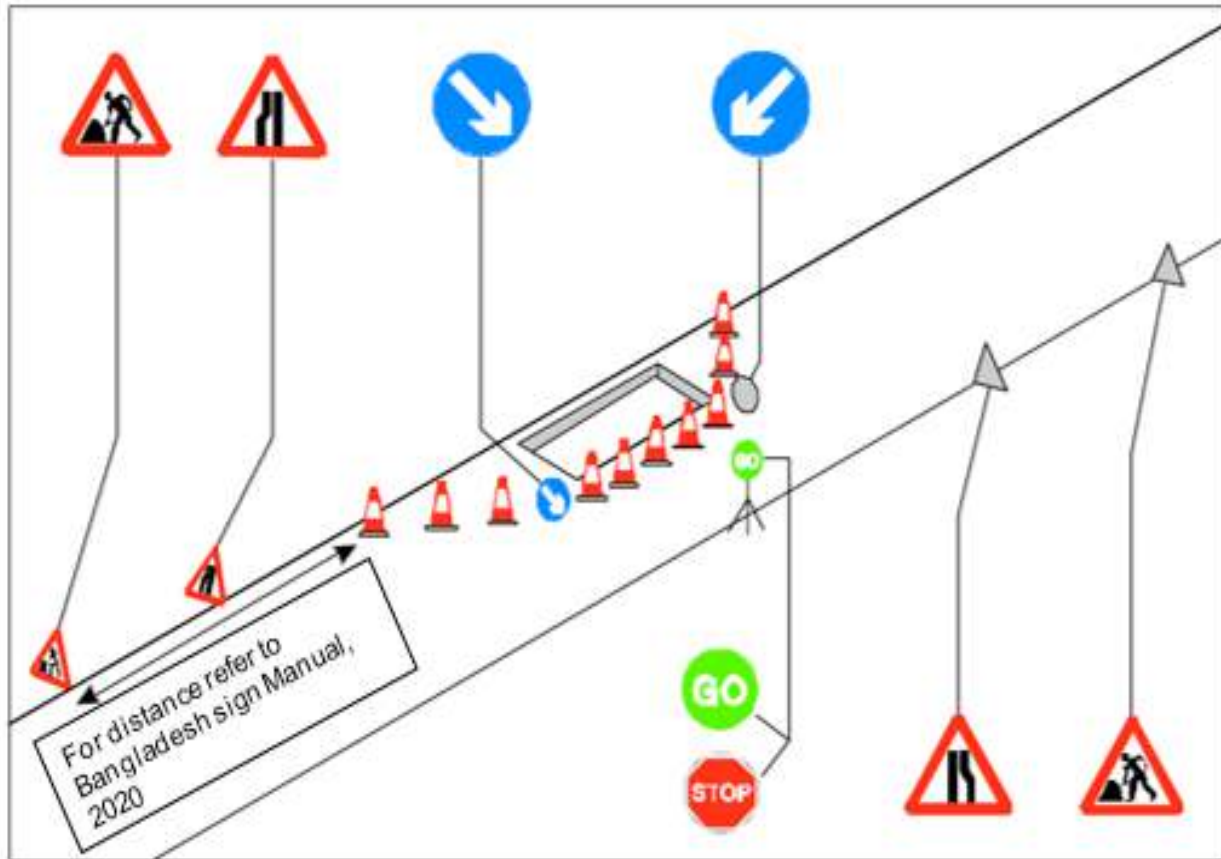
⁵³ Bangladesh Road Sign Manual, Bangladesh Road Transport Authority Ministry of Communication, March 2020

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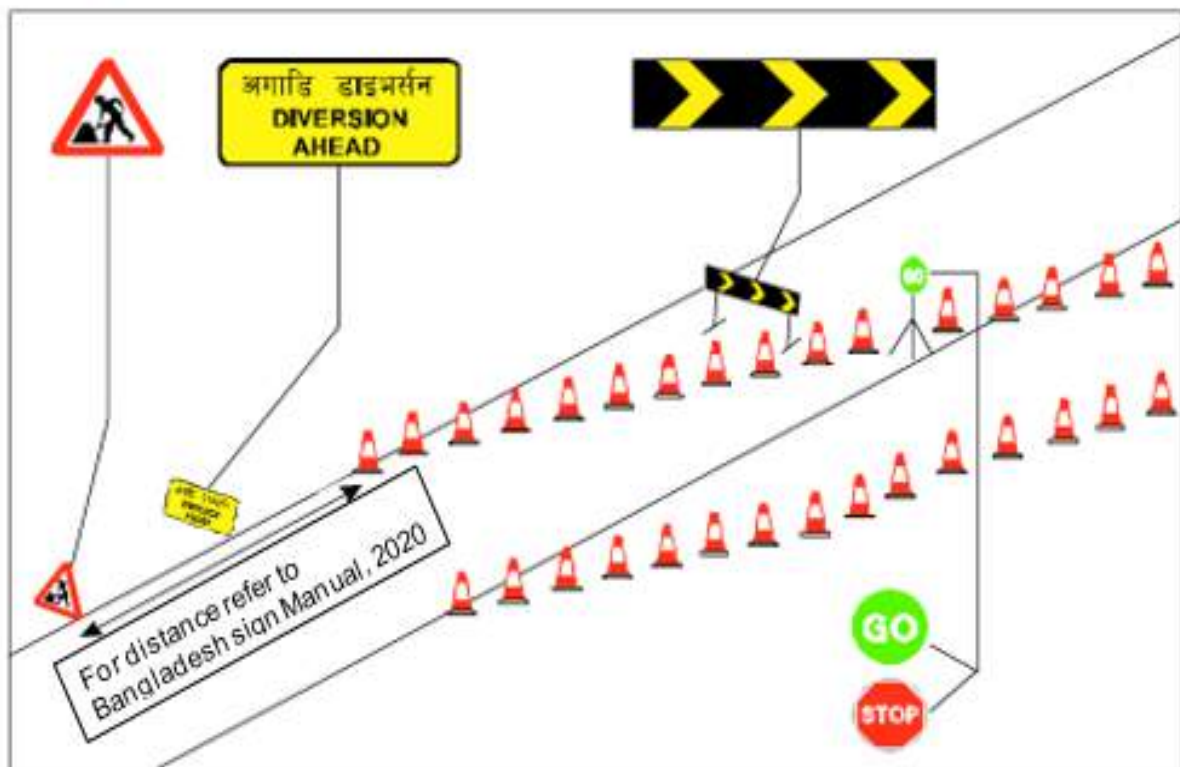
List of Minimum/basic Signs required at construction Site53	
Pictorial View of Sign	Description about the Sign
	Place Keep Left or, if appropriate, Keep Right, signs at the beginning and end of the works - at the point where the works extend furthest into the road. This sign has a white arrow on a light blue background.
	Place a line of Traffic Cones to guide pedestrian and vehicle traffic past the works. Leave some working space between the line of cones and the actual excavation or works area. Traffic cones should be red, and, if used at night, should preferably have white reflective sleeves. Where theft is likely to be a problem oil drums painted red and white may be used instead.
	Where there is a lot of traffic or the works site is very long, you will need to control traffic manually using these STOP /GO boards. If the obstruction is less than 30 meters long and is on a straight section of road you will only need a single board operating at one end or in the middle. Do not use flags, as these can be confusing, and make sure that the boards are operated by a responsible adult. Provide training if necessary.
Notes: Sign plates should normally be 750mm in diameter (750mm high triangle). On low-speed (40km/h or less) single carriageway roads 600mm high signs will normally be adequate. Safety jackets and helmets should be provided to all the workers/ Engineers working on the road. Fixed mobile solid barricades must be placed between the workmen and traffic or pedestrian and traffic.	

The contractor must design the traffic management plan as per the construction activities that are planned to be taken up considering the requirement of traffic sign manual of Bangladesh Road Transport Authority, Ministry of Communication. Similarly typical basic layout for two road operations is presented in the figures as follows:

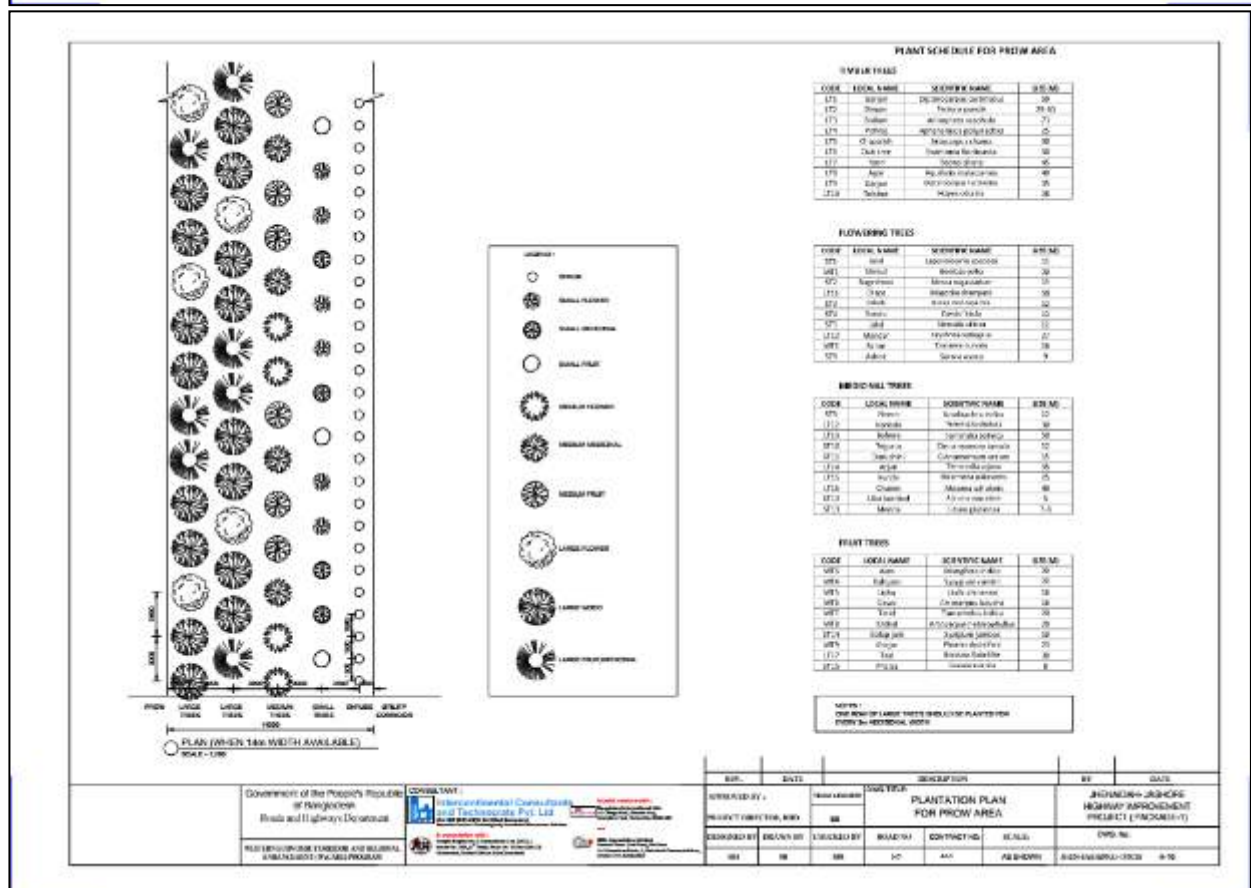
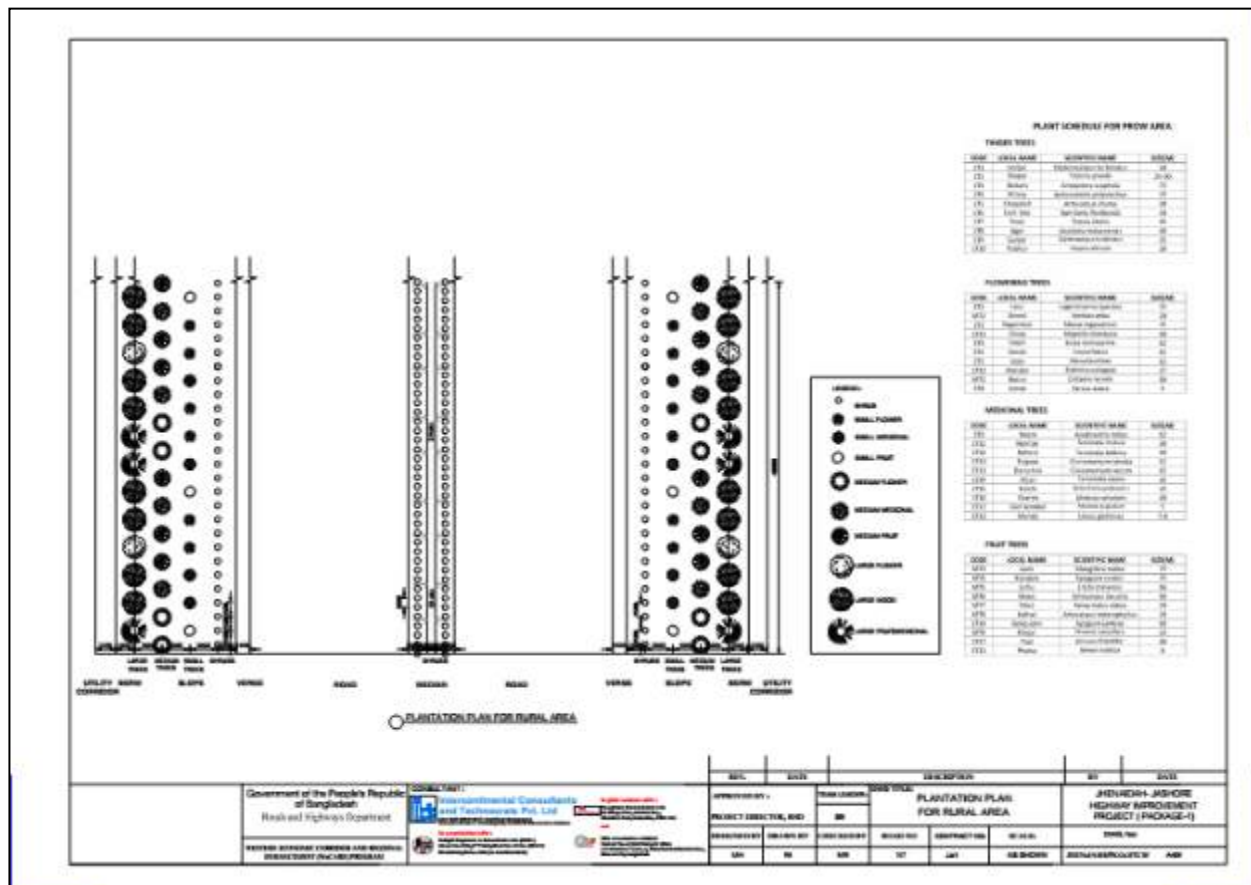
Basic layout

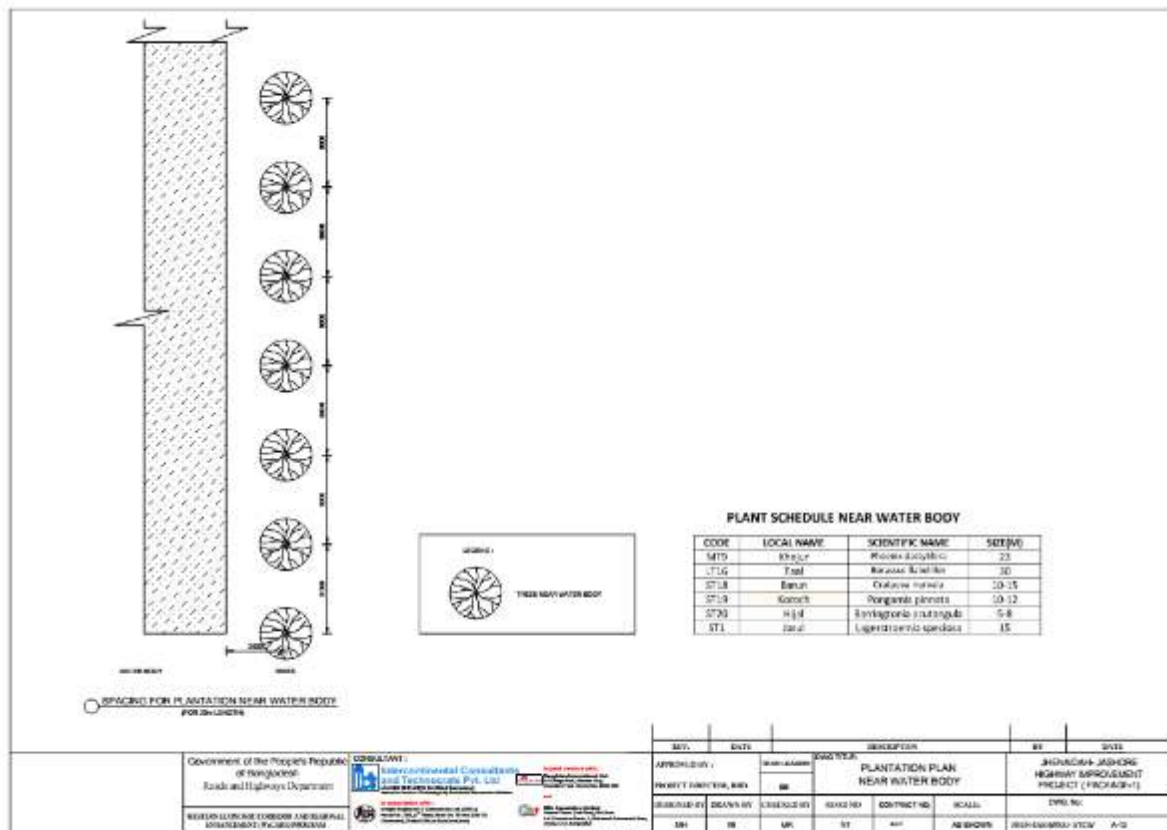


Road diversion

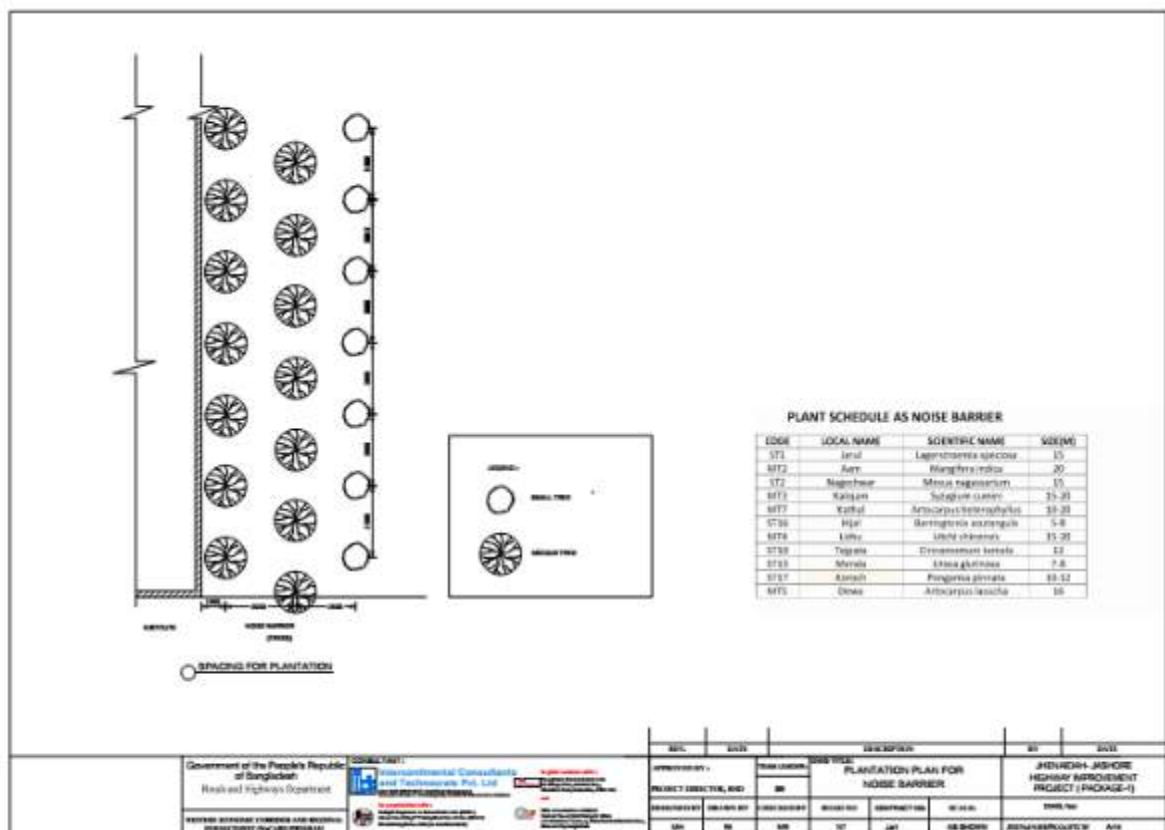
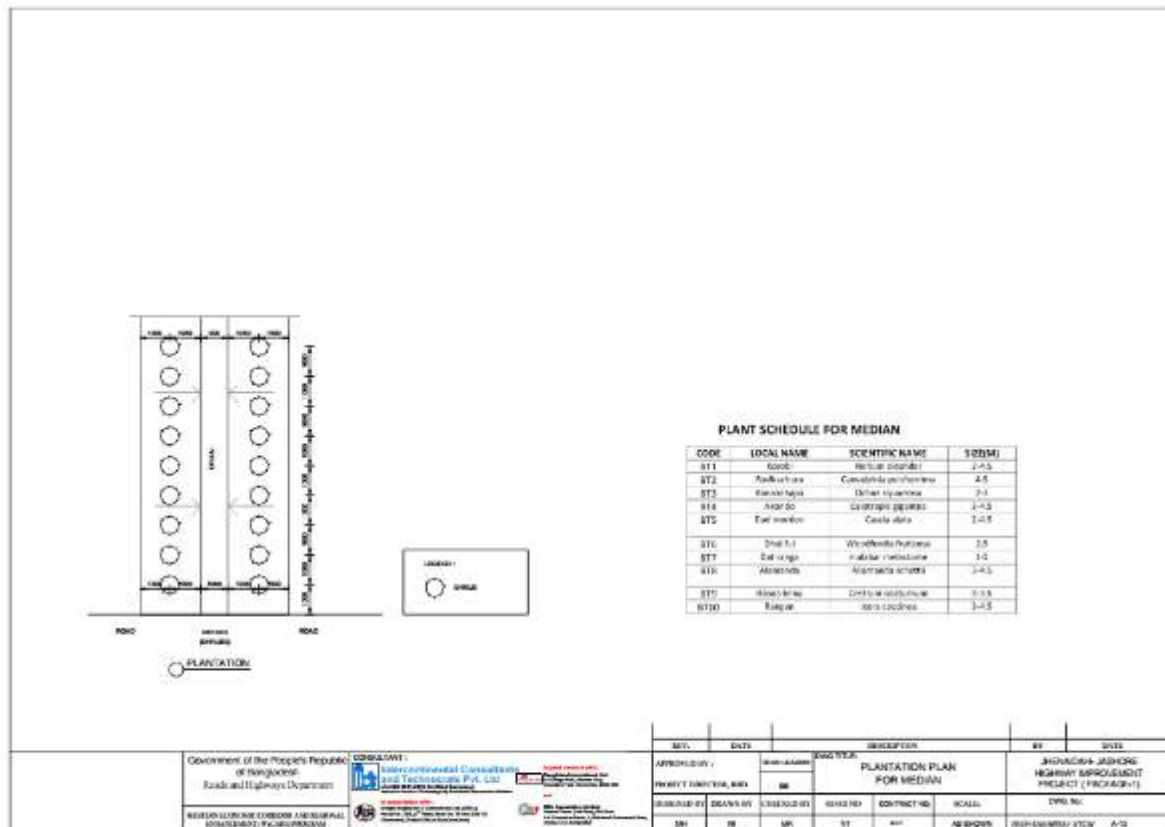


Annex 7.2 :Typical Road Plantation

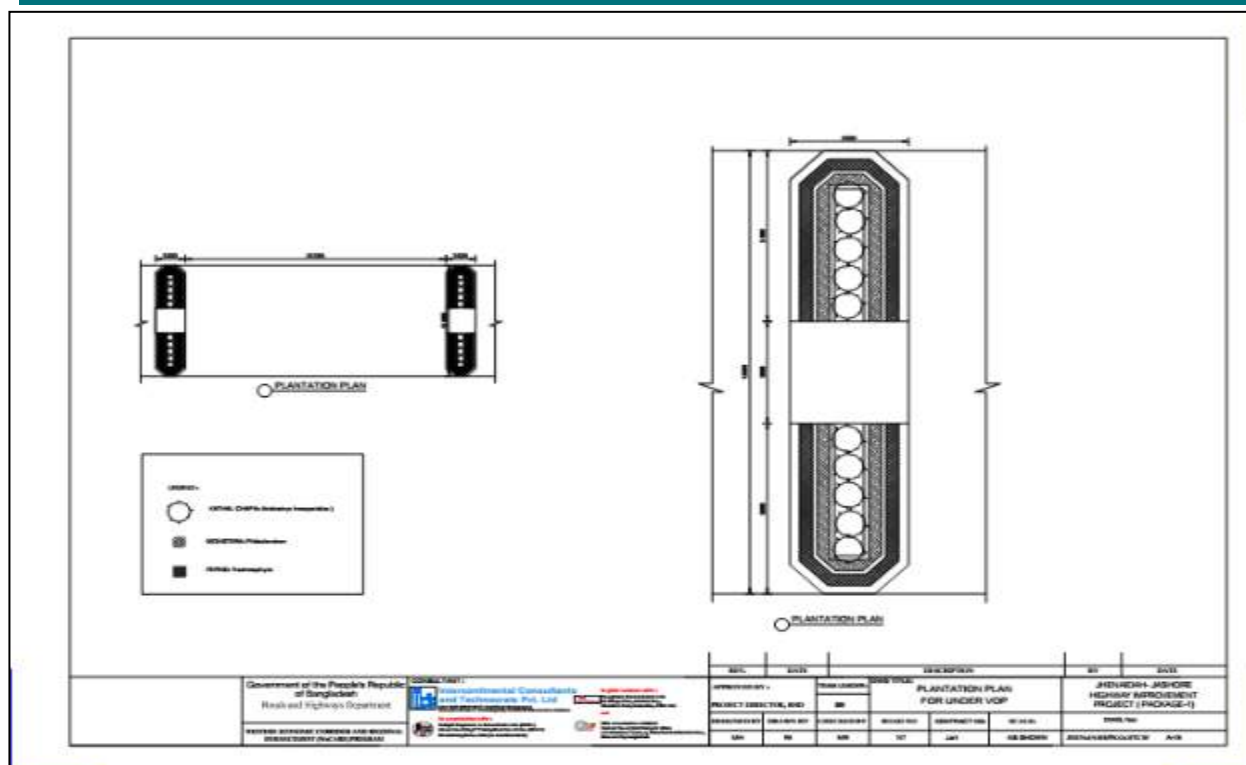




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Plant Schedule for Median			
Code	Local Name	Scientific Name	Mature Plant Height(m)
ME1	Korobi	<i>Nerium oleander</i>	2-4.5
ME2	Radhachura	<i>Caesalpinia pulcherrima</i>	4-5
ME3	Konokchapa	<i>Ochna squarrosa</i>	2-3
ME4	Akondo	<i>Calotropis gigantea</i>	3-4.5
ME5	Dad mordon	<i>Cassia alata</i>	2-4.5
ME6	Dhaiful	<i>Woodfordia fruticosa</i>	2.5
ME7	Datranga	<i>Melastoma malabarica</i>	1-2
ME8	Alamanda	<i>Allamanda schottii</i>	3-4.5
ME9	Hasnahena	<i>Cestrum nocturnum</i>	3-3.5
ME10	Rangan	<i>Ixora coccinea</i>	3-4.5
ME11	Arhar	<i>Cajanus cajan</i>	3-3.5
Timber Trees			
Code	Local Name	Scientific Name	Mature Plant Height(m)
LT1	Garjan	<i>Dipterocarpus costatus</i>	50-60
LT2	Shegun	<i>Tectona grandis</i>	30-40
LT3	Boilum	<i>Anisoptera scaphula</i>	60-75
LT4	Pitraj	<i>Aphanamixis polystachya</i>	25-30
LT5	Chapalish	<i>Artocarpus chama</i>	30-35
LT6	Civit	<i>Swintonia floribunda</i>	50-55
LT7	Toon	<i>Toona ciliata</i>	40-45
LT8	Agar	<i>Aquilaria malaccensis</i>	35-40
LT9	Telsur	<i>Hopea odorata</i>	40-50
LT10	Teligarjon	<i>Dipterocarpus turbinatus</i>	55-60

Ornamental Trees			
Code	Local Name	Scientific Name	Mature Plant Height(m)
ST1	Jarul	<i>Lagerstroemia speciosa</i>	15-17
MT1	Shimul	<i>Bombax ceiba</i>	20-25
ST2	Nageshwar	<i>Mesua nagassarum</i>	15-17
LT11	Champa	<i>Michaellia champaka</i>	50-55
ST3	Polash	<i>Butea monosperma</i>	15-17
ST4	Sonalu	<i>Cassia fistula</i>	14-16
ST5	Udal	<i>Sterculia villosa</i>	15-20
LT12	Mander	<i>Erythrina variegata</i>	25-30

Annexes

MT2	Borun	<i>Crataeva nurvala</i>	16-20
ST8	Ashok	<i>Saraca asoca</i>	12-Oct

Medicinal Trees			
Code	Local Name	Scientific Name	Mature Plant Height(m)
ST9	Neem	<i>Azadirachta indica</i>	15-20
LT12	Haritaki	<i>Terminalia chebula</i>	30-32
LT13	Bohera	<i>Terminalia bellirica</i>	40-42
ST10	Tejpata	<i>Cinnamomum tamala</i>	25-27
ST11	Daruchini	<i>Cinnomum verum</i>	15-17
LT14	Arjun	<i>Terminalia arjuna</i>	30-35
LT15	Kurchi	<i>Holarrhena antidysenterica</i>	12-15
LT16	Chatim	<i>Alstonia scholaris</i>	40-45
ST12	Utotkombol	<i>Abroma augusta</i>	4-5
ST13	Chapaitta/Menda	<i>Litsea glutinosa</i>	15-20

Fruit trees			
Code	Local Name	Scientific Name	Mature Plant Height(m)
MT3	Aam	<i>Mangifera indica</i>	20-25
MT4	Kalojam	<i>Syzygium cumini</i>	20-26
MT5	Litchu	<i>Litchi chinensis</i>	15-17
MT6	Deoa	<i>Artocarpus lacucha</i>	16-20
MT7	Tentul	<i>Tamarindus indica</i>	20-25
MT8	Kantal	<i>Artocarpus heterophyllus</i>	15-20
ST14	Golapjam	<i>Syzyium jambos</i>	12-15
MT9	Khejur	<i>Phoenix dactylifera</i>	20-25
LT17	Taal	<i>Borassus flabellifer</i>	25-30
ST15	Phalsa	<i>Grewia asiatica</i>	8-10

Plant Schedule as Noise Barrier

Code	Local Name	Scientific Name	Mature Plant Height(m)
MT1	Jarul	<i>Lagerstroemia speciosa</i>	15
MT2	Aam	<i>Mangifera indica</i>	15-20
MT3	Nageshwar	<i>Mesua nagassarium</i>	15
MT4	Kalojam	<i>Syzygium cumini</i>	15-20
MT5	Kathal	<i>Artocarpus heterophyllus</i>	10-20
MT6	Hijal	<i>Barringtonia acutangula</i>	5-8
MT7	Lichu	<i>Litchi chinensis</i>	15-20
MT8	Chatim	<i>Alstonia scholaris</i>	40
MT9	Menda	<i>Litsea glutinosa</i>	7-8
MT11	Karoz	<i>Pongamia pinnata</i>	10-12
MT12	Dewa	<i>Artocarpus lacucha</i>	10-15

Plant Schedule Near Water Body

Code	Local Name	Scientific Name	Mature Plant Height(m)
MT13	Khejur	<i>Phoenix dactylifera</i>	23
MT14	Tal	<i>Borassus flabellifer</i>	30
MT15	Barun	<i>Crataeva nurvala</i>	10-15
MT11	Koroch	<i>Pongamia pinnata</i>	10-12
MT6	Hijal	<i>Barringtonia acutangula</i>	5-8
MT1	Jarul	<i>Lagerstroemia speciosa</i>	15
MT16	Narikel	<i>Cocos nucifera</i>	18

Plants Schedule for Monument

Code	Local Name	Scientific Name	Mature Plant Height(m)
LT1	Garjan	<i>Dipterocarpus costatus</i>	50-60
LT3	Boilum	<i>Anisoptera scaphula</i>	60-75
LT5	Chapalish	<i>Artocarpus chama</i>	30-35
LT6	Civit	<i>Swintonia floribunda</i>	50-55
LT9	Telsur	<i>Hopea odorata</i>	40-50
LT10	Teligarjon	<i>Dipterocarpus turbinatus</i>	55-60

Annexes

Annex 7.3 :Contractors Reporting Formats

EC-1: POLLUTION MONITORING (CONSTRUCTION)

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No: _____

Construction Stage: Monthly Report: Date _____ Month _____ Year _____

(Site Layout of all locations to be attached with format)

Sl. No.	Chainage (Km)	Details of Location	Duration of Monitoring	Instruments Used	Parameters	Standards	Results	Reason exceeding std, if any	Mitigation Measures Suggested	Category of Zone	Remarks
		Air Quality Monitoring									
1.											
2.											
		Water Quality Monitoring									
1.											
2.											
		Noise Level Monitoring									
1.											
2.											
		Soil Quality Monitoring									
1.											
2.											

Remarks

Submitted

Checked

Approved

Signature

Name

Designation

Contractor

Signature

Name

Environmental Specialist

CSC

Signature

Name

Resident Engineer/Team Leader

CSC

Annexes

EC-2: ARRANGEMENT OF TEMPORARY LAND

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No: _____

Construction Stage: Monthly Report: Date _____ Month _____ Year _____

(Site Layout of all locations to be attached with format)

Sl. No.	Item	Location					Present Land Use	Size (Lx W)	Existing trees (>30m girth)	Dist from nearest settlement	Dist from nearest water source	Site Approved (Y/N)	Remarks by CSC/PIU
		Village Name	Chainage (Km)	Side of the road (LHS/RHS)	Area m2	Haul Road (m)							
Borrow Areas													
1.	BA-1												
2.	BA-2												
Construction Camp													
1.	CC-1												
Batching Plant													
1.	BP-1												
2.	BP-2												
Hot Mix Plant													
1.	HMP-1												
Stock Yard													
1.	SY-1												
2.	SY-2												

Remarks

Submitted

Checked

Approved

Signature

Name

Designation

Contractor

Signature

Name

Environmental Specialist

CSC

Signature

Name

Resident Engineer/Team Leader

CSC

Annexes

EC-3: ESTABLISHMENT OF HOT MIX PLANT /BATCHING PLANT

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No: _____

Construction Stage: Monthly Report: Date _____ Month _____ Year _____

(Site Layout of all locations to be attached with format)

Sl. No.	Location				Area (m2)	Distance from nearest Water Course (m)	Distance from nearest settlement	Existing land use	Prevalent wind direction	If settlements are in down wind direction (Y/N)	Photograph of the site proposed enclosed?	Approved by EO (Y/N)
	Village Name	Chainage (Km)	Side (LHS /RHS)	Haul road length (m)								

Remarks

Submitted

Checked

Approved

Signature

Name

Designation

Contractor

Signature

Name

Environmental Specialist

CSC

Signature

Name

Resident Engineer/Team Leader

CSC

Annexes

EC-4: SAFETY (CONSTRUCTION) CHECK LIST

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No : _____

Construction Stage: Monthly Report : _____ Date _____ Month _____ Year _____

Name of the Safety Officer : _____

Date of Inspection : _____

Particulars	Location-1			Location-2			Location-3			Remarks
	A	B	C	A	B	C	A	B	C	
General										
House Keeping										
Stacking of Material										
Passageway										
Lighting										
Ventilation										
Others										
Electrical										
Switches										
Wiring										
Fixed Installation										
Portable Lighting										
Portable Tool										
Welding Machine										
Others										
Fire Prevention										
Fire Fighting Appliances										
Inflammable Good Store										
Gas Welding Cylinders										
Others										
Personal Protection										
Helmet										
Eye Protector										
Ear Protector										
Respirator										
Safety Shoes										
Safety Belts										
Others										
First Aid Equipment										
Washing Facility										
Latrine										
Canteen										
Dust Control										
Noise Control										

Submitted

Checked

Approved

Signature

Signature

Signature

Name

Name

Name

Designation

Environmental Officer

Resident Engineer/Team Leader

Contractor

CSC

CSC

Annexes

EC-5: ROAD SAFETY

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No: _____

Sketch of construction zone showing all sub zones and location of signs etc. to be attached with format

Format on Acquisition of Temporary diversion to be attached with this format.

Construction Stage: Monthly Report. Date Month Year

Diversion No _____ Location (Km _____)

Sl. No.	Item	Unit	Compliance	Remarks
	Details of Construction Zone			
1.	Length of Construction Zone	Km		
2.	Distance between this and next construction zone	Km		
3.	Length of transition sub zone (should be min 50m for a speed of 50 Km/hr.)			
4.	Length of work sub zone in urban stretch (should be < 2 Km)	Km		
5.	Length of work sub zone in rural stretch (5-10 Km)	Km		
6.	Distance between two work sub zones			
	Signages in Construction Zones			
1.	Sign saying 'Men at Work' 1 Km ahead of transition sub zone	Y/N		
2.	Supplementary sing saying diversion 1 Km provide	Y/N		
3.	Sign Saying 'Road Closed Ahead' provide	Y/N		
4.	Compulsory Right Turn/Left Turn sing provide	Y/N		
5.	Detour sing placed	Y/N		
6.	Sharp deviation sign place at end of advance warning sub zone	Y/N		
	Signage in Transition Sub Work Zone			
1.	Signage saying 'Keep Right /Left' provided	Y/N		
2.	Delineators placed along length of transition	Y/N		
	Signage in work sub zone			
1.	Hazard Marker placed where railing for CD structure on diversion starts	Y/N		
2.	Barricade on either side of work sub zone	Y/N		
	Signage in Termination of Sub Zone			
1.	Sign for indication of end of wok zone 120 m form end of termination sub zone	Y/N		
	Road Delineator			
1.	Roadway indicator provided	Y/N		
2.	Hazard Markers Provide	Y/N		
3.	Object Markers Provided	Y/N		

Submitted

Checked

Approved

Signature

Signature

Signature

Name

Name

Name

Designation

Environmental Officer

Resident Engineer/Team Leader

Contractor

CSC

CSC

Annexes

EC-6: Accident Reporting

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No : _____

Construction Stage: Monthly Report. Date Month

Part-I: Type of Accident

D01 ()	Fall of person from a height	D11 ()	Explosion
D02 ()	Slip, trip or fall on same level	D12 ()	Fire
D03 ()	Struck against fixed objects	D13 ()	Contact with hot or corrosive substance
D04 ()	Struck by faying or falling objects	D14 ()	Contact with poisonous gas or toxic substances
D05 ()	Stuck by moving objects	D15 ()	Hand tool accident
D06 ()	Struck/caught by cable	D16 ()	Vehicles/mobile plant accident
D07 ()	Stepping on nail etc.	D17 ()	Machinery operation accident
D08 ()	Handling without machinery	D18 ()	Other (please specify)
D09 ()	Crushing/burying	D19 ()	
D10 ()	Drowning or Asphyxiation	D20 ()	

Agent involved in accident

E01 ()	Machinery	E11 ()	Excavation /underground working
E02 ()	Portable power appliance	E12 ()	Ladder
E01 ()	Vehicle or associated equipment/ machinery	E13 ()	Scaffolding/gondola
E01 ()	Material being handled, used or stored	E14 ()	Construction framework, shuttering and false work
E01 ()	Gas, vapor, dust fume or oxygen	E15 ()	Electricity supply cable, wiring switch board and associate equipment
E01 ()	Hand tools	E16 ()	Nail, slinter or chipping
E01 ()	Floor edge	E17 ()	Other (please specify)
E01 ()	Floor opening	E18 ()	
E01 ()	Left shaft	E19 ()	
E10 ()	Stair edge	E20 ()	

Unsafe action Relevant to the accident

F01 ()	Operating without authority	F11 ()	Failure to use eye protector
F02 ()	Failure to secure objects	F12 ()	Failure to use respirator
F03 ()	Making safety devices inoperative	F13 ()	Failure to use proper clothing
F04 ()	Working on moving or dangerous equipment	F14 ()	Failure to use warn others or given proper signals
F05 ()	Using un-safe equipment	F15 ()	Horseplay
F06 ()	Adopting unsafe position or posture	F16 ()	No unsafe action
F07 ()	Operating or working at unsafe speed	F17 ()	Others (please specify)
F08 ()	Unsafe loading, placing, mixing etc.	F18 ()	
F09 ()	Failure to use helmet	F19 ()	

Accident Reporting Format

F10 ()	Failure to use proper footwear	F20 ()	
G01 ()	No protective gear	G08 ()	Unsafe layout of job, traffic etc.
G02 ()	Defective protective gear	G09 ()	Unsafe process of job methods
G03 ()	Improper dress /foot wear	G10 ()	Poor housekeeping
G04 ()	Improper guarding	G11 ()	Lack of warming system
G05 ()	Improper ventilation	G12 ()	Defective tool, machinery or material
G06 ()	Improper illumination	G13 ()	No unsafe condition
G07 ()	Improper procedure	G14 ()	Others (please specify)

Personal Factor Relevant to the Accident

H01 ()	Incorrect Attitude/motive	H04 ()	Others (please specify)
H02 ()	Unsafe act by another person	H05 ()	
H03 ()	No unsafe personal factor	H06 ()	

Annexes

Submitted	Checked	Approved
Signature	Signature	Signature
Name	Name	Name
Designation	Environmental Officer	Resident Engineer/Team Leader
Contractor	CSC	CSC

Part-II: Completed upon Finalization of Employee's Compensation Claim

101 () No permanent incapacity

102 () Less than 5% incapacity

103 () More than 5% incapacity

104 () Final

Submitted	Checked	Approved
Signature	Signature	Signature
Name	Name	Name
Designation	Environmental Officer	Resident Engineer/Team Leader
Contractor	CSC	CSC

Annexes

EC-7: DETAILS OF MACHINERY IN OPERATIONS

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No: _____

Construction Stage: Monthly Report: Date _____ Month _____ Year _____

[Copies of the Pollution under Control (PUC) Certificates to be enclosed]

Details of the Machinery in Operation

Sl. No.	Name of the Machinery	No	Servicing due	Remarks
1.	Excavator			
2.	Grader/Dozers			
3.	Stone Crushing Plant			
4.	WMM Plant			
5.	Asphalt Plant			
6.	Concrete Batching Plants			
7.	Concrete Pumps			
8.	Pneumatic Tyre Rollers			
9.	Vibratory Rollers			
10.	Tandem Rollers			
11.	Cranes			
12.	Piling Equipment			
13.	Transit Mixers			
14.	Emulsion Distributors			
15.	Pay loader			
16.	Dumper			
17.	D G Set			

Remarks

Submitted

Checked

Approved

Signature

Name

Designation

Contractor

Signature

Name

Environmental Officer

CSC

Signature

Name

Resident Engineer/Team Leader

CSC

Annexes

EC-8 RESTORATION OF CONSTRUCTION SITES

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No : _____

Construction Stage: Monthly Report: Date _____ Month _____ Year _____

Sl. No.	Labour Camp		Construction Camp		Plant Site		Borrow Areas		Disposal Locations		Top stockyard	Soil
	O	R										
1												

O= Operational, R=Restored

Sl. No	Particulars	Status
1	Is the restoration as per with negotiation between the parties	
2	Has all the debris/unwanted material been removed by Contractor?	
3	Has the slope protection/erosion control been taken into consideration?	
4	Has the drainage been taken into consideration?	
5	Has to top soil been spread on the restored site?	
6	Is the handing over letter enclosed by Contractor	
7	Any other issues to be addressed by Contractor	

Remarks:

Submitted

Checked

Approved

Signature

Signature

Signature

Name

Name

Name

Designation

Environmental Officer

Resident Engineer/Team Leader

Contractor

CSC

CSC

Annexes

EC-9: FORMAT FOR REGISTER OF SITES OPENED AND CLOSED AND IT'S REPORTING

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No: _____

Construction Stage: Monthly Report: Date _____ Month _____ Year _____

Contract date and duration _____

Site Details

Sl. No.	Site opening date	Type of Site*	Address of site (Place name – Village name, Revenue No., Survey No. Panchyat	Name and address of the owner	List of approval required	Issue date of approval	Expiry date of approval	Site closing date	Redevelopment status	Remarks	Signature of EO of Contractor
1.											
2.											
3.											

Construction Camp/Labour Camp/Quarry area & Stone crusher/Borrow Area/Debris/Water Source.

Remarks

Submitted

Checked

Approved

Signature

Name

Designation

contractor

Signature

Name

Environmental Officer

CSC

Signature

Name

Resident Engineer/Team Leader

CSC

Annexes

EM-1: IDENTIFICATION OF DUMPING SITES LOCATIONS

Name of the Corridor : _____

Contract Name/No: _____

Criteria on which information for each site is to be collected			
Area covered (m2)			
Total Material that can be dumped in that site (m3)			
Depth to which dumping is feasible (m)			
Distance of nearest watercourse (m)			
Nearest Settlement (m)			
Date(s) of Community Consultation(s)			
Whether the community is agreeable to siting of dumping site (Y/N)			
Date of Permission from Land Owner			
Proposed future use of the Site			

Certified that the above information is correct to the best of my knowledge and belief.

(Contractor)

Verified:

Date:

Recommendation on the suitability of the site

Signed:

Date:

Name & Designation:

Decision Taken:

Approved/Not Approved

Signed:

Date:

Name and Designation of Deciding Authority

Enclosures

(Tick as appropriate)

- 1 Lay out plan of dumping site
- 2 Photographs
 - a Land use of proposed site
 - b Each community consultation
- 3 Copy of the negotiation between individual land owner/community and Contractor
- 4 Slope protection measures details
- 5 Contractors' methodology to compact at stages to avoid any future slides from the dumping sites

Annexes

EM-2: IDENTIFICATION OF WATER STORAGE LOCATION

Name of the Corridor : _____

Contract Name/No: _____

Construction Stage: One time Reporting. Date Month Year

Location of the dumping site	
Geo-reference:	
Name of village:	
Type of owner ship (Private/Community/Government)	
Whether copy of negotiation enclosed?	
Lay out plan of the proposed site enclosed?	
Detailed methodology and sketch for proposed storage enclosed?	
Area likely to be covered (m2)	
Likely storage capacity of the proposed site (m3)	
Any chance of submergence of agricultural /jhum or residential area?	
Details on the safety of the check dam/bund taken into consideration enclosed?	
Distance of the nearest house? (m)	
Is there any likely damage to the any property due to storage of water?	
Does the negotiation cover during for Contractor's usage and future hand over?	

Certified that the above information is correct to the best of my knowledge and belief.

(Contractor)

Verified:

Date:

Recommendation on the suitability of the site

Signed:

Date:

Name & Designation:

Decision Taken:

Approved/Not Approved

Signed:

Date:

Name and Designation of Approving Authority

Enclosures

(Tick as appropriate)

- 1 Lay out plan of water storage site
- 2 Photographs
 - a Land use of proposed site
 - b Each community consultation
- 3 Copy of the negotiation between individual land owner/community and Contractor
- 4 Detailed methodology and sketch of the proposed storage
- 5 Safety of check dam/ bund taken into consideration

EM-3: SETTING UP OF LABOUR CAMP

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No: _____

Construction Stage: . Date Month Year

(Site Layout of labor camp and working drawings of dwelling units with allied facilities to be attached with format)

Format to be submitted at least 15 days before date of expected operation of camp

Location of Camp (Km _____)

Sl. No.	Item	Unit	Details	Remarks by Engineer if any
1	Detail of item camp			
a	Size of Camp	Mxm		
b	Area of Camp	sq.m		
c	Distance from Nearest Settlement			
d	Distance from Nearest Water Source	Type/Size/Capacity/Present Use/Ownership		

Joint Venture of



STUP Consultant Pvt. Ltd.
On July 1st, 2021, STUP was acquired by Assystem and rebranded as Assystem STUP.



BCL Associates Limited, Bangladesh

Annexes

Sl. No.	Item	Unit	Details	Remarks by Engineer if any
e	Date of camp being operational dd/mm/yy			
f	Present land use			
g	No other trees with girth > 0.03m.			
h	Details of Storage area (Availability of impervious surface)	mxm		
i	Availability of separate waste disposal from storage area	Cum		
2	Details of top soil stacking			
a	Quantity of top soil removed from the site	sq.m		
b	Detail of storage of topsoil	Describe stacking arrangement		
3	Details of workforce			
a	Total No of Laborer	nos		
b	Total no of Male Workers	nos		
c	No of Male Workers below 18 years of age	nos		
d	Total No of Female Workers	nos		
e	No of Female workers below 18 years of age	nos		
f	No of children	nos		
4	Details of dwelling units			
a	No of dwellings/huts	nos		
b	Minimum Size of Dwelling	mxm		
c	No of openings per dwelling	nos		
d	Minimum size of opening	mxm		
e	Walls	specifications		
f	Roofing	specifications		
g	Flooring	specifications		
h	Drinking Water Tank	specifications		
i	Capacity of Drinking water Tank	cum		
j	Size of Drinking Water Tank	mxmxm		
k	Total no of WC	nos		
l	No of Wcs for female workers	nos		
m	Minimum Size of WC	mxm		
n	Total No of Bathrooms for female workers	nos		
o	Size of septic tank for WC/Baths	mxmxm		
p	Capacity of Water Tank for WCs/ Bathrooms and general purpose			
q	Fencing around camp	Y/N		
5	Details of facilities			
a	Availability of security guard 24 hrs a day	Yes/No		
b	Details of First Aid Facility	Yes/No		
c	Availability of Day Care Centre	Yes/No		
d	Availability of dust bins (capacity 60 Ltrs)	nos		
e	Canteen facilities for labors	Yes/No		

Remarks

Submitted

Signature

Name

Designation

Contractor

Checked

Signature

Name

Environmental Officer

CSC

Approved

Signature

Name

Resident Engineer/Team Leader

CSC

Annexes

EM-4: TOPSOIL AND EARTH WORK MANAGEMENT

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No: _____

Construction Stage: Monthly Report: Date _____ Month _____ Year _____

Details of the Top Soil

Sl. No.	Particulars	Details
1.	TOPSOIL DETAILS	
	Topsoil stock before start of the reporting month?	
	Topsoil collected and stored during reporting month	
	Quantity of topsoil collected from the Borrow Areas	
	Quantity of topsoil collected from clearing and grubbing	
	Quantity of topsoil collected from other locations (specify location)	
	Location of the topsoil stored	
	Quantity of the topsoil utilized during reporting month?	
	Details on location and reason for usage?	
	Anticipated period of storage	
	Slope of the pile (V:H)	
	Whether site fencing is provided?	
	Is any other covering / measure provided? If yes, what is it?	
	Improvements required (Y/N)	
	Extent of Compliance as on date of report	
	Location(s) where topsoil has been utilized (specify in a location plan)	
2	EARTH WORK	
	Quantity of the earth excavated from existing road	
	Total quantity of earth work reused in cu m	
	Location of disposal /utilization (if other than sites) (specify clearly on a location plan)	
	Quantity of earth work re-used in the fill operation	

Remarks

Submitted

Checked

Approved

Signature

Name

Designation

Contractor

Signature

Name

Environmental Officer

CSC

Signature

Name

Resident Engineer/Team Leader

CSC

Annexes

EM-5: TREE CUTTING /STUMP REMOVAL

(To Be Submitted by The Contractor)

Name of the Corridor : _____

Contract Name/No: _____

Construction Stage: Monthly Report: Date _____ Month _____ Year _____

Sl. No.	Chainage (Km)/Geo-reference coordinate	Distance from edge of existing road	Identification number marked in field (Tree/Stump)	Species		Girth (cm)	Dry/Green	Average Height (m)	Remarks
				Local Name	Botanical Name				

Remarks

Submitted

Signature

Name

Designation

Contractor

Checked

Signature

Name

Environmental Officer

CSC

Approved

Signature

Name

Resident Engineer/Team Leader

CSC

Annexes

EM 6: BORROW AREA IDENTIFICATION

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No : _____

Construction Stage Report : Date ____ Month ____ Year ____

Site Layout of Borrow Area and Proposed Redevelopment Plan to be attached with format

Format to be submitted with complete documents at least 15 days before operation of Borrow Areas

Borrow Area No. _____

Location of Borrow Area (geo-reference coordinate and name of the village):

Borrow Area Identification				
Sl. No.	Item	Unit	Details	Remarks by Contractor, if any
1	Statutory Clearance			
a	If copy of the environmental clearance enclosed?			
b	If copy of permission enclosed for tree felling?			
c	If copy of Consent from MPCB enclosed?			
2	Details of Borrow Area			
a	Date of Borrow area becoming operational dd/mm/yy			
b	Current land use			
c	Distance from Nearest Settlement	Km		
d	No of houses within 200m of Haul Road	No.		
e	No of houses within 500m of Borrow Area	No.		
f	Total Capacity	cum		
g	No of Trees affected with girth more than 0.03 m	No.		
h	Length of Haul Road	Km		
i	Width of Haul Road	m		
j	Type of Haul Road	metal/dirt		
k	Size of Borrow Area	sqkm		
l	Area of Borrow Area	Km x Km		
m	Quantity Available	cum		
n	Distance of Nearest Water Source			
o	Daily/occasional use of the Borrow Area by the community, if any	-		
p	Drainage channels/slope/characteristics of the area	-		
3	Enhancement Elements			
a	Preventive measures for			
i	Mosquito Breeding			
ii	Water run-off/contamination			
iii	Any other environmental degradation			
b	Health and safety issues			
i	Details of PPE arranged for workforce?			
ii	Details of first aid arrangement for workers?			
iii	Details of toilet and urinal arrangement for workers?			
iv	Details of drinking water facilities proposed for workers?			
4	Details of workforce			
a	Total No of Laboure's	No.		
b	Total no of Male Workers	No.		
C	No of Male Workers below 18 years of age	No.		
d	Total No of Female Workers	No.		
e	No of Female workers below 18 years of age	No.		
5	Details of redevelopment/rehabilitation Plan enclosed			

Remarks

Submitted

Signature

Name

Designation

Contractor

Checked

Signature

Name

Environmental Officer

CSC

Approved

Signature

Name

Resident Engineer/Team Leader

CSC

Annexes

EM-7: AGGREGATE QUARRY IDENTIFICATION

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No: _____

Construction Stage Report: Date ____ Month ____ Year ____

Site Layout of Quarry Area and Proposed Redevelopment Plan to be attached with format

Format to be submitted with complete documents at least 15 days before operation of Quarry Areas

Quarry Area No. _____

Location of Quarry Area (geo-reference coordinate and name of the village):

Aggregate Quarry Identification				
Sl. No.	Item	Unit	Details	Remarks by Contractor, if any
1	Statutory Clearance			
a	If copy of the environmental clearance enclosed?			
b	If copy of permission enclosed for tree felling?			
c	If copy of Consent from MPCB enclosed?			
d	If copy of permission under Bangladesh Explosive Act enclosed?			
2	Details of Quarry Area			
a	Date of quarry area becoming operational dd/mm/yy			
b	Current land use			
c	Distance from Nearest Settlement	Km		
d	No of houses within 200m of Haul Road	No.		
e	No of houses within 500m of Quarry Area	No.		
f	Total Capacity	cum		
g	No of Trees affected with girth more than 0.03 m	No.		
h	Length of Haul Road	Km		
i	Width of Haul Road	m		
j	Type of Haul Road	metal/dirt		
k	Size of Quarry Area	sqkm		
l	Area of Quarry Area	Km x Km		
m	Quantity Available	cum		
n	Distance of Nearest Water Source	Type/Size/Capacity/Present Use/Ownership		
o	Daily/occasional use of the Quarry Area by the community, if any	-		
p	Drainage channels/slope/characteristics of the area	-		
3	Enhancement Elements			
a	Preventive measures for			
i	Mosquito Breeding			
ii	Water run-off/contamination			
iii	Any other environmental degradation			
b	Health and safety issues			
i	Details of PPE arranged for workforce?			
ii	Details of first aid arrangement for workers?			
iii	Details of toilet and urinal arrangement for workers?			
iv	Details of drinking water facilities proposed for workers?			
4	Details of workforce			
a	Total No of Labourers	No.		
b	Total no of Male Workers	No.		
c	No of Male Workers below 18 years of age	No.		
d	Total No of Female Workers	No.		
e	No of Female workers below 18 years of age	No.		
5	Details of redevelopment/rehabilitation Plan enclosed			

Remarks:

Submitted

Signature

Name

Designation

Contractor

Checked

Signature

Name

Environmental Officer

CSC

Approved

Signature

Name

Resident Engineer/Team Leader

CSC

Annexes

EM-8: SETTING UP OF Construction CAMP

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No : _____

Construction Stage : Date Month Year

(Site Layout of Construction camp and working drawings of dwelling units with allied facilities to be attached with format)

Format to be submitted at least 15 days before date of expected operation of camp

Location of Camp (Km _____)

Construction Camp				
Sl. No.	Item	Unit	Details	Remarks by CSC if any
1	Detail of item camp			
a	Size of Camp	Mxm		
b	Area of Camp	sq.m		
c	Distance from Nearest Settlement			
d	Distance from Nearest Water Source	Type/Size/Capacity/Present Use/Ownership		
e	Date of camp being operational dd/mm/yy			
f	Present land use			
g	No other trees with girth > 0.03m.			
h	Details of Storage area (Availability of impervious surface)	mxm		
i	Availability of separate waste disposal from storage area	Cum		
2	Details of top soil stacking			
a	Quantity of top soil removed from the site	sq.m		
b	Detail of storage of topsoil	Describe stacking arrangement		
3	Details of workforce			
a	Total No of laborer	nos		
b	Total no of Male Workers	nos		
c	No of Male Workers below 18 years of age	nos		
d	Total No of Female Workers	nos		
e	No of Female workers below 18 years of age	nos		
4	Other Details			
a	Drinking Water	mxmxm		
b	Total no of Toilets	nos		
c	No of toilets for female workers	nos		
d	Total No of Bathrooms for female workers	nos		
e	Size of septic tank for WC/Baths	mxmxm		
f	Capacity of Water Tank for WCs/ Bathrooms and general purpose			
g	Fencing around camp	Y/N		
5	Details of facilities			
a	Availability of security guard 24 hrs a day	Yes/No		
b	Details of First Aid Facility	Yes/No		
c	Availability of Day Care Centre	Yes/No		
d	Availability of dust bins (capacity 60 ltr)	nos		
e	Canteen facilities for labours	Yes/No		
6	Plant and Machinery			
a	If HMP to be located in camp	Yes/No		
b	If workshop for maintenance of vehicles and machinery to be located in camp	Yes/No		
c	If fuel refilling station to be in camp	Yes/No		
d	If aggregate batching plant to be in camp	No		
e	If canteen waste to be dumped in camp?	Yes/No		
7	Statutory Clearance			
a	If copy of consent from PPCB enclosed?	Yes/No		
b.	If copy of permission for each plant / fuel refilling station enclosed?	Yes/No		

Remarks

Submitted

Signature

Name

Designation

Contractor

Checked

Signature

Name

Environmental Officer

CSC

Approved

Signature

Name

Resident Engineer/Team Leader

CSC

Annexes

EM-9: Monitoring of Construction Camp

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No: _____

Construction Stage: _____ Date Month Year

(Site Layout of Construction camp and working drawings of dwelling units with allied facilities to be attached with format)

Name of Construction Camp with Sl.No. in register of Site

Monitoring of Construction Camp				
Sl. No.	Environmental Management Measure	CSC Observation (Y/N/Not Applicable)	Corrective Action Taken	Remarks
	Whether concrete flooring and oil interceptors are provided for hot mix plant area and workshop, vehicle washing and fuel handling area?			
	Are all the first aid facilities provided in the camp?			
	Whether the plant is in such a way that there are no residences, public institutions, or hospital within a radius of 500 M from the center of the plant?			
	Whether the vehicle movement in and out of the camp is in a controlled manner?			
	Does water in cross drainage channels block?			
	Whether all the plant and machineries are well maintained and regularly serviced?			
	Whether a green belt is provided along the periphery of camp?			
	Whether water is stored for dust suppression in the camp?			
	Whether sanitation facilities are provided for male and female?			
	Whether separate garbage bins are provided to collect the garbage?			
	Whether septic tanks with soak pits are provided?			
	Whether the location of soak pit is in such a way that it does not pollute the ground water?			
	Whether a qualified safety officer is appointed for ensuring safety?			
	Whether noise barriers near sensitive receptors are provided?			
	Whether personal protective equipment are provided?			
	Whether warning sign boards are set up at the entrance gate for the public?			
	Whether all applicable clearances are obtained and valid till date?			
	Whether Notices boards construction related information displayed or not			
	Whether Labor engagement policy is displayed			
	Whether COC/VOC policy is displayed or not			

Submitted

Checked

Approved

Signature

Name

Designation

Contractor

Signature

Name

Environmental Officer

CSC

Signature

Name

Resident Engineer/Team Leader

CSC

Annexes

EM-10: Monitoring of Labor Camp

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No : _____

Construction Stage : Date Month Year

(Site Layout of Construction camp and working drawings of dwelling units with allied facilities to be attached with format)

Name of Labor Camp with Sl. No. in register of Site

Monitoring of Labor Camps				
Sl. No	Environmental Management Measure	CSC's Observation (Y/N/Not Applicable)	Corrective Action Taken	Remarks
	Whether the camps are floored with concrete?			
	Are all the first aid facilities provided in the camp?			
	Whether the plant is in such a way that there are no residences, public institutions or hospital within a radius of 500 M from the center of the plant?			
	Whether the vehicle movement in and out of the camp is in a controlled manner?			
	Whether LPG for cooking is provided?			
	Whether safe drinking water is provided?			
	Whether all the drains and channels are covered?			
	Whether a green belt is provided along the periphery of camp?			
	Whether day care centers are provided with in the camp?			
	Whether sanitation facilities are provided for male and female?			
	Whether separate garbage bins are provided to collect the garbage?			
	Whether septic tanks with soak pits are provided?			
	Whether the location of soak pit is in such a way that it does not pollute the ground water?			
	Whether a qualified safety officer is appointed for ensuring safety?			
	Whether proper fencing of the camp is done?			
	Whether the workers are aware of cleanliness, hygiene, community livings, AIDS etc.?			
	Whether Labour engagement policy is displayed			
	Whether COC/VOC policy is displayed or not			

Submitted

Checked

Approved

Signature

Signature

Signature

Name

Name

Name

Designation

Environmental Officer

Resident Engineer/Team Leader

Contractor

CSC

CSC

Annexes

EM-11: Monitoring of Stone Crusher Management

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No: _____

Construction Stage: _____ Date Month Year

(Site Layout of Construction camp and working drawings of dwelling units with allied facilities to be attached with format)

Name of Disposal Site with Sl. No. in register of Site

State of Completion of Project

Monitoring Parameters of Stone Crusher				
Sl. No	Environmental Management Measure	Applicability	Corrective Action Taken	Remarks
	Whether the construction operations are carrying out in such a manner that no waste material is dumped or disposed of in an unhealthy manner that causes any environmental hazard?			
	Whether the debris forming work close to the streams and water bodies are generally avoided during the monsoon period?			
	Whether the debris disposal site is at least 500 meters away from the surface water body?			
	Whether the debris disposal site is at least 500 meters away from the ecologically sensitive are, residential area or main road?			
	Whether the debris disposal along the water courses and close to the drainage channels are in such a manner that it does not cause any blockage to the flow of water?			
	Whether the bituminous waste is used as a surfacing material to the access roads to base camps, quarries, borrow area, temporary diversion, haulage routes etc.?			
	Whether the waste disposal details are submitted to the ENGINEER in the prescribed format?			
	Whether the spoils from excavation of the river bed are disposing off at specified area suggested by the engineers?			
	Whether the debris generated due to dismantling of existing permanent structure is reused in the temporary diversion?			
	Whether the preserved topsoil is used for redevelopment of the area?			
	Whether green belt is developed?			
	Whether all applicable clearances are obtained and valid till date?			

Submitted

Checked

Approved

Signature

Signature

Signature

Name

Name

Name

Designation

Environmental Officer

Resident Engineer/Team Leader

Contractor

CSC

CSC

Annexes

EM-12: Monitoring of Redevelopment of Borrow Area

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No : _____

Construction Stage : Date Month Year

(Site Layout of Construction camp and working drawings of dwelling units with allied facilities to be attached with format)

Name of Borrow Area Site with Sl. No. in register of Site

State of Completion of Project

Monitoring Details of Redevelopment of Borrow Area				
Sl. No.	Environmental Management Measure	Engineer's Observation (Y/N/Not Applicable)	Corrective Action Taken	Remarks
	Has slope stabilization been undertaken along the edges (if there is a level difference)?			
	Is all the waste material raised from the borrow area disposed of properly?			
	Has the preserved top soil been used in redevelopment of site?			
	Has the borrow areas been re-vegetated properly?			
	Is the cross-drainage system and the flood water drains managed properly to avoid occurrence of flooding?			
	Are the borrow area pits re-developed?			
	Is the leveling of depression after filling-in of waste undertaken?			
	Selection of Species as per Project area for plantation.			
	Has bund creation and temporary fencing been undertaken?			
	Has additional tree plantation been undertaken as mentioned in the re-development plan?			

Submitted

Checked

Approved

Signature

Signature

Signature

Name

Name

Name

Designation

Environmental Officer

Resident Engineer/Team Leader

Contractor

CSC

CSC

Annexes

EM-13: Monitoring of Redevelopment of Disposal Site

(To be submitted by the Contractor)

Name of the Corridor : _____

Contract Name/No : _____

Construction Stage: : Date Month Year

(Site Layout of Construction camp and working drawings of dwelling units with allied facilities to be attached with format)

Name of Disposal Site with Sl. No. in register of Site

State of Completion of Project

Monitoring Details

Sl. No	Environmental Management Measure	Engineer's Observation (Y/N/Not Applicable)	Corrective Action Taken	Remarks
1	Rehabilitation of the dump site by planting local shrubs and other plant species.			
2	Conversion of debris site into farm land, playground, parking area, block plantation area etc.			
3	Maintenance of the hydrological flow in the area.			

Submitted

Checked

Approved

Signature

Signature

Signature

Name

Name

Name

Designation

Environmental Officer

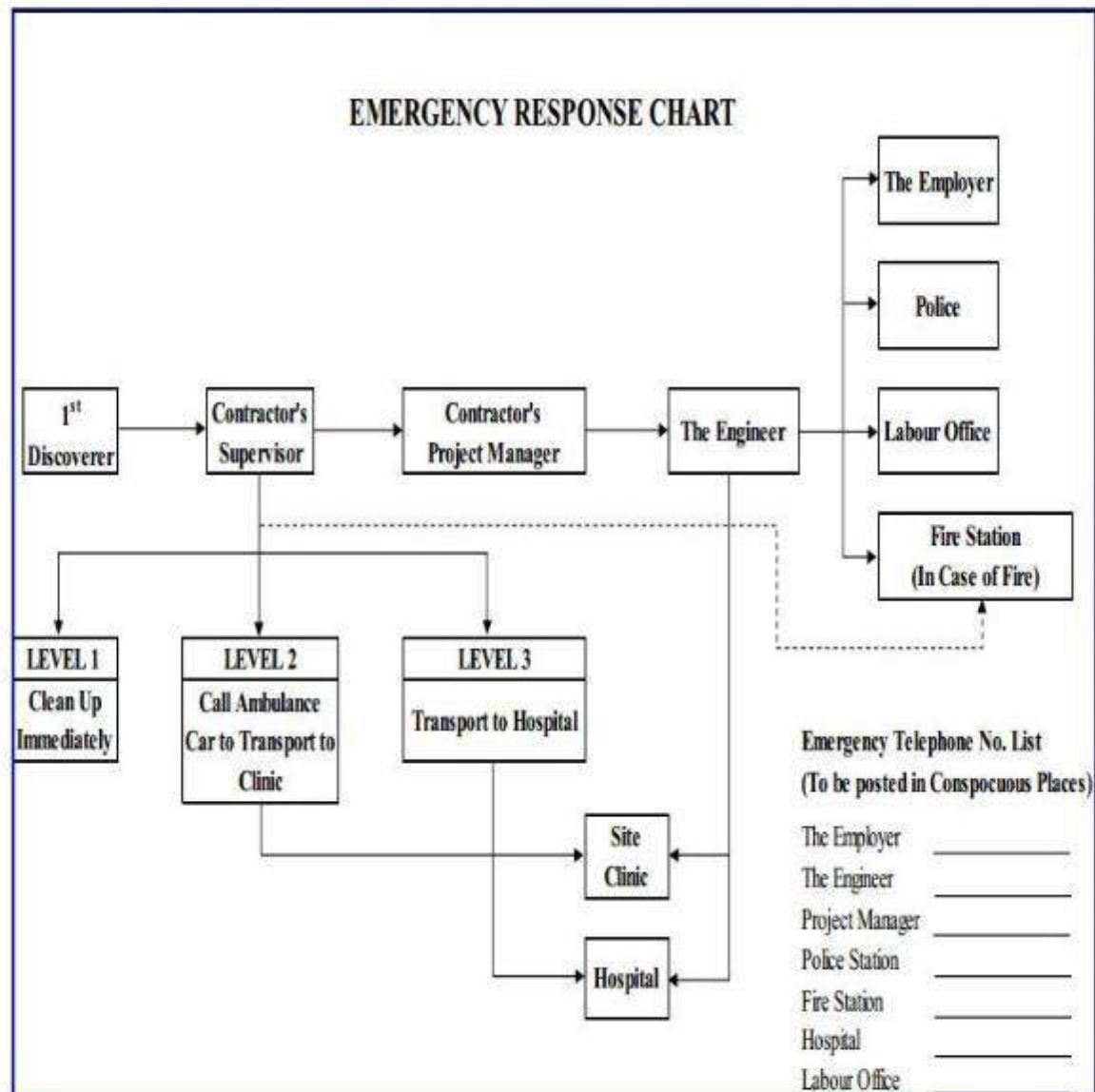
Resident Engineer/Team Leader

Contractor

CSC

CSC

Annex 7.4 :Flow Chart and Reporting Mechanism of Incidents for Development Emergency Response Action Plan



Annexes

Incident / Near Miss Report									
INCIDENT / NEAR MISS REPORT									
To: _____						File No.: _____			
Details (To be completed by immediate Supervisor / Supervisor-in-Charge within 24 hours)									
Project: _____						Country: _____			
Contractors Name: _____						Contract No.: _____			
Location of Incident: _____						Date: _____		Time: _____	
Types of Occurrence: Dangerous Occurrence [] Near Miss []									
Description: _____						Sketch (Continued on separate sheet if necessary)			
_____						_____			
_____						_____			
_____						_____			
_____						_____			
_____						_____			
_____						_____			
_____						_____			
_____						_____			
Causing Damage to: _____									
Estimated Cost: _____						Repair Time: _____			
How could this incident have been avoided									
State: _____									

(Mark x one)									
A - Requirements / Guidelines not prepared						Does Incident relate to the one			
B - Requirements / Guidelines not appropriate						of the followings:			
C - Requirements / Guidelines not complied						If yes, mark appropriately			
A	B	C	Descriptions				Emergency Isolation		
			Leadership and Accountability				Ground Disturbance		
			Risk Assessment and Management				Confined Space Entry		
			People, Training and Behaviors				Working at Height		
			Working with Contractors and Others				Lifting Operations		
			Facilities Design and Construction				Vehicle Safety		
			Operation and Maintenance				Management of Change		
			Management of Change						
			Information and Documentation						
			Customers and Products						
			Community and Stakeholder Awareness				Does Incident relate to Dropped Objects?		
			Crisis and Emergency Management				Yes		
			Incident Analysis and Prevention				No		
			Assessment, Assurance and Improvement						
Actions to prevent Reoccurrence									
No.	Action				Responsible Person			Priority	Due Time
1									
2									
3									
4									
5									
6									
What Action is being taken to Prevent Reoccurrence?									
State: _____									

Annexes

Action: Yes [] No [] Date: _____			
Other Comments: _____			
Name: _____		Signature: _____ Title: _____	
Follow-up Review (To be completed by the Engineer's Safety Department)			
Do all actions taken meet the Engineer's satisfaction		Yes [] No []	
If No, please state further actions required: _____			
Close out: Yes [] No []		Date: _____	
Name: _____		Signature: _____ Title: _____	
Distribution: The Employer, The Engineer, Construction Manager, Safety Manager, ...			

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			Working with Contractors and Others					Lifting Operations		
			Facilities Design and Construction					Vehicle Safety		
			Operation and Maintenance					Management of Change		
			Management of Change							
			Information and Documentation							
			Customers and Products							
			Community and Stakeholder Awareness				Does Incident relate to Dropped Objects?			
			Crisis and Emergency Management				Yes			
			Incident Analysis and Prevention				No			
			Assessment, Assurance and Improvement							
Actions to prevent Reoccurrence										
No.	Action					Responsible Person			Priority	Due Time
1										
2										
3										
4										
5										
6										
What Action is being taken to Prevent Reoccurrence?										
State: _____										

_____ Action: Yes [] No [] Date: _____										
Other Comments: _____										
Name: _____ Signature: _____ Title: _____										
Follow-up Review (To be completed by the Engineer's Safety Department)										
Do all actions taken meet the Engineer's satisfaction								Yes [] No []		
If no, please state further actions required: _____										
Close out: Yes [] No []								Date: _____		
Name: _____ Signature: _____ Title: _____										
The Engineer's Review and Comments										

Report to the Employer: Yes [] No [] Lost Work Days: _____ Light Duty Days: _____										
Name: _____ Signature: _____ Title: _____										
Distribution: The Employer, The Engineer, Construction Manager, Safety Manager, ...										

Annexes

Monthly Safety Report (1/4)											
Project											
Country											
Contractors Name:											
Contract No.:											
Reporting Period		From				To					
Job Situation		Start				End					
Document No.											
Type of Accident	Nature of Injury									First Aid	Total
	Eye Disease	Burn	Cut	Bruise	Contusion	Sprain	Fracture	Other	Fatal		
Fall to Different Level											
Fall on Same Level											
Struck against Object											
Struck by Flying or Falling Object											
Collapse											
Struck by Moving Object											
Caught in or between Object											
Cut / Rub											
Stepping on Nails, etc.											
Drowning											
Contact with extreme Temperature											
Contact with Poisonous Substances											
Contact with Electrical Current											
Explosion											
Rupture											
Fire											
Traffic Accident (Public Road)											
Traffic Accident (other)											
Reaction or Overexertion											
Others											
Total											

Approved By	:	Name		Title		Signature	
Prepared By	:	Name		Title		Signature	

Annexes

Monthly Safety Report (2/4)										
Near - Miss Record										
No.	Date	Time	Location	Description of Near-Miss (Brief)	Caused by			Damage		Cause (tick)
					Work Category	Task	Trade	Property (Yes / No)	Psychological (Yes / No)	Unsafe Act / Human Error
										Unsafe Condition / No Procedure
										Wrong Direction / Time Pressure
										Lack of Communication
										Lack of Education
Others										
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										

Approved By	:	Name		Title		Signature	
Prepared By	:	Name		Title		Signature	

Approved By	:	Name		Title		Signature	
Prepared By	:	Name		Title		Signature	

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Note:

(i) Transfer the figures calculated in column (8) in sheet 3 of 4. Total Lost Workdays * 1,000,000; No. of Total Recordable Injuries * 1,000,000

(ii) Frequency Rate of Recordable Injuries = -----

(iii) Transfer the figure calculated in column (5) in sheet 3 of 4. No. of Total Lost Time Injuries * 1,000,000

(iv) Frequency Rate of Lost Time Injuries = -----

(v) Rate of Lost Workdays = -----

(vi) Severity Rate = -----

Approved By	:	Name		Title		Signature	
Prepared By	:	Name		Title		Signature	

Annexes

Crane Detail Inspection Checklist			
Name of Contractor			
Name of Responsible Person			
Type of Crane			
Brand / Model / Serial No.			
Location of Used			
Last Inspection Date			
Parts to be Checked	Descriptions	Condition	
		Yes	No
Guarding	All exposed moving parts such as gears, chains, reciprocating or rotating parts are guarded or isolated.		
Swing Clearance Protection	Materials for guarding rear swing area or Warning Lights & Audible Alarms installed to signal movement of crane.		
High-Voltage Warning Sign	High-voltage warning signs displaying restrictions and requirements installed at the operator's station & at strategic locations on the crane.		
Boom Stops	Shock absorbing or hydraulic type boom stops installed in a manner to resist boom overturning.		
Jib Boom Stops	Jib stops restraints installed to resist overturning.		
Boom Angle Indicator	Boom angle indicator readable from Operator station installed accurately to indicate boom angle.		
Boom Hoist Disconnect, Automatic Boom Hoist Shutoff	Boom hoist installed with disconnect safety shutoff or hydraulic relief to automatically stops the boom hoist when the boom reaches a predetermined high angle.		
Two-Blocking Device	Cranes with telescoping booms equipped with two-blocking damage prevention feature that has been tested on-site in accordance with manufacturers requirements.		
	Cranes hydraulic and fixed boom type used to hoist personnel equipped with two-blocking devices on all hoist lines.		
	Anti-two blocking device installed has automatic capabilities for controlling functions that will cause a two-blocking condition.		
Power Controlled Lowering	Cranes use to hoist personnel equip with power controlled lowering operation on all hoist lines.		
	Check clutch, chains, and sprockets for wear.		
Leveling Indicating Device	Leveling device provided on crane.		
	Crane leveled during set up.		
Sheaves	Sheave grooves smooth and free from surface defects, cracks, or worn places that will cause rope damage.		
	Flanges not be broken, cracked, or chipped.		
	Bottom of sheave groove form a close-fitting saddle for the rope used.		
	Lower load blocks equipped with close fitting guards.		
Main Hoist and Auxiliary Drums System	Minimum number of wraps to remain on the drum.		
	Condition of drum grooves		
	Condition of flanges at the end of drum.		
	Rope end attachment		
	Spooling characteristics of rope.		
	Rope condition.		
Main Boom, Jib Boom, Boom Extension	Boom jibs, or extensions, not cracked or corroded.		
	Bolts and rivets tightly installed.		
	Certification that repaired boom members meets manufacturer's original design standard documented and submitted.		
	Any non-certified repaired to boom members.		
Load Hooks and Hook Blocks	Hooks and blocks permanently labeled with rated capacity.		
	Hooks and blocks are counterweighted to the weight of the overhaul line from highest hook position.		
	Hooks will not have cracks or throat openings more than 15% of normal or twisted off center more than 10% from the longitudinal axis.		
	All hooks used to hoist personnel equipped with effective positive safety catches especially on hydraulic cranes.		
Hydraulic Hoses Fittings and Tubing	Flexible hoses show no signs of leaking at the surface or its junction with the metal and couplings.		

Annexes

	Hoses show no blistering or abnormal deformation to the outer covering and no leaks at threaded or clamped joints that cannot be eliminated by normal tightening or recommended procedures.		
	No evidence of excessive abrasion or scrubbing on the outer surfaces of hoses, rigid tubing, or hydraulic fittings.		
Outriggers	Outrigger number, locations, types and type of control are in accordance with manufacturer's specifications.		
	Outriggers visible to the operator or a signal person during extension or setting.		
Load Rating Chart	A durable rating chart(s) with legible letters and figures will be attached to the crane in a location accessible to the operator while at the controls. The rating charts will contain the following:		
	A full and complete range of manufacturer's crane loading ratings at all stated operating radius.		
	Optional equipment on the crane such as outriggers and extra counterweight which effect ratings.		
	A work area chart for which capacities are listed in the load rating chart, i.e., over side, over rear, over front.		
	Weights of auxiliary equipment, i.e., load block, jibs, boom extensions.		
	A clearly distinguishable list of ratings based on structural, hydraulic or other factors rather than stability.		
	A list of no-load work areas.		
	A description of hoist line reeving requirements on the chart or in operator's manual.		
Wire Rope	Main hoist and auxiliary wire rope inspection will include examining for Broken wires.		
	Excess wear.		
	External damage from crushing, kinking, cutting or corrosion.		
Cab	Contains all crane function controls in additional to mechanical boom angle indicators, electric wipers, dash lights, warning lights and buzzers, fire extinguishers, seat belts, horn, and clear unbroken glass.		
Braking Systems	Truck cranes and self-propelled cranes mounted on rubber-tired chassis or frames will be equipped with a service brake system, secondary stopping emergency brake system and a parking brake system.		
	The braking systems will have been inspected and tested and found to be in conformance with applicable requirements.		
	Crawler cranes are provided with brakes or other locking devices that effectively hold the machine stationary on level grade during the working cycle.		
	The braking system will be capable of stopping and holding the machine on the maximum grade recommended for travel. The brakes or locks are arranged to engage or remain engaged in the event of loss of operating pressure or power.		
Turntable/Crane Body	Make sure that the rotation point of a crane gears and rollers are free of damage, wear and properly adjusted and the components are securely locked and free of cracks or damage.		
	The swing locking mechanism will be functional (pawl, pin) and operated in the cab.		
Counterweight	The counterweight approved and installed according to manufacturer's specifications with attachment points secured.		
Name of Inspector			
Position / Title			
Date of Inspection			
Signature			

Annexes

Sample of Risk Assessment and Management				
Risk Assessment and Management				
Project:				
Contractors Name:				
Country:				
Contract No.:				
Task:		Excavation and Backfill		
Identify Hazard (Potential to do harm)	Hazard Effect (If the Hazard is released)	Risk Ranking	Control Measures (PPE, Procedures, etc.)	Recovery Measures
Heavy Rain Flooding	Collapse of Walls of Trench or Excavation, Injuries to Personnel	Low	After rain and before the work commences excavation - Trench shall be checked by the Supervisor	First Aid, Clinic, Hospital
Underground Electrical Cables Services	Electrocution of persons or Damage to Services	High	Excavation Permit before start excavation. Use of Cable Detectors, As built Drawings and Cable Protection Boards	Emergency Procedures (No. _____)
Insufficient, Incorrect Barriers Insufficient Signage	Persons or Machinery Falling into Excavation	Med	Pre - work Site Inspection, Tool Box Talks, Training Barricading Procedure (No. _____)	Emergency Contact:
Side Wall, Banking Collapse	Crush Injuries, Asphyxiation of Personnel	Med	Correct Angle of Repose, Battening as Necessary Excavation Procedure	
Excavation Beside Existing Facilities	Collapse of Structure, Crush Injuries, Death	High	Excavation Permit before start excavation. Shoring & Scaffolding	
Open Trench, Ditch	People, Machinery and Animals falling in.	Med	Barriers, Signage, Flash Lamp Toolbox Talks	
Equipment Operators Lack of Competence	Collision, Trench Collapse Damage to Machinery	Med	Use only Experienced Operators (5Years min) Training, Assessments Competent Person Designation	
Uneven Soft Floor Surface	Slips, Trips, Falls	Low	Toolbox Talks, PPE, Grading	

Approved By	:	Name		Title		Signature	
Prepared By	:	Name		Title		Signature	

Annexes

Risk Assessment and Management					
Project:					
Contractors Name:					
Country:					
Contract No.:					
Task:		Working at Height			
Identify Hazard (Potential to do harm)	Hazard Effect (If the Hazard is released)	Risk Ranking	Control Measures (PPE, Procedures, etc.)	Recovery Measures	
Scaffolding	Defective scaffolding resulting in collapse leading to injury/fatality	High	Only proprietary materials to be used. Erection to be done by trained persons. Full supervision Procedure- No. _____	First Aid, Clinic, Hospital	
Access to scaffolding	Insecure or substandard ladder leading to falls and injury	Med	Scaffolding access to comply with Procedure- No. _____ Provision of Scaff tag	Emergency Procedures (No. _____)	
Unguarded platforms	Fall from height leading to injury/fatality	High	Persons working on unguarded areas shall wear harness and lifelines. Tag System Fall Protection Procedure - No. _____	Emergency Contact:	
Unauthorized personnel	Personnel climbing scaffolding falling leading to injury/fatality	High	Barriers and signboards to be erected to prevent access of third parties		
Unsafe Scaffolds	Collapse, Injury, Fatality	High	Daily Inspection, RED Scaff Tag Procedure- No. _____		

Approved By	:	Name		Title		Signature	
Prepared By	:	Name		Title		Signature	

Risk Assessment and Management					
Project:					
Contractors Name:					
Country:					
Contract No.:					
Task:		Heavy Lifting Operations (1/2)			
Identify Hazard (Potential to do harm)	Hazard Effect (If the Hazard is released)	Risk Ranking	Control Measures (PPE, Procedures, etc.)	Recovery Measures	
Mechanical Failure/Defective	Dropping of Load leading to Fatality	High	Machinery Inspection and Maintenance Procedures No. _____	First Aid, Clinic, Hospital	
Incorrect Rigging/Unstable Load	Dropping of Load leading to Fatality	High	Checking by Qualified Supervisor. Competent Person Designation. Procedure- No. _____	Emergency Procedures (No. _____)	
Unstable Ground Conditions Undeployed Out Riggers	Crane Overturning leading to Fatality	High	Check on Ground Conditions by Supervisor before Start of Work. Cranes & Lifting Operation Procedure- No. _____	Emergency Contact:	
Overloading of Crane	Crane Overturning/Dropping of Load leading to Fatality	High	Crane to be fitted with Overload Computer and Alarm. Cranes & Lifting Operation Procedure- No. _____		
Use of Damaged Lift Equipment	Dropping of Load leading to Fatality or Damage to Equipment	High	Checking by Competent Person before lift begins. Competent Person Designation. Procedure- No. _____		
No Load Plan/ Incorrect Choice of Equipment	Dropping of or Collision of Load leading to Fatality	High	Correct Rigging Practices. Cranes & Lifting Operation Procedure- No. _____		
Incompetent, Inexperienced Operators, Flagmen, Rigger and Slings	Dropping of or Collision of Load leading to Damage,	High	Training. Qualified Rigger and Flagman. Qualified Trained, Experienced Operators. Competent Person		

Annexes

	Fatality or Personnel Injury		Designation. Procedure- No. _____	
Risk Assessment and Management				
Project:				
Contractors Name:				
Country:				
Contract No.:				
Task:		Heavy Lifting Operations (2/2)		
Identify Hazard (Potential to do harm)	Hazard Effect (If the Hazard is released)	Risk Ranking	Control Measures (PPE, Procedures, etc.)	Recovery Measures
Bad Attitude, Complacency, Bad Behavior, 3rd Party Interference	Loss of Load, Control. Leading to Major Injury, Trapped Limbs, Fatality	High	Training, Competent Personnel Selection. Tool Box Talks and Briefings by Supervisor, Foreman before Start of work. Competent Person Designation. Procedure- _____	
Adverse Weather, Poor Visibility, Poor Communication	Crane Overturning, Dropping of Load, Leading to Fatality	High	Avoid Operation in bad weather conditions. Training, Lifting Plan (No. _____), Experienced Operators, Flagmen.	
Lack of or Incorrect PPE	Personnel Injury	Med	Issue PPE as per Health and Safety Plan. PPE Procedure- No. _____	

Risk Assessment and Management				
Project:				
Contractors Name:				
Country:				
Contract No.:				
Task:		Electricity		
Identify Hazard (Potential to do harm)	Hazard Effect (If the Hazard is released)	Risk Ranking	Control Measures (PPE, Procedures, etc.)	Recovery Measures
Working near Overhead lines	Vehicle load or equipment near or touching line leading to electrocution	High	Erection of goalposts at approach to Overhead Lines at sites and access roads. Install of Sign boards.	First Aid, Clinic, Hospital
Underground cables	Excavation equipment hitting underground line leading to major injury and severe Damage to the Public.	High	Excavation Permit system, Training, Hand Excavation. Cable Detectors/As-built drawings. Full Supervision.	Emergency Procedures (No. _____)
Power Tools	Defective tools / insulation leading to electrocution.	Med	Weekly inspection by supervisor and daily inspection by operator of tools.	Emergency Contact:
Electricity in Switchgear	Incorrect identification during tie in leading to electrocution.	High	Work to be conducted by Competent Personnel. Barriers and flags to be used. Lock Out Tag Out Procedure.	
Failure to Barricade Worksite	Electrocution, Burns, Fatalities	Med	Work to be conducted by Competent Personnel. Barriers and flags to be used.	

Approved By	:	Name		Title		Signature	
Prepared By	:	Name		Title		Signature	

11 COMMENT -RESPONSE MATRIX

Sl.No.	Comments by PIU	Chapter no. & Section	Response
1	In Executive Summary, approximate requirement of land is written 946.485 acres, while in Table 10.2 it is 783.665 acres. Pls. check and correct this figure.	Executive Summary, Table: 10.2	Corrected
2	-Clearence for the project authority should be DOE under MOEFCC -Regarding permission to establish Construction camps: DOE, Agreement with landowner and Consultation meeting with community for establishing camps. -Labor License is not required. License is required for labor organization which is issued by Labor & Employment Ministry. -Extraction of GW; Permitting Authority DPHE & UP	Chapter-2, Table: 2.3	Corrected
3	-It has been written Bhomra & Navaron as a District. -It has been written Jamuna as a prominent river under Satkhira district. Pls. correct those.	Chapter-3, Page: 27	Corrected
4	-Pls. correct LAP & LOT number considering final road design & District boundary.	Chapter-3 Page: 27. Table 2.3	Addressed Accordingly
5	-It has been written Proposed structure under LOT-L. It has been written Proposed structure under LOT-LL, LLC, LV Pls. correct LOT number as well as type and number of structures in consultation with Design team.	Chapter-3, Page 38. Table: 3.5, 3.6	
6	-There must be some drains on both side of bridge at Navaron.(Bridge on Road,at starting of grade separation)	Chapter-3, Page: 44. Table: 3.7	Addressed
7	-In Bagachra area,farmers cultivate 1-2 crops a year. -In Kolaroa area, farmers cultivate 1-2 crops a year -In Bagachra town, considered existing alignment Wirth grade separation. But, in Final Design, it has been considered bypass. Bagachra area low-lying area. So, how they cultivate 1-2 crops a year?	Chapter-3, Page: 51& 52	Corrected
8	-Implementation Schedule: It does not match with the project document.	Chapter-3, Page: 52	Corrected as per Design Team information
9	-In figure, Existing alignment has been shown as a proposed alignment for Bagachra urban area -Table reference shown error in paragraph 227 and 228 Please correct those.	Chapter-5, Page: 105/106	Corrected
10	-In comparison of alignment options, Grade separation is considered in Bagachra urban area instead of bypass which is not match with final design.	Chapter-5, Table: 5.1	Corrected