PUBLIC WORKS DEPARTMENT
GOVERNMENT OF MEGHALAYA

PROJECT NAME: PREPARATION OF DETAILED PROJECT REPORT (DPR) FOR ROADS IN (MEGHALAYA WEST) UNDER MEGHALAYA INTEGRATED TRANSPORT PROJECT(MITP)

ROAD NAME: **MITP TOURISM ROAD**

ENVIRONMETAL MANAGEMENT PLAN

Date of Release: 21.03.2022
Prepared:DR.BPS & MS.PB
Checked: DR.BPS & MS.PB
Approved: DR.BPS

LIST OF ABBREVIATIONS

CPCB	-	Central Pollution Control Board
EA	-	Executing Agency
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Monitoring Plan
ESZ	-	Eco-Sensitive Zone
GoI	-	Government of India
IFC	-	International Finance Corporation
IRC	-	Indian Road Congress
MDR	-	Major District Road
MoEF&CC	-	Ministry of Environment and Forests & Climate Change
MoRT&H	-	Ministry of Road Transport and Highways
MPWD	-	Meghalaya Public Works Department
NBWL	-	National Board for Wildlife
NGO	-	Non-government Organization
NH	-	National Highway
OP	-	Operational Policy
PAF	-	Project Affected Person
PMGSY	-	Pardhan Mantri Gram Sadak Yojana
RF	-	Reserve Forest
ROW	-	Right of Way
SPCB	-	State Pollution Control Board
TOR	-	Terms of Reference

Table of Contents

1. INTRODUCTION

1.1 Background

Meghalaya has been one of the most tourist friendly states of the eight states of the north eastern region and also serves to provide regional interconnectivity between Barak valley and the Brahmaputra valley. The West Meghalaya has been one of the beautiful hill areas in Meghalaya which has the capacity to be developed as tourist hub and horticulture productivity hub in recent future.

The Road transport is the backbone of the state‟s socio-economic development. More than 80 percentage of freight and almost cent percentage of passenger movement within the state depends on roads. Yet, about half of the habitations lack all-weather road access. Further, many semi-permanent timber bridges are in dilapidated condition, limiting maximum allowable axle load on them. The problem is further compounded by difficult terrain and extreme climatic condition, leading to high maintenance cost of the roads.

Similarly, rapid urbanization has created a huge gap between demand and supply of urban services and infrastructure. It has been assessed that other than Shillong, urban mobility at other cities and towns of the state are less than satisfactory1. In most of the towns due to narrow roads, lack of parking facilities and yearly growth of vehicles, traffic congestion is often evident. Further, in most cases the major highway passes through the city center as a result of which regional traffic comes in conflict with the local traffic.

To overcome the abovementioned challenges in a holistic and all-inclusive manner, the Government of Meghalaya, with financing and technical support from the World Bank, is preparing a project titled “Meghalaya Integrated Transport Project”. The objective of the project is to “provide a well-connected efficient, good quality and safe transport network on long-term basis in a cost-effective manner maximizing economic and social outcomes”. This will involve taking a whole-of-the-state approach of the entire transport sector and introduce innovations, efficiency, and new ways of doing business at various stages of service delivery, ensuring value for money.

This will involve:

- Integrating transport and development agenda thus resulting in more job-creation, better incomes, and realization of the SDGs;

- Integrating various modes of transport – such as roads, ropeways, waterways, and urban transport to operate as part of one system for optimal performance;
- Integrating climate resilience, green growth, asset management, and safety in the transport sector thus making the sector more resource efficient, reducing carbon footprint, minimizing GHG and contributing to health outcomes.

The Government of India thus, on behalf of Government of Meghalaya has applied for financing an amount of US$ 150 Million equivalent from the World Bank for MEGHALAYA Integrated transport project, **MITP Phase - I Roads**. Up-gradation of tourism roads will be carried out in phases. The Department of Economic Affairs (DEA) and The World Bank (WB) has accorded in principle approval of Tranche-I of MITP for US$ 150 million. Four roads has been under proposal to develop for tourism boost in Meghalaya. The Government of India thus, on behalf of Government of Meghalaya has applied for financing an amount of US$ 110 Million equivalent from the World Bank for MEGHALAYA Integrated transport project, The Meghalaya PWD has prepared DPR (Detailed Project Road) for tourism roads in East Meghalaya as part of whole MITP (Table 1-1).

Table 1-1: MITP Tourism Roads

	District	Name of Road	Category	Total Length	Length Proposed in MITP (km)
East Meghalaya (Khasi and Jaintia Hills)					
1	Eastern West Khasi Hills	Construction of Approach Road from Niangmer to Sohmylleng for Development of Tourism Infrastructure under	Tourism Road	2.971	2.971
2	Eastern West Khasi Hills	Construction of Approach Road from Mawphanlur to Mawthadraishan for Development of Tourism Infrastructure	Tourism Road	3.545	3.545
3	Eastern West Khasi Hills	Construction of Approach Road from Laitartet to Nonglyput for Development of Tourism Infrastructure	Tourism Road	3.050	3.050
4	East Khasi Hills	Construction of approach Road from Mawklot to Umiam Road to Trekking path	Tourism Road	0.600	0.600

The Chief engineer of MPWD serves as a project proponent for the above roads and the contact details is given in Table 1-2.

Table 1-2: PIU / Project Proponent Contact Details

Sl. No	PIU/ Project Proponent Contact Details	
1	Name of the applicant/ Proponent	The Chief Engineer, PWD
2	Registered Address	PWD, Shillong, Meghalaya
3	Address for correspondence: Name Designation(Owner/Partner/CEO) Address Pin Code E-mail Telephone no Fax No	The Chief Engineer Office of the Chief Engineer PWD, Government of Meghalaya Shillong Shillong, Meghalaya cenhwbmitp@gmail.com +91- +91-

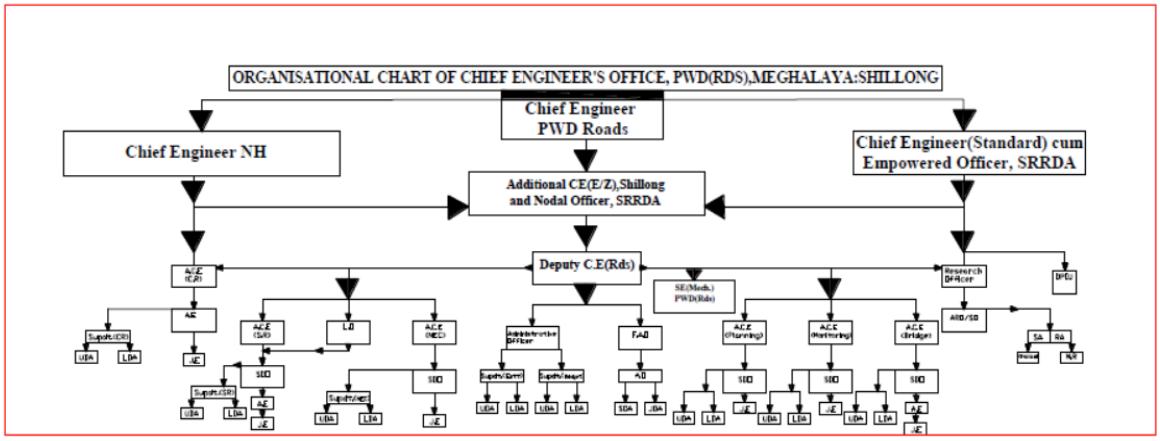


Figure 1-1: MPWD Organization Structure

The project roads prioritized for design shall be subjected to Environmental Assessment (EA) /Social Assessment (SA) as per the requirements of Government of India (MoEF) and the World Bank. It is also decided that EA projects and project surveys will be undertaken by appointing external consultants. The task of Environmental and Social Assessment of above roads is entrusted to Dr. Bhrigu Prasad Saikia, Environmental Specialist and Mr. Prafulla Hazwary Leo as Social Expert during public consultations.

1.2 Description of the Project Road

The Government of Meghalaya (GoM) plans to improve the state road network under Improved Transport Connectivity Rehabilitation of Roads under Phase-I in West Meghalaya Programme i.e. MEGHALAYA Integrated transport project (MITP) with the help of World Bank funding. This project comprises of two components namely Improved Transport Connectivity Rehabilitation of Roads. Under this programme the following roads has been taken:

Sl.no.	District	Name of Road	Category	Length to be taken in Km
1	Eastern West Khasi Hills	Construction of Approach Road from Niangmer to Sohmylleng for Development of Tourism Infrastructure under	Tourism Road	2.971
2	Eastern West Khasi Hills	Construction of Approach Road from Mawphanlur to Mawthadraishan for Development of Tourism Infrastructure	Tourism Road	3.545
3	Eastern West Khasi Hills	Construction of Approach Road from Laitartet to Nonglyput for Development of Tourism Infrastructure	Tourism Road	3.050
4	East Khasi Hills	Construction of approach Road from Mawklot to Umiam Road to Trekking path	*Tourism Roads*	*0.600*

MAP Showing Tourism Project Roads

At present these roads are of earthen in most part. The planned work requires new road construction on existing earthen road. The improvements have been planned by carrying out economic viability of each project route. The MITP project will provide connectivity of tourism attractions, faster traffic movement and project benefits in terms of reduction in vehicle operation costs (VOC) and travel time. The planned up-gradation may result into some adverse environmental impacts.

The above roads has been the one of the important tourism roads in those locations (as per project ToR).

Figure 1-2: *Niangmer to Sohmylleng Road* Corridor Map

1.3 Purpose of Environment Assessment Report

This Environmental Impact Assessment Report has been prepared for ***All Four Tourism Roads*** included in the table in order to identify all relevant direct, indirect and cumulative environmental and social risks and impacts for construction and operational phase. Preparation Environment Management Plan for each road section to mitigate the potential impacts on the physical, biological and socio-economic parameters.

The environmental assessment study was done between the months of February-March 2022 as part of detailed project report. This is draft Environmental Impact Assessment (EIA) report prepared to fulfill requirements of the Operational Policy 4.01 for World Bank funded Project

The environmental and social risks and impacts related to the proposed project activities have been classified into 'Category C'' as per which a proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impact. For Category C projects that are not in environmentally sensitive areas and that present well-defined and well-understood issues of narrow scope, the Bank may accept

alternative approaches for meeting EA requirements: for example, environmentally sound design criteria, siting criteria, or pollution standards for small-scale industrial plants or rural works; environmentally sound siting criteria, construction standards, or inspection procedures for housing projects; or environmentally sound operating procedures for road rehabilitation projects.

Objective and Scope of the Environment Assessment

The objective of the present assessment is to identify potential environmental impacts of the proposed ***Tourism Road*** improvement measures and formulate strategies to avoid / mitigate the same. The scope of work to accomplish the above objective, comprise the following.

- Collecting primary and secondary environmental baseline data within the project boundary and surrounding areas; Assessing potential adverse environmental impacts that might arise during operation of the Project after reviewing Project information and using the environmental baseline study conducted during the feasibility study;
- Suggesting appropriate mitigation measures to effectively manage potential adverse impacts; and
- Analyze the alternatives in terms of alternative alignment, technology, design and operation, including the “with project” and "without project" situation were carried out to analyse the feasibility
- Consultation with the Public/Stakeholders and incorporate their concerns into the project design;
- Developing an Environmental Management Plan (EMP) to implement suggested mitigation measures and management plans to minimize adverse impacts through effective management systems including formulation of monitoring and reporting requirements;
- Conducting additional studies for the enhancement of the benefit to the local Community and the road users;

The environmental studies have been confined to the situation around the deemed areas of direct influence caused by constructional and operational facilities along ***Tourism Road***, the proposed tourism road in the state of Meghalaya. The following sections of the

report, discusses the methodology adopted by the consultant in conducting the study and presents the results of the same.

1.4 Approach and Methodology Adopted for Environmental Assessment Study

The Environmental Impact Assessment has been carried out, in accordance with the requirements of the World Bank‟s Operational Policy 4.01. The Government of India guidelines for Rail/Road/Highway project; EIA notification 2006 and its amendment of MoEFCC and Highway Sector EIA guidance manual 2010 has also been followed in the process of this environmental assessment. The study methodology has been adopted in such a manner to ensure that environmental concerns are given adequate weightage in the selection of alignment and design of proposed road improvements. The study in the road section project employ an iterative approach in which potential environmental issues have been examined at successive levels in detail and specificity, at each step in the process.

The Environmental assessment is based on the information collected from secondary as well as primary sources on various environmental attributes. Monitoring of air, water, noise and soil quality was also carried out along the road section alignment and significant issues were examined during field surveys to determine the magnitude of significant environmental impacts.

(viii) Environmental Management and Monitoring

The final stage in the EIA Process is definition of the management and monitoring measures that are needed to ensure: a) impacts and their associated Project components remain in conformance with applicable regulations and standards; and b) mitigation measures are effectively implemented to reduce the effects to the extent predicted.

An Environmental Management Plan, which is a summary of all actions which the Project has committed to execute with respect to environmental/social/health performance for the Project, is also included as part of the Bidding Documents. The Environmental Management Plan includes mitigation measures, compensatory measures and offsets and management and monitoring activities.

2. PROJECT DESCRIPTION

The Chief Engineer PWD (Standard), Meghalaya will be the employer and executing agency for the consultancy services for design of the proposed *Tourism **Road*** in Meghalaya and the standards of output required from the appointed consultants are of international level both in terms of quality and adherence to the agreed terms & conditions and time schedule.

The instant proposal is to carryout Detailed Project Report (DPR) of the above-mentioned road project.

2.1 **Objective of the Project:** To improve transport connectivity and efficiency and modernization of transport institutions in Meghalaya. The project will focus "to provide a well-connected efficient, good quality and safe transport network on long-term basis in a cost-effective manner maximizing economic and social outcomes". This will involve:

(i) Integrating transport infrastructure with transport services to reduce overall transport costs thereby increasing the competitiveness of agricultural, industries, and businesses;

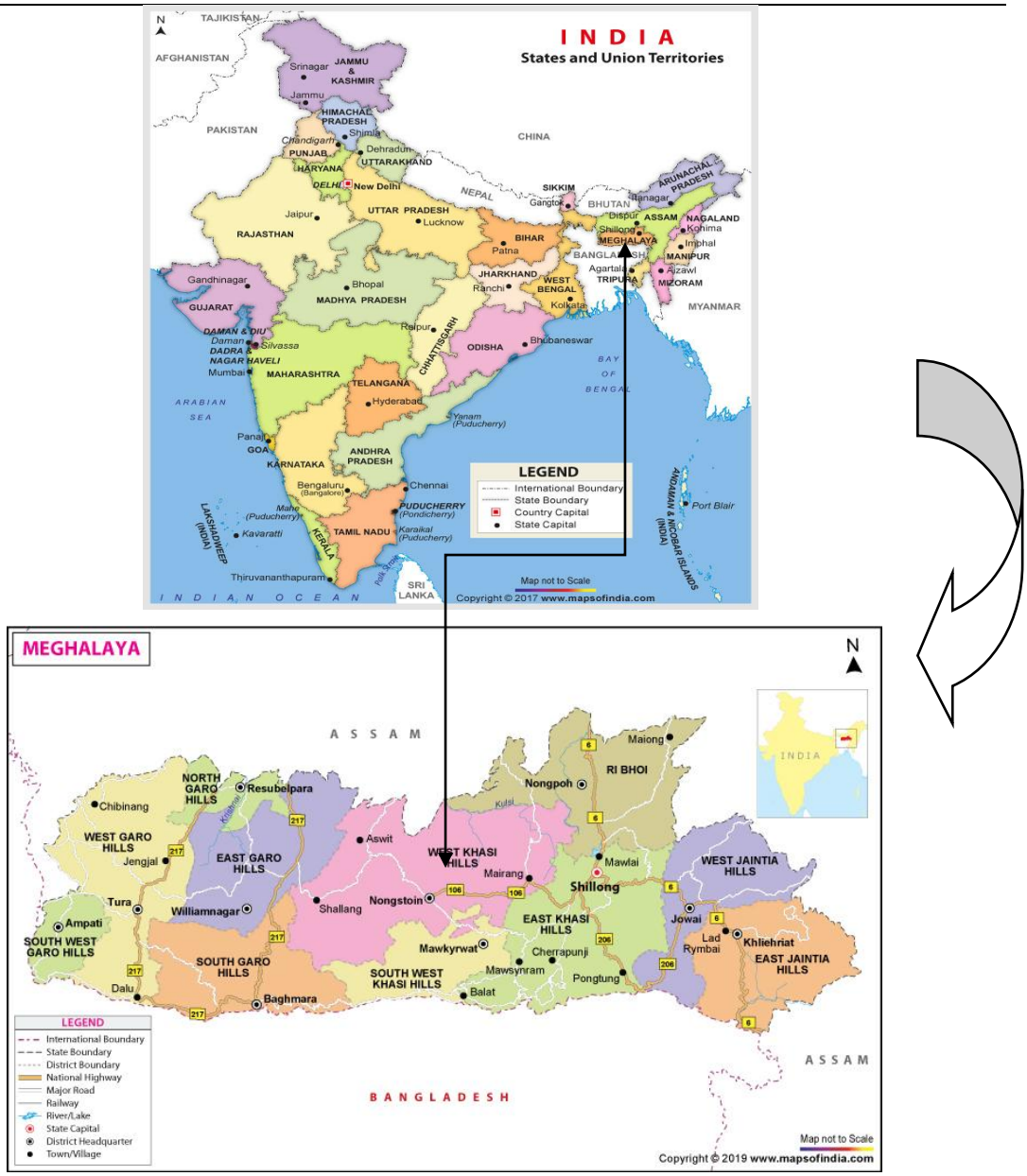
(ii) Integrating climate resilience, green growth, asset management, and safety in the transport sector thus making the sector more resource efficient, reducing carbon footprint, minimizing GHG and contributing to health outcomes.

2.2 Project Scope:

As part of the development policies, Government of Meghalaya is implementing various programs for development of tourism, agriculture, handicrafts, rural livelihood, employment generation, and women empowerment. It is perceived that adequate transport infrastructure and efficient transport services (focus of the proposed project) are essential for successful implementation of these programs. **Table 2.1 .The location plan of project road is shown below**:

	District	Name of Road	Category	Total Length (km)	Length Proposed in MITP (km)
East Meghalaya (Khasi and Jaintia Hills)					
1	Eastern West Khasi Hills	Niangmer to Sohmylleng	Tourism Road	2.971	2.971
2	Eastern West Khasi Hills	Mawphanlur to Mawthadraishan	Tourism Road	3.545	3.545

3	Eastern West Khasi Hills	Laitartet to Nonglyput		Tourism Road	3.050	3.050
4	East Khasi Hills	Mawklot to Umiam Road		Tourism Road	0.600	0.600



(i) Location Plan

3. POLICY LEGAL AND ADMINISTRATIVE FRAMEWORKS

3.1 Introduction

To address environmental risks of the project and its associated components and to protect and conserve the environment from any adverse impacts, the regulations, policy and guidelines enacted by the Government of India and Government of Meghalaya which must be followed are presented in the sections below. In addition, The World Bank have their own set of requirements i.e. the Operational Policy to which any project funded by them must also ensure compliance.

. This Section focuses on the administrative framework under the purview of which the Project will fall and the EIA study will be governed, namely:

• The national and local, legal and institutional framework;

• World Bank Policies and framework; and

• International Safeguard Requirements.

3.2 Government (India) Environmental Legal Framework

. The national legal framework of India consists of several acts, notifications, rules and regulations to protect environment and wildlife. In 1976, the 42nd Constitutional Amendment created Article 48A and 51A, placing an obligation on every citizen of the country to attempt to conserve the environment.

The environmental impact assessment requirement in India is based on the Environment (Protection) Act, 1986, the Environmental Impact Assessment Notification, 2006 (amended 2009), all its related circulars, MOEF&CC‟s Environmental Impact Assessment Guidance Manual for Highways 2010 and IRC Guidelines for Environmental Impacts Assessment (IRC:104-1988) of highway projects. In addition to road widening and rehabilitation including establishment of temporary workshops, construction camps, hot mix plants, and opening of quarries for road construction work require to comply with provisions of The Forest (Conservation) Act 1980 (Amended 1988) and Rules 1981 (Amended 2003): The Wildlife (Protection) Act, 1972 (Amended 1993); The Water (Prevention and Control of Pollution) Act 1972 (Amended 1988) and Rules 1974; The Air (Prevention and Control of Pollution) Act, 1981 (Amended 1987) and Rules 1982; The Noise Pollution (Regulation and Control) Rules, 2000 (Amended 2002) and Hazardous

Waste (Management, Handling and Trans-boundary Movement) Rules 2008 (Amended 2009).

3.3 Environmental Clearance Procedure

No environmental clearance required as it a category C Project as per the World Bank guidelines and all tourism roads has no/minimal land acquisition, has only up gradation works only

3.4 Environmental Standards and Code of Practices

In order to understand the extent of the environmental and social assessment for the proposed improvement works, applicable laws, legislation and policies were reviewed and presented in the following sections. A summary of applicable rules and regulation is furnished in Table 3-1.

Table 3-1: Summary of Environmental Legislation Applicable for Proposed Project

National Act	Year	Objective	Responsible Institution
Environment (Protection) Act.	1986	To protect and improve the overall environment	MoEF, CPCB
Notification on Environment Impact Assessment of Development projects (and amendments) (referred to as the Notification on Environmental Clearance)	2006 2009	To provide environmental clearance to new development activities following environmental impact assessment.	MoEF, CPCB
Wildlife Protection Act	1972	To protect wild animals and birds through the creation of National Parks and Sanctuaries	MoEF
Forest (Conservation) Act	1980	To protect and manage forests	MoEF
Water (Prevention and Control of Pollution) Act (and subsequent amendments)	1974	To provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water.	CPCB
Air (Prevention and Control of Pollution) Act (and subsequent amendments)	1981	To provide for the prevention, control and abatement of air pollution, and for the establishment of Boards to carry out these purposes.	CPCB and PWD
The Land Acquisition Act	1894 1984	Set out procedures for acquisition of land by government	Revenue and disaster management department, Meghalaya
Central Motor Vehicle Act Central Motor Vehicle Rules	1988 1989	To control vehicular air and noise pollution. To regulate development of the transport sector, check and control vehicular air and noise pollution.	Transport Department, Meghalaya
National Resettlement and Rehabilitation Policy	2007	Addressing impacts on affected persons due to all	MoRD and respective state institutions

National Act	Year	Objective	Responsible Institution
		development projects	undertaking the development projects
Meghalaya Government"s Guidelines for Compensatory Afforestation	2000	Focus on mitigating environmental impact associated with any infrastructure development projects in the state	Department of Environment and Forest, Meghalaya
Draft National Policy on Tribal"s	2004	The main objective is to facilitate overall development and welfare of the tribal people	Department of Social Welfare
Ancient Monuments and Archaeological sites and Remains Act	1958	Conservation of Cultural and historical remains found in India.	Archaeological Dept. GOI, Indian Heritage Society and Indian National Trust for Art and Culture Heritage (INTACH).

Source: GoI, MoEF & GoM

3.4.1 World Bank Environmental Requirements

A review of all applicable operational policies / directives of The World Bank and environmental laws / regulations in India, was carried out in this task. Measures designed to address the operational policies of The World Bank are as follows-

Safeguard Policies	**Triggered?**	**Measures Taken**
Environmental Assessment OP/BP 4.01	Yes	In compliance with OP 4.01, an Environmental and Social Management Framework (ESMF) has been prepared which includes procedures and mitigation methods along with appropriate institutional arrangements for screening and reviewing sub-projects. Screening, Community Consultation, and corridor specific ESIA with EMP has been prepared for the road. The suggestions from public consultation and findings of the assessment were integrated into the Detailed Project Report (DPR) to reduce environmental and social impacts.
Performance Standards for Private Sector Activities OP/BP 4.03	No	
Natural Habitats OP/BP 4.04	**No**	Not a rich aquatic biodiversity areas has been observed in the project area
Forests OP/BP 4.36	**No**	No forest observed in the area.
Pest Management OP 4.09	No	
Physical Cultural Resources OP/BP	No	Not found

4.11		
Indigenous Peoples OP/BP 4.10	Yes	Meghalaya is pre-dominantly tribal state and there is presence of tribes in the road corridor. As more than 85% of the community is tribal, IPDP has been prepared in consultation with the community that will be implemented in the road corridors.
Involuntary Resettlement OP/BP 4.12	No	No land to be acquired as road will be constructed on a exiting earthen road to the village.
Safety of Dams OP/BP 4.37	No	
Projects on International Waterways OP/BP 7.50	N/A	Not applicable

4. ENVIRONMENTAL SCREENING REPORTS

4.1 Introduction

This section describes the existing environmental and social baseline of the study area around the Project Road. It includes relevant components of physical, biological and socio-economic environment.

The purposes of describing the environmental screening or assessment of the study area are:

- To understand the project needs and environmental characteristics of the area; and
- To assess the quality of the existing environment, as well as the environmental impacts of the future developments being studied.

4.2 The screening reports

The screening reports are as follows-

Screening Checklist Mawphanlur to Mawthadraishan

Name of the sub-project	Construction of Approach Road from **Mawphanlur to Mawthadraishan** for Development of Tourism Infrastructure under Eastern West Khasi Hills District in the State of Meghalaya under Meghalaya Integrated Transport Project (MITP), funded by World Bank
Size of the project (approx. area in sq. mt/hac or length in mt/km, as relevant)	Length = 3.545 Km
Location of the proposed sub-project	Mawthadraishan Block of Eastern West Khasi Hills district in Meghalaya.
Name of the of the district, block	Mawthadraishan Block of Eastern West Khasi Hills district
Name of the settlement/ area, where the bridge is located	N/A
Latitude and longitude	Start Point: - Latitude- $25^0$32'26.96", Longitude- $91^0$25'38.77" End Point:- $25^0$32'29.37", Longitude- $91^0$27'12.89"
New construction/ repair/ rehabilitation/ expansion(if there is an existing bridge, please share picture of old bridge. Also, the approach roads.)	New Construction. From 0.00 Km to 1.100 Km the alignmnet of the road passes through existing earthen track with 6/7.5 m Formation width. Beyond 1.100 km, completely new alignment passing through jungle up to the end point i.e. Ch. 3.545 Km
If expansion, then is there any need of new land	Since it is a new construction, new land is required through which the proposed road passes.
If yes, please share detail: - Total requirement	Total requirement of land is for a length of 2.445 Km (*3.545 Km - 1.100 Km*) with a formation width of 6 m
- Private land	2.445 Km of Length with aformation width of 6 m
- Govt. land - Forest land	
What is the High Flood Level in the sub-project area?	-

Sl. No.	Environmental & Social Features	Presence within 500mts from activity sites (Yes/No) If yes, mention distance inkm)	Type of Impact (+ or -)	Significance of Impact (High (H), Medium (M), Low (L))	Likelihood of Impact (Likely, Unlikely)	Description of Impact	Mitigation Mesures
Physical Environment							
1	Springs	Yes					Cross drainage has been proposed where spring water crosses the proposed road alignment
2	Standing water bodies (ponds, lakes, etc.)	Yes					Mawphanlur Lake located within 100 m aerial distance from the road alignment towards downhill side
3	Flowing water bodies (rivers, rivulets, streams, canals, etc.)	No	N/A	N/A	N/A	N/A	
4	Ground water sources (open wells, bore wells, etc.)	No	N/A	N/A	N/A	N/A	
5	Meandering River	No	N/A	N/A	N/A	N/A	
6	Erosion prone stretches	Yes	(+)	H	Likely		Protection works have been proposed on locations where there are prone to landslide
7	Areas with high slope (higher than 15 percent)	No	N/A	N/A	N/A	N/A	
8	Landforms (hills, valleys)	Yes	(+)	M	Likely		As the road meanders through a mountainous/steep terrain with valleys, road safety measures has been taken into consideration
9	Coal Mine	No	N/A	N/A	N/A	N/A	

Sl. No.	Environmental & Social Features		Presence within 500mts from activity sites (Yes/No) If yes, mention distance in km)	Type of Impact (+ or -)	Significance of Impact (High (H), Medium (M), Low (L))	Likelihood of Impact (Likely, Unlikely)	Description of Impact	Mitigation Measures
Biological Environment								
1	National Park / Wildlife Sanctuary		No	N/A	N/A	N/A	N/A	No National park within the 10Km as per the biodiversity report prepared.
2	Reserved Forests		No	N/A	N/A	N/A	N/A	No reserved forest along the alignment within the row
3	Community Forest/ Fisheries		No	N/A	N/A	N/A	N/A	No impact to any fish breeding around the area
4	Large Trees / Woodland		No	N/A	N/A	N/A	N/A	
5	Sacred Groves		No	N/A	N/A	N/A	N/A	
6	Presence of endangered species / habitat areas		No	N/A	N/A	N/A	N/A	
7	Migratory routes		No	N/A	N/A	N/A	N/A	
8	Ecologically sensitive areas		No	N/A	N/A	N/A	N/A	
Human Environment								
1	Settlements/Habitations		Yes					No establishment is coming in the way of proposed roadway
2	Sensitive Receptors (schools, hospitals, markets etc.)	if found, please click photograph	No					No school or hospital situated around 500m of the area.
3	Drinking water sources		Yes					No Impact to any drinking water sources but natural water sources flow from the uphill side
4	Underground utility lines like electricity lines, pipelines for gas, etc	if found, please click photograph	No					

5	Physical cultural resources – Protected monuments, historical/ heritage sites etc.	if found, please click photograph	No					
6	Physical cultural resources – Religious structures, other sites significant to community	if found, please click photograph	No					

Sl. No.	Environmental & Social Features		Presence within 500mts from activity sites (Yes/No) If yes, mention distance in km)	Type of Impact (+ or -)	Significance of Impact (High (H), Medium (M), Low (L))	Likelihood of Impact (Likely, Unlikely)	Description of Impact	Mitigation Measures
7	Agricultural land/ Other activities		No					No impact to agricultural land
8	Defence Installations / Airports	if found, please click photograph	No					
9	Heavy polluting Industry	Detail – name, type of process, capacity, treatment facility if any	No					
10	Water or Waste water Treatment Plant	Detail – name, type of process, capacity,	No					
Social Safeguard Issues								
1	Any loss / reduction of access to traditional dependent communities (to areas where they earn for their primary or substantial livelihood).		No					
2	Adverse impacts to women, gender issues including economic and safety concerns		No					
3	Presence of Indigenous / vulnerable communities		No					
4	Land acquisition of private land leading to loss of shelter and livelihood		No					
5	Whether land acquired / donated is more than 10% of the total holding		No					
6	Land acquisition resulting to loss of income; livelihood; sources of livelihood; loss of access to common property resources and / or private residential and/or property resources.		No					No impact. The land proposed along the road follow the existing path which already selected by the community. If any land required people are ready to donate land required.
7	Possible conflicts with and/or disruption to local community		No					No conflicts to the local community anticipated since the area will benefit with the development of the project

Sl. No.	Environmental & Social Features	Presence within 500mts from activity sites (Yes/No) If yes, mention distance in km)	Type of Impact (+ or -)	Significance of Impact (High (H), Medium (M), Low (L))	Likelihood of Impact (Likely, Unlikely)	Description of Impact	Mitigation Measures
8	Significant issues raised by the stakeholders during consultation	No					From public consultation it has been learned that, people has no objection for the construction of road. They have raised issues of springs and water crossing during monsoon. For the same cross drainage structure has been added.

Screening Checklist for Niangmer to Sohmylleng Torurism Road	
Name of the sub-project	Construction of Approach Road from ***Niangmer to Sohmylleng*** for Development of Tourism Infrastructure under Eastern West Khasi Hill District in the State of Meghalaya under Meghalaya Integrated Transport Project (MITP), funded by World Bank
Size of the project (approx. area in sq. mt/hac or length in mt/km, as relevant)	Length = 2.971 Km
Location of the proposed sub-project	Mairang Block of Eastern West Khasi Hills district in Meghalaya.
Name of the of the district, block	Mairang Block of Eastern West Khasi Hills district
Name of the settlement/ area, where the bridge is located	N/A
Latitude and longitude	Start Point: - Latitude- $25^0$44'21.05", Longitude- $91^0$42'56.04" End Point:- $25^0$43'15.86", Longitude- $91^0$43'16.14"
New construction/ repair/ rehabilitation/ expansion(if there is an existing bridge, please share picture of old bridge. Also, the approach roads.)	New Construction. The alignment of the Road is mostly along the existing track which is a private land and completely earthen in nature. However change for alignment has been proposed for those with steep gradient.
If expansion, then is there any need of new land	It is a new construction and hence, new land is required through which the proposed road passes.
If yes, please share detail: - Total requirement	Total requirement of land is for a length of 2.971 Km with a formation width of 6 m
- Private land	2.971 Km of Length with a formation width of 6 m
Govt. land - Forest land	
What is the High Flood Level in the sub-project area?	-

Sl. No.	Environmental & Social Features	Presence within 500mts from activity sites (Yes/No) If yes, mention distance in km)	Type of Impact (+ or -)	Significance of Impact (High (H), Medium (M), Low (L))	Likelihood of Impact (Likely, Unlikely)	Description of Impact	Mitigation Measures
Physical Environment							
1	Springs	No					
2	Standing water bodies (ponds, lakes, etc.)	No					
3	Flowing water bodies (rivers, rivulets, streams, canals, etc.)	Yes					Hume Pipe culverts have been proposed on locations where flowing water bodies are present to provide connectivity to Sohmylleng village.
4	Ground water sources (open wells, bore wells, etc.)	No					
5	Meandering River	No					
6	Erosion prone stretches	Yes	(+)	H	Likely		Protection works have been proposed on locations where there are prone to landslide
7	Areas with high slope (higher than 15 percent)	No	N/A	N/A	N/A	N/A	
8	Landforms (hills, valleys)	Yes	(+)	M	Likely		As the road meanders through a mountainous/steep terrain with valleys, road safety measures has been taken into consideration
9	Coal Mine	No	N/A	N/A	N/A	N/A	

Sl. No.	Environmental & Social Features		Presence within 500mts from activity sites (Yes/No) If yes, mention distance in km)	Type of Impact (+ or -)	Significance of Impact (High (H), Medium (M), Low (L))	Likelihood of Impact (Likely, Unlikely)	Description of Impact	Mitigation Measures
Biological Environment								
1	National Park / Wildlife Sanctuary		No	N/A	N/A	N/A	N/A	
2	Reserved Forests		No	N/A	N/A	N/A	N/A	
3	Community Forest/ Fisheries		No	N/A	N/A	N/A	N/A	
4	Large Trees / Woodland		No	N/A	N/A	N/A	N/A	
5	Sacred Groves		No	N/A	N/A	N/A	N/A	
6	Presence of endangered species / habitat areas		No	N/A	N/A	N/A	N/A	
7	Migratory routes		No	N/A	N/A	N/A	N/A	
8	Ecologically sensitive areas		No	N/A	N/A	N/A	N/A	
Human Environment								
1	Settlements/Habitations		Yes					As the construction of the proposed road is on the existing track, shifting of settlements/habitations does not arise.
2	Sensitive Receptors (schools, hospitals, markets etc.)	if found, please click photograph	No					
3	Drinking water sources		No					
4	Underground utility lines like electricity lines, pipelines for gas, etc	if found, please click photograph	No					
5	Physical cultural resources – Protected monuments, historical/ heritage sites etc.	if found, please click photograph	No					

6	Physical cultural resources – Religious structures, other sites significant to community	if found, please click photograph	No					
7	Agricultural land/ Other activities		No					
8	Defence Installations / Airports	if found, please click photograph	No					
9	Heavy polluting Industry	Detail – name, type of process, capacity, treatment facility if any	No					

Sl. No.	Environmental & Social Features		Presence within 500mts from activity sites (Yes/No) If yes, mention distance in km)	Type of Impact (+ or -)	Significance of Impact (High (H), Medium (M), Low (L))	Likelihood of Impact (Likely, Unlikely)	Description of Impact	Mitigation Measures
10	Water or Waste water Treatment Plant	Detail – name, type of process, capacity,	No					
Social Safeguard Issues								
1	Any loss / reduction of access to traditional dependent communities (to areas where they earn for their primary or substantial livelihood).		No					
2	Adverse impacts to women, gender issues including economic and safety concerns		No					
3	Presence of Indigenous / vulnerable communities		No					
4	Land acquisition of private land leading to loss of shelter and livelihood		No					
5	Whether land acquired / donated is more than 10% of the total holding		No					
6	Land acquisition resulting to loss of income; livelihood; sources of livelihood; loss of access to common property resources and / or private residential and/or		No					

	property resources.						
7	Possible conflicts with and/or disruption to local community	No					
8	Significant issues raised by the stakeholders during consultation	No					

Screening Checklist for Laitartet to Nonglyput Tourism Road

Name of the sub-project	Construction of Approach Road from **Laitartet to Nonglyput** for Development of TourismInfrastructure under Eastern West Khasi Hills District in the State of Meghalaya under Meghalaya Integrated Transport Project (MITP), funded by World Bank
Size of the project (approx. area in sq. mt/hac or length in mt/km, as relevant)	Length = 3.050 Km
Location of the proposed sub-project	Mairang Block of Eastern West Khasi Hills district in Meghalaya.
Name of the of the district, block	Mairang Block of Eastern West Khasi Hills district
Name of the settlement/ area, where the bridge is located	N/A
Latitude and longitude	Start Point: - Latitude- $25^0$33'55.24", Longitude- $91^0$44'29.94" End Point:- $25^0$34'33.94", Longitude- $91^0$43'46.20"
New construction/ repair/ rehabilitation/ expansion(if there is anexisting bridge, please share picture of old bridge. Also, the approach roads.)	Existing Bituminous Road in poor condition, proposed upgradation  **Existing BUG Bridge at Ch. 2.48 Km**
If expansion, then is there any need of new land	No need of new land as it is existing road
If yes, please share detail: - Total requirement	
- Private land	
- Govt. land - Forest land	
What is the High Flood Level in the sub-project area?	-

Sl. No.	Environmental & Social Features	Presence within 500mts from activity sites (Yes/No) If yes, mention distance in km)	Type of Impact (+ or -)	Significance of Impact (High (H), Medium (M), Low (L))	Likelihood of Impact (Likely, Unlikely)	Description of Impact	Remarks
Physical Environment							
1	Springs	No	N/A	N/A	N/A	N/A	No spring water crosses the proposed road alignment
2	Standing water bodies (ponds, lakes, etc.)	No	N/A	N/A	N/A	N/A	
3	Flowing water bodies (rivers, rivulets, streams, canals, etc.)	Yes					River crosses the alignmnet at ch. 2.48 Km, where there is an existing BUG bridge.
4	Ground water sources (open wells, bore wells, etc.)	No	N/A	N/A	N/A	N/A	
5	Meandering River	Yes					River crosses the alignmnet at ch. 2.48 Km, where there is an existing BUG bridge.
6	Erosion prone stretches	Yes	(+)	M	Likely		Protection works have been proposed on locations where there are prone to landslide
7	Areas with high slope (higher than 15 percent)	No	N/A	N/A	N/A	N/A	
8	Landforms (hills, valleys)	Yes	(+)	M	Likely		As the road meanders through a mountainous/steep terrain with valleys, road safety measures has been taken into consideration
9	Coal Mine	No	N/A	N/A	N/A	N/A	

Sl. No.	Environmental & Social Features		Presence within 500mts from activity sites (Yes/No) If yes, mention distance in km)	Type of Impact (+ or -)	Significance of Impact (High (H), Medium (M), Low (L))	Likelihood of Impact (Likely, Unlikely)	Description of Impact	Remarks
Biological Environment								
1	National Park / Wildlife Sanctuary		No	N/A	N/A	N/A	N/A	No National Park within 10 Km
2	Reserved Forests		No	N/A	N/A	N/A	N/A	No Reserve forest along the alignmnet
3	Community Forest/ Fisheries		No	N/A	N/A	N/A	N/A	No impact to any fish breeding around the area
4	Large Trees / Woodland		No	N/A	N/A	N/A	N/A	
5	Sacred Groves		No	N/A	N/A	N/A	N/A	
6	Presence of endangered species / habitat areas		No	N/A	N/A	N/A	N/A	
7	Migratory routes		No	N/A	N/A	N/A	N/A	
8	Ecologically sensitive areas		No	N/A	N/A	N/A	N/A	
Human Environment								
1	Settlements/Habitations		Yes					No establishment is coming in the way of proposed roadway
2	Sensitive Receptors (schools, hospitals, markets etc.)	if found, please click photograph	No				No school or hospital situated around 500m of the area.	
3	Drinking water sources		Yes					
4	Underground utility lines like electricity lines, pipelines for gas, etc	if found, please click photograph	No					
5	Physical cultural resources – Protected monuments, historical/ heritage sites etc.	if found, please click photograph	No					
6	Physical cultural resources – Religious structures, other sites significant to community	if found, please click photograph	No					

7	Agricultural land/ Other activities		No					No Impact to Agriculture Land
8	Defence Installations / Airports	if found, please click photograph	No					

Sl. No.	Environmental & Social Features		Presence within 500mts from activity sites (Yes/No) If yes, mention distance in km)	Type of Impact (+ or -)	Significance of Impact (High (H), Medium (M), Low (L))	Likelihood of Impact (Likely, Unlikely)	Description of Impact	Remarks
9	Heavy polluting Industry	Detail – name, type of process, capacity, treatment facility if any	No					
10	Water or Waste water Treatment Plant	Detail – name, type of process, capacity,	No					
Social Safeguard Issues								
1	Any loss / reduction of access to traditional dependent communities (to areas where they earn for their primary or substantial livelihood).		No					
2	Adverse impacts to women, gender issues including economic and safety concerns		No					
3	Presence of Indigenous / vulnerable communities		No					
4	Land acquisition of private land leading to loss of shelter and livelihood		No					
5	Whether land acquired / donated is more than 10% of the total holding		No					
6	Land acquisition resulting to loss of income; livelihood; sources of livelihood; loss of access to common property resources and / or private residential and/or property resources.		No					
7	Possible conflicts with and/or disruption to local community		No					
8	Significant issues raised by the stakeholders during consultation		No					

Screening Checklist for Mawklot to Umiam Tourism Road

Name of the sub-project	Construction of Approach Road from Mawklot to Umiam Road for Development of Tourism Infrastructure under East Khasi Hills District in the State of Meghalaya under Meghalaya Integrated Transport Project (MITP), funded by World Bank
Size of the project (approx. area in sq. mt/hac or length in mt/km, as relevant)	Length = 0.600 Km
Location of the proposed sub-project	Near Shillong of East Khasi Hills district in Meghalaya.
Name of the of the district, block	Mylliem Block of East Khasi Hills district
Name of the settlement/ area, where the bridge is located	N/A
Latitude and longitude	Start Point: - Latitude- $25^0$33'55.24", Longitude- $91^0$44'29.94" End Point:- $25^0$34'33.94", Longitude- $91^0$43'46.20"
New construction/ repair/ rehabilitation/ expansion(if there is an existing bridge, please share picture of old bridge. Also, the approach roads.)	Existing Bituminous Road in poor condition, proposed upgradation
If expansion, then is there any need of new land	No need of new land as it is existing road
If yes, please share detail: - Total requirement	
- Private land	
- Govt. land - Forest land	
What is the High Flood Level in the sub-project area?	-

Sl. No.	Environmental & Social Features	Presence within 500mts from activity sites (Yes/No) If yes, mention distance in km)	Type of Impact (+ or -)	Significance of Impact (High (H), Medium (M), Low (L))	Likelihood of Impact (Likely, Unlikely)	Description of Impact	Mitigation Measures
Physical Environment							
1	Springs	No	N/A	N/A	N/A	N/A	No spring water crosses the proposed road alignment
2	Standing water bodies (ponds, lakes, etc.)	No	N/A	N/A	N/A	N/A	
3	Flowing water bodies (rivers, rivulets, streams, canals, etc.)	No					No flowing water bodies
4	Ground water sources (open wells, bore wells, etc.)	No	N/A	N/A	N/A	N/A	
5	Meandering River	No					
6	Erosion prone stretches	Yes	(+)	M	Likely		Protection works have been proposed on locations where there are prone to landslide
7	Areas with high slope (higher than 15 percent)	No	N/A	N/A	N/A	N/A	
8	Landforms (hills, valleys)	Yes	(+)	M	Likely		As the road meanders through a mountainous/steep terrain with valleys, road safety measures has been taken into consideration
9	Coal Mine	No	N/A	N/A	N/A	N/A	

Sl. No.	Environmental & Social Features		Presence within 500mts from activity sites (Yes/No) If yes, mention distance in km)	Type of Impact (+ or -)	Significance of Impact (High (H), Medium (M), Low (L))	Likelihood of Impact (Likely, Unlikely)	Description of Impact	Mitigation Measures
Biological Environment								
1	National Park / Wildlife Sanctuary		No	N/A	N/A	N/A	N/A	No National Park within 10 Km
2	Reserved Forests		No	N/A	N/A	N/A	N/A	No Reserve forest along the alignmnet
3	Community Forest/ Fisheries		No	N/A	N/A	N/A	N/A	No impact to any fish breeding around the area
4	Large Trees / Woodland		No	N/A	N/A	N/A	N/A	
5	Sacred Groves		No	N/A	N/A	N/A	N/A	
6	Presence of endangered species / habitat areas		No	N/A	N/A	N/A	N/A	
7	Migratory routes		No	N/A	N/A	N/A	N/A	
8	Ecologically sensitive areas		No	N/A	N/A	N/A	N/A	
Human Environment								
1	Settlements/Habitations		Yes					No establishment is coming in the way of proposed roadway
2	Sensitive Receptors (schools, hospitals, markets etc.)	if found, please click photograph	No				No school or hospital situated around 500m of the area.	
3	Drinking water sources		Yes					
4	Underground utility lines like electricity lines, pipelines for gas, etc	if found, please click photograph	No					
5	Physical cultural resources – Protected monuments, historical/ heritage sites etc.	if found, please click photograph	No					
6	Physical cultural resources – Religious structures, other sites significant to community	if found, please click photograph	No					

7	Agricultural land/ Other activities		No					No Impact to Agriculture Land
8	Defence Installations / Airports	if found, please click photograph	No					

Sl. No.	Environmental & Social Features		Presence within 500mts from activity sites (Yes/No) If yes, mention distance in km)	Type of Impact (+ or -)	Significance of Impact (High (H), Medium (M), Low (L))	Likelihood of Impact (Likely, Unlikely)	Description of Impact	Mitigation Measures
9	Heavy polluting Industry	Detail – name, type of process, capacity, treatment facility if any	No					
10	Water or Waste water Treatment Plant	Detail – name, type of process, capacity,	No					
Social Safeguard Issues								
1	Any loss / reduction of access to traditional dependent communities (to areas where they earn for their primary or substantial livelihood).		No					
2	Adverse impacts to women, gender issues including economic and safety concerns		No					
3	Presence of Indigenous / vulnerable communities		No					
4	Land acquisition of private land leading to loss of shelter and livelihood		No					
5	Whether land acquired / donated is more than 10% of the total holding		No					
6	Land acquisition resulting to loss of income; livelihood; sources of livelihood; loss of access to common property resources and / or private residential and/or property resources.		No					
7	Possible conflicts with and/or disruption to local community		No					
8	Significant issues raised by the stakeholders during consultation		No					

Forest map collected from MoEF reveals that, project corridor district-West Khasi Hills is free from reserved/ protected forest with no environmental sensitive area (Figure 4-1and Figure 4-2).

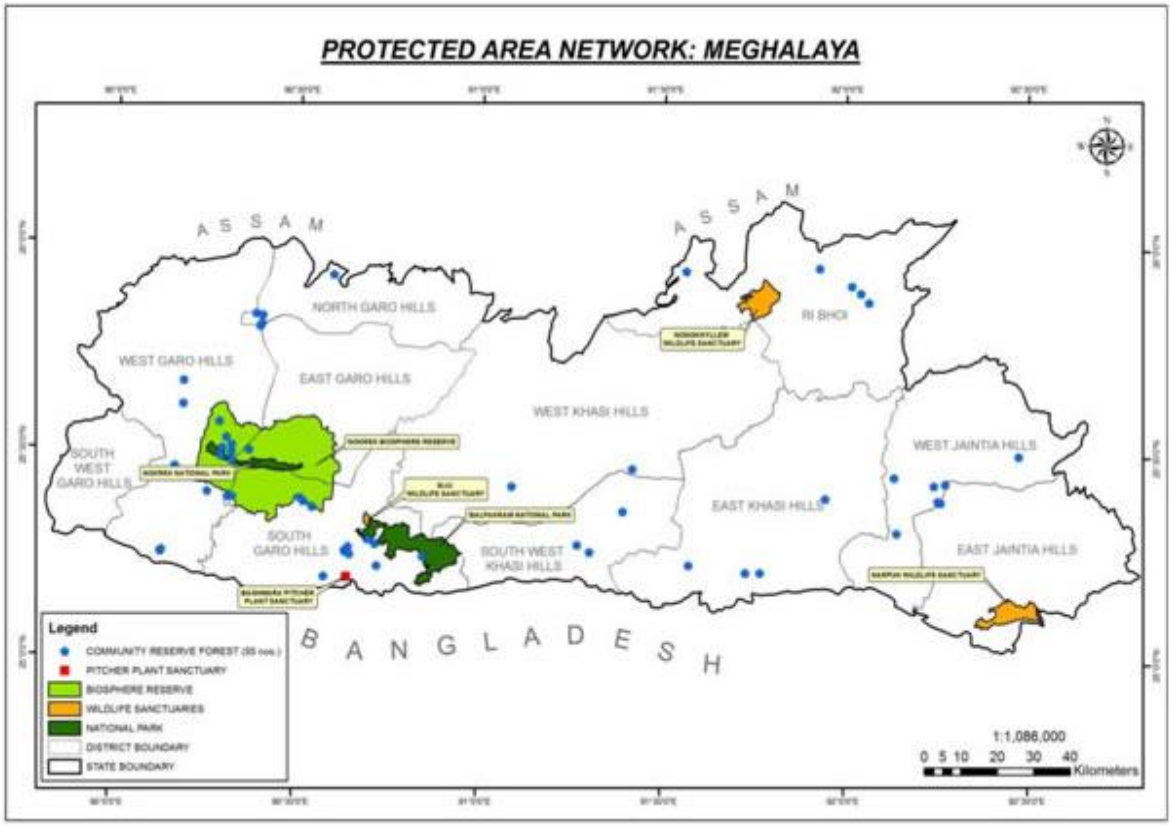


Figure 4-1: Forest Map of Project Site, Govt of Meghalaya.

Source: Meghalaya Forest Department Website

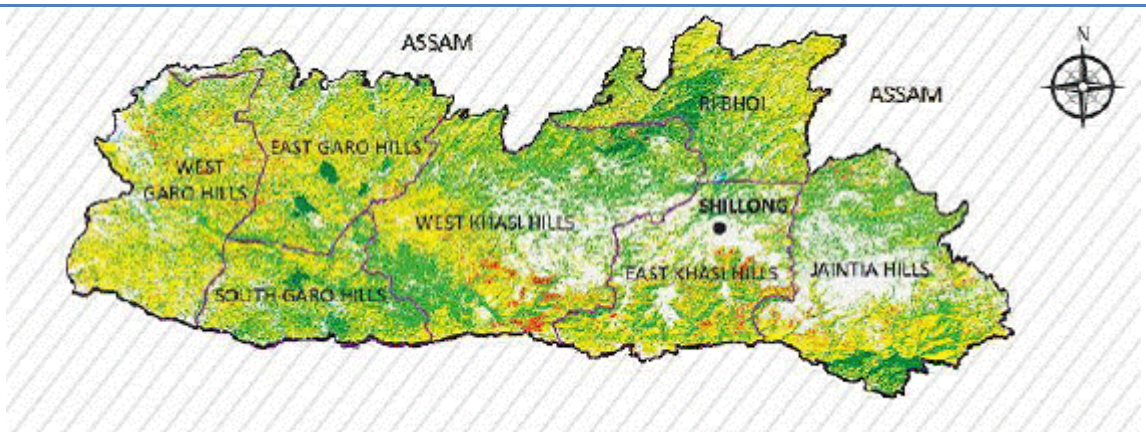


Figure 4-2: Forest Type Map of Project District

Source: Meghalaya Forest Department Website

Figure 4-3: View of starting point with no tree

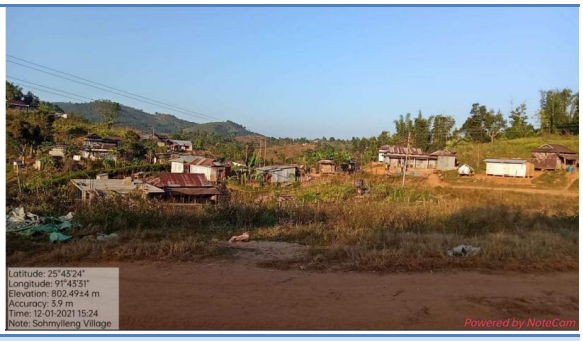


Figure 4-4: View of village with trees

5. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1 Impact Assessment and Mitigation Measures

Sl. No	Activities	Anticipated Impact	Location
1.0			
1.1			
1.1.1	Tree Cutting	No tree cutting requirement has been found as the most of the roads are devoid of trees on either side of the road.	Corridor of Impact.
1.1.2	Utility Relocation	No utility relocation required as there is none in the impact corridor	Corridor of Impact.
1.1.3	Relocation of Cultural Properties	No cultural properties within the CoI, and not getting impacted..	Corridor of Impact.
1.1.4	Replacement of Common Property Resources	No common property resources will be impacted	Corridor of Impact.
1.2.1	Procurement of Machinery		
1.2.2	Crushers, Hot-mix Plants & Batching Plants	Installation of crushers, hot mix plants and batching plants will cause pollution to nearby areas.	Corridor of Impact. And nearby human habitation
1.2.3	Other Construction Vehicles, Equipment and Machinery	All vehicles, equipment and machinery will have adverse impact.	
1.2.4	Construction Material Sources		
1.2.4.1	Borrow Areas	The borrow area will impact the local ecology and agriculture along with the human habitation.	Ecologically sensitive area
1.2.4.2	Quarries	The quarries with the suitable materials for construction. To be used and has adverse impact on environment.	Corridor of Impact.
1.2.4.3	Water	Other than the surface Water bodies, boring of any tube wells/ wells will have adverse impact on ground water table.	Corridor of Impact.
1.2.4.4	Sand	The contractor will identify sand quarries with requisite approvals for the extraction of sand under The Land Acquisition Act, 1894 for use in the project	Corridor of Impact.
1.2.5	Labour Requirements	The contractor will use unskilled labour drawn from local communities to avoid any additional stress on the existing facilities (medical services, power, water supply, etc.)	Along project corridor at construction sites
1.2.6	Setting up construction sites		
1.2.6.1	Construction Camp Locations – Selection, Design & Layout	Construction camps will have impact on local water sources, enviromnnet and society. .	All Construction Workers Camps including areas in immediate vicinity.

Sl. No	Activities	Anticipated Impact	Location
1.2.6.2	Hot Mix Plants & Batching Plant Location	Will cause adverse impact in nearest habitation, preferably in the downwind direction.	
1.2.6.3	Temporary Land Requirement	Will have impact on local ecology and environment	Areas temporarily acquired for construction sites / hot mix plants / borrow areas / diversions / detours
2.0			
2.1			
2.1.1	Site Clearance		
2.1.1.1	Clearing and Grubbing	Vegetation will be removed from the CoI before the commencement of Construction. All works will be carried out such that the damage or disruption to flora and fauna.	Corridor of Impact
2.1.1.2	Dismantling of Bridgework / Culverts	No such item	-
2.1.1.3	Generation & disposal of Debris	Generated debris material will cause harm to local environment. •	Throughout All Tourism Project Corridor
2.1.1.4	Non-bituminous construction wastes disposal	Disposal and dumping will impact natural drainage courses, endangered/rare flora may be impacted by such dumping along with the human settlements in nearby areas.	Disposal site locations
2.1.1.5	Bituminous wastes disposal	The disposal of residual bituminous wastes will cause harm to local environment.	Throughout Project Corridor
2.1.2	Procurement of Construction Materials		
2.1.2.1	Borrow Areas	Borrow area/ Borrow pits will cause harm to local environment.	All along the project corridor, all access roads, sites temporarily acquired & all borrow areas
2.1.2.2	Borrow area top soil	The topsoil from borrow areas, areas of cutting and areas will be impacted during material extraction.	Throughout Project Corridor, where productive land is acquired.
2.1.2.3	Quarries	The quarry operations will adversely impact the local environment.	All along the project corridor and all haul roads

Sl. No	Activities	Anticipated Impact	Location
2.1.2.4	Blasting	Blasting operations will adversely impact the local environment.	All blasting and Pre-splitting Sites.
2.1.2.5	Transporting Construction Materials	Transportation of materials to the site will adversely impact the local environment.	All along the Project corridor and all haul roads
2.1.2.6	Water Extraction	This may impact the local ground water table and local surface water availability.	All water bodies recommended to be used in the project
2.1.3	Infrastructure provisions at construction camps	Camps setup by contractor during the progress of work will provide, erect and maintain necessary (temporary) will generate garbage, sanitary waste etc., which will adversely impact the local environment.	Construction camps
2.1.4	Operation of construction equipments and vehicles	All vehicles and equipment used for construction will have adverse impact of local environment	All construction equipments and vehicles
2.1.5	Material Handling at Site	Material handling by workers employed on mixing asphaltic material, cement, lime mortars, concrete etc., may cause physical troubles.	All construction sites
2.1.6	Precautionary/Safety Measures During Construction	Safety of the workers to be maintained.	All construction sites
2.1.7	Religious Structures and Shrines	No Such structures present in close vicinity of the roads.	All construction sites
2.1.8	Archaeological property	No Such structures present in close vicinity of the roads.	All construction sites
2.1.9	Earthworks		
2.1.9.1	Excavations	All excavations may cause soil erosion, water pollution etc along with drainage issues.	All along the project corridor
	Earth fill	Earth filling may cause soil erosion, water pollution etc along with drainage issues.	Along earth fill areas
2.1.9.2	Stripping, stocking and preservation of top soil	Top soil in excavated area may be lossed	All along the project corridor
2.1.9.3	Slope protection and control of erosion	Erosion will be there if slope protection measures not taken	
2.1.9.4	Drainage requirements at construction sites	No drainage will cause flooding of the site or any adjacent area.	All along the project corridor
2.1.9.5	Dust	All earthwork will generate dust.	All along the project corridor
2.1.9.6	Contamination of soil	Vehicle/machinery and equipment operation, maintenance and refueling etc. may cause oil and grease contamination with soil.	All along the project corridor

Sl. No	Activities	Anticipated Impact	Location
2.1.9.7	Compaction of soil	Soil compaction may occur due to construction vehicle, machinery and equipment.	All along the project corridor
2.1.9.8	Silting, Contamination of Water bodies	Siltation may occur in the nearby water bodies.	Water bodies close to the project corridor
2.1.9.9	Cutting/Filling of Surface water bodies	No cut an fill in the water bodies	-
2.1.10	Sub-Base & Base	During such activity noise pollution may occur	All along the project corridor
2.1.11	Surfacing	During surfacing work noise pollution may occur	All along the project corridor
2.1.12	Culverts Works	All precautions required.	Area with culverts proposed.
2.1.13	Road Furniture	Not having road furniture including footpaths, railings, storm water drains, crash barrier, traffic signs, speed zone signs, pavement markers and any other such items will cause accidents.	All along the project corridor
2.1.14	Monitoring Environmental Conditions	Monitoring Plan prepared required	For all roads
2.2			
2.2.1	Clearing of Construction of Camps & Restoration	Restoration plans construction camps	All Construction Workers‟ Camps
2.2.2	Borrow Areas	Redevelopment of borrow areas required	At all borrow area locations suggested for the project.
2.2.3	Tree Plantation	No tree cutting	No tree cutting
3.0			

Sl. No	Activities	Anticipated Impact	Location
3.1	Monitoring Operational Performance	Monitoring of environmental parameters for air and noise and status of rehabilitation of borrow areas to be done.	Table 8-8
4.0			
4.1	Orientation of implementing agency and contractors	The orientation session require for all staff of Environmental Cell, field level implementation staff of PIU, Engineer and Contractor.	

6. PUBLIC CONSULTATION AND DISCLOSURE

6.1 Stakeholders Consultation

6.1.1 Introduction

The objective of this stakeholder consultation is to get different views on the project activity, to take into account concerns and recommendations. From the project inception stage itself, the consultation procedure has been continued as part of the environmental screening, environmental assessment and environmental management plan preparation at various stages of technical proceedings of the project.

Stakeholder consultation involving local communities in the project planning is basis of the participatory planning. Because, often suggestion and option given by the people improves technical and economic efficiency of the project and suggested improvements proposals (if adopted by the project) of the people also generates sense of ownership within communities, thus eases implementation process.

Following section highlights level of consultative procedure adopted at various stages, strategies to participatory and continued consultation and specific inputs from the stakeholder‟s consultation in project planning.

6.1.2 Identification of Stakeholders

Consultations are conducted with both primary and secondary stakeholders in the project area. The primary stakeholders consulted are usually (i) Roadside community having their temporary or permanent residences (PAP‟s) (ii) Road side shop owners/vendors and (iii) Road users (iv) Community Leaders and Forest Department. While the secondary stakeholders are mostly the project officials (PWD), Village representatives, NGO‟s, few academicians and other consultants (if any) working on road projects in the area.

1	Primary Stakeholders (Main stakeholders)	• Potential PAPs, Forest Department and Community Leaders
2	Secondary Stakeholders (Other stakeholders)	• Groups of affected persons; • Village representatives like Sardar and members, PRIs, Village level health workers • Tribal groups • Local voluntary organizations like CBOs and NGOs; • Field level Engineers (Asst Engineers, Junior Engineers), PWD, Government of Meghalaya, • Other project stakeholders such as official of line Department

6.1.3 Consultations with Primary Stakeholders

Preliminary consultations with the primary stakeholders provided some insight into the felt need of the community, their suggestions on design of the road, likely environmental & social impacts, mitigation measures in case of likely adverse environmental & social impacts. The consultations were held with the people inhabiting along the tourism roads Road, who are likely to be affected.

Stakeholder Consultation on
Construction of Approach Road from Niangmer to Sohmylleng for Development of TourismInfrastructure under Eastern West Khasi Hill District in the State of Meghalaya under Meghalaya Integrated Transport Project (MITP), funded by World Bank
Venue: Sohmylleng Church Field, Eastern West Khasi Hills
Date: 4th March, 2022

Proceeding:

At the very outset, the meeting was chaired and called into order by Asst. Executive Engineer, PWD (Roads), Sub-Division, Mairang Division gave introduction on Construction of Approach Road from Niangmer to Sohmylleng for Development of Tourism Infrastructure under Eastern West Khasi Hill District in the State of Meghalaya under Meghalaya Integrated Transport Project (MITP), funded by World Bank

Dr. Bhrigu Prasad Saikia, Environmental Specialist has also gave introduction to the villagers regarding the purpose of having public consultation. Social Expert Ms. Pangkhi Bharali was also participated in the same discussion.

The forum was opened for discussion with the stakeholders and the following points were noted during the course of discussion:-

1. Mr Hosel Kurbah has expressed the happiness of the villagers for the forthcoming construction of the road. They have welcome the same and has no objection for the same.
2. Mr. Lamphang Mawnai has informed that this road will not impact their any public amenities and hence there is no question of objecting the same.
3. Mr. Aibit Kurbah has informed that, they are not doing any broom grass farming near the RoW of the road and donot have any other plantation near to it.
4. Mr. Marius Mawnai has informed that, many times the road has been surveyed for construction but not yet done and hence, he ask for confirmation that this time the road will be constructed. To this AEE has informed that, this time the project has been considered under the MITP project and surely it will be constructed.
5. The villager, Mr. Akres Kurbah has asked about the measures for erosion protection during the phase of the construction as the exiting road is of katcha.
6. Mr. Dresi Lyngdoh Nangbri has asked whether there is any alignment shifting of the road than the exiting one. To this AEE has informed the villagers that there is no shifting of alignment.

7. Mr. Kristina Dohtdong has informed that, they will allow labour camp setup in their village but they will fix the location .
8. Mr. Brik War of the villages has informed that, no major wildlife seen near the road/village during recent past.
9. Villagers informed that, their prime livelihood is being the cultivation of Ginger, Sesame seed, Tapioca farming and they want good transportation to sell their product.

Stakeholder Consultation on
Construction of Approach Road from Mawphanlur to Mawthadraishan for Development of Tourism Infrastructure under Eastern West Khasi Hills District in the State of Meghalaya under Meghalaya Integrated Transport Project (MITP), funded by World Bank
Venue: Mawphanlur Village
Date: 4th March, 2022

Proceeding:

The Stakeholder Consultation Meeting which was held at Mawphanlur village on the 4th March, 2022 was chaired and called into order by Mr. D. Lamare, Assistant Executive Engineer, PWD (Roads), Markasa Sub-Division, Mairang Division who also delivered an introductory speech on the aims and objectives of the proposed project "Construction of Approach Road from **Mawphanlur to Mawthadraishan** for Development of Tourism Infrastructure under Eastern West Khasi Hill District in the State of Meghalaya under Meghalaya Integrated Transport Project (MITP), funded by World Bank"

Mr. D. Lamare, AEE, welcome all the officers present which includes Dr. Bhrigu Prasad Saikia, Environmental Specialist, Ms. Pangkhi Bharali, Social Expert, Mr. A. Mallai, Junior Engineer, Mr. J.J.L. Nonglait, Junior Engineer, and all the stakeholders present for the consultation / discussion at the meeting venue.

The Chairman invited Dr. Bhrigu Prasad Saikia, Environmental Specialist to deliver an introduction to the villagers regarding the purpose of having a public consultation on the proposed project.

Dr. Bhrigu Prasad Saikia, Environmental Specialist gave a detailed presentation to the villagers regarding the aims and objectives of having a public consultation before taking up the proposed project.

The Chairman then invited Ms. Pangkhi Bharali, Social Expert, to deliver an introduction to the members present regarding the possible social impact of the project.

Ms. Pangkhi Bharali, Social Expert, presented a speech to highlight the social impact of the project on the local habitation and invited further discussion on the positive and negative aspects of the project.

The forum was then opened for discussion with the stakeholders and the following points were noted during the course of discussion:-

10. Mr. Lamphrang Marwein, Sordar of Mawphanlur village expressed and conveyed in the forum the happiness of the villagers for the forthcoming construction of the road and said that they welcome the project and has no objection for the same. He

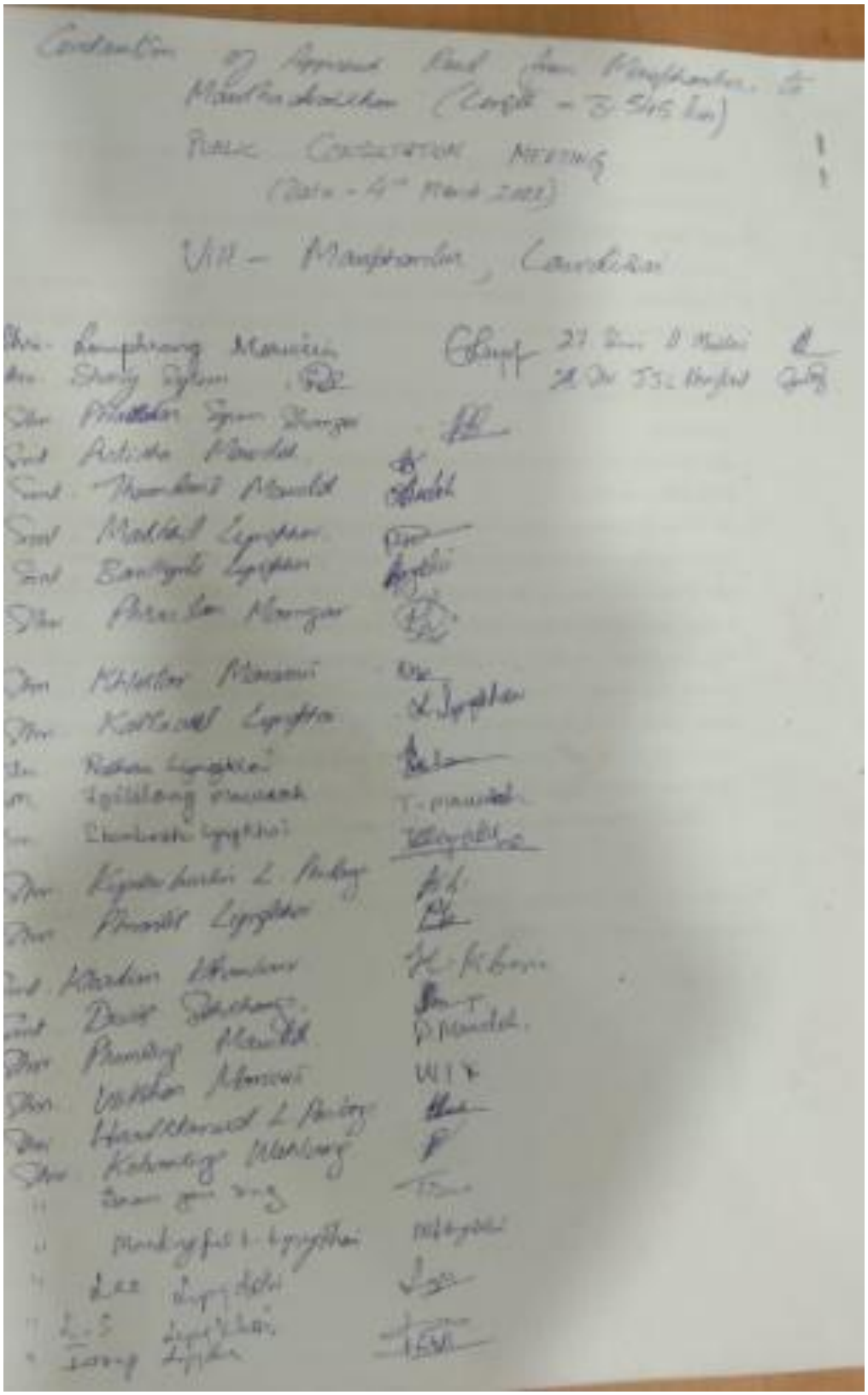
also stated that this Road which will connect the two popular tourists‟ spots i.e., Mawphanlur village and Mawthadraishan Peak was a long awaited project.

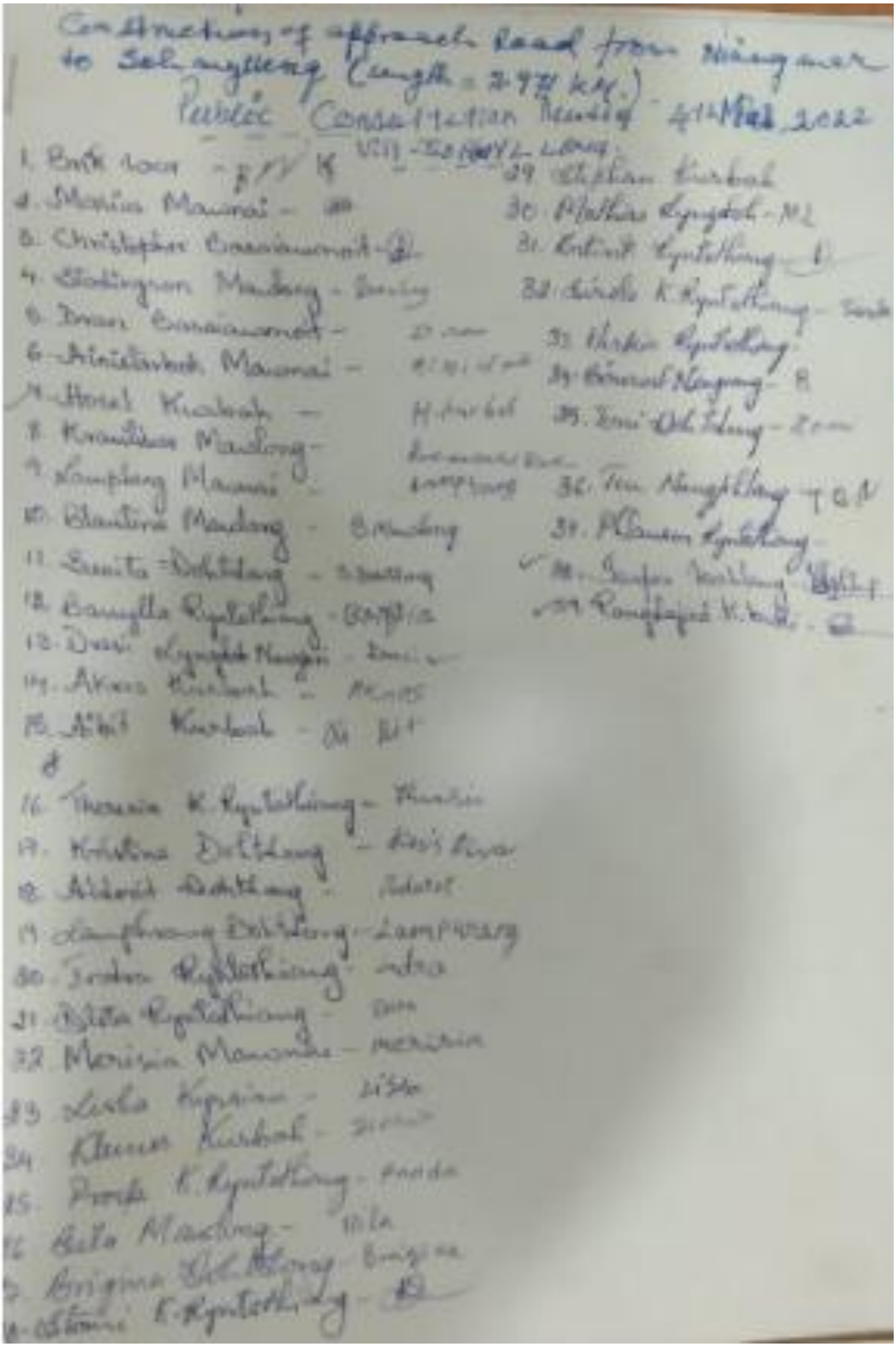
11. Mr. Phlarland Marngar, Sordar of Lawdisai village informed that this project will not affect any of their public amenities and hence there is no question of objecting the same.
12. Mr. Phran Lyngkhoi, E/C Member of Mawphanlur village informed that there are no broom grass farming along and near the proposed alignment of the Road and that there are no other plantation near the RoW of the road.
13. Women participant, Mrs. Dioris Sohshang informed that since majority of the villagers are dependent on the income from tourism sector therefore the road construction will boost up the local economy.
14. The villager, Mr. Kobarsing Wahlang asked about the measures for erosion protection during the phase of the construction as the exiting road is katcha. To this, Mr. D. Lamare, AEE, replied that wherever needed, the type and cost of proper protection works has already been incorporated in the DPR.
15. Mr. Bel Lyngkhoi and Mrs. Rina Lyngkhoi, land owners, expressed their willingness to donate part of their private land for the road construction purposes.
16. Mr. Lamphrang Marwein, Sordar of Mawphanlur village informed that the village Dorbar have no issues relating to setting up of labour camps and have no objection on the same.
17. Mr. Phransis Lyngkhoi, a local resident, informed that there are no major wildlife seen near the road/village during the recent past except for the occasional appearances of one or two jackals.

After all the discussions and deliberations the meeting was then concluded with a vote of thanks from Mr. A. Mallai, Junior Engineer, PWD (Roads), Markasa Sub-Division, Markasa, West Khasi Hills District.

Public Consultation Photo Graph

Attendance Sheet Of Persons in the Public Consultation





Construction of approach Road from Nongmaw to Sohmynting (Length = 2.97 km.)
Public Consultation Meeting 4th Mar 2022

1. Bok Lang
2. Monica Mawnai
3. Christopher Cramiawmoit
4. Gladingson Madang
5. Dmon Cramiawmoit
6. Niristarbok Mawnai
7. Hemel Kurbah
8. Kranting Madang
9. Lampbang Mawnai
10. Blantina Madang
11. Sanita Dohtdong
12. Bangtla Ryntathiang
13. Dani Kyndait Nongpiur
14. Akros Kurbah
15. Aibit Kurbah
16. Theresia K. Ryntathiang
17. Kristina Dohtdong
18. Aldarit Dohtdong
19. Lamphrang Dohtdong
20. Jordan Ryntathiang
21. Rita Ryntathiang
22. Merisia Mawnai
23. Lisha Kupsiar
24. Klinar Kurbah
25. Panda K. Ryntathiang
26. Bila Madang
27. Brigina Dohtdong
28. Stamai K. Ryntathiang
29. Stephan Kurbah
30. Mathias Kyndait
31. Enlait Ryntathiang
32. Linda K. Ryntathiang
33. Ihulan Ryntathiang
34. Emmanuel Nongpiur
35. Dani Dohtdong
36. Tin Nongthlang
37. Plamen Ryntathiang
38. Sanfor Nongkhlaw
39. Rangbajiot K. Kurbah

7. ENVIRONMENTAL MANAGEMENT PLAN

7.1 Introduction

Environmental Management Plan (EMP) deals with the implementation procedure of the guidelines and measures recommended to avoid, minimize and mitigate environmental impacts of the project. It also includes management of measures suggested for enhancement of the environmental quality along the **tourism roads**. The institutional arrangement made under project will look into the implementation of project as well as EMP and the various legal settings applicable to the project are briefly stated in Chapter 1.

The avoidance, mitigation & enhancement measures for protection of the environment along **all four tourism roads** have been discussed in detail in previous chapter. Although the social environmental impacts, its mitigation and management is an essential component of the EMP, this section excludes it for the purpose of clarity and procedural requirements. Social environmental elements have been separately dealt in separate volume namely, Resettlement and Rehabilitation Action Plan (RAP).

7.2 Objective of EMP

The EMP is a plan of action for mitigation / management / avoidance of the negative impacts of the project and enhancement of the project corridor. For each measure to be taken, its location, implementation and overseeing / supervision responsibilities are listed. A description of the various management measures during various stages of the project is provided in the Table 8-1.

7.3 Environmental Monitoring Program

The monitoring programme is devised to ensure that the envisaged purpose of the project is achieved and results in the desired benefit to the target population. To ensure the effective implementation of the EMP, it is essential that an effective monitoring programme be designed and carried out. Broad objectives of the monitoring programme are:

- To evaluate the performance of mitigation measures proposed in the EMP
- To suggest improvements in the management plans, if required
- To satisfy the statutory and community obligations

The monitoring programme contains monitoring plan for all performance indicators, reporting formats and necessary budgetary provisions. Monitoring plan for performance indicators and reporting system is presented in the following sections.

7.4 Performance Indicators

Physical, biological and environmental management components identified as of particular significance in affecting the environment at critical locations have been suggested as Performance Indicators (PIs).

The Performance Indicators and monitoring plans prepared for Project Implementation are presented in Table 7-1.

Table 7-1: Performance Indicators for Project Implementation

Sl. No.	Indicator	Details	Stage	Responsibility
A	Environmental Condition Indicators and Monitoring Plan			
1	Air Quality	The parameters to be monitored, frequency and duration of monitoring as well as the locations to be monitored will be as per the Monitoring Plan prepared (Refer Table 6-5)	Construction	
			Operation	PIU through approved monitoring agency
			Pre Construction	PIU through approved monitoring agency
2	Noise Levels		Construction	
			Operation	PIU through approved monitoring agency
			Pre Construction	PIU through approved monitoring agency
3	Water Quality		Construction	
			Operation	PIU through approved monitoring agency
			Pre Construction	PIU through approved monitoring agency
4	Soil Quality		Construction	
			Operation	PIU through approved monitoring agency
B	Environmental Management Indicators and Monitoring Plan			
1	Construction Camps	Location of construction camps have to be identified and parameters indicative of environment in the area has to be reported	Pre-construction	PIU
2	Borrow Areas	Location of borrow areas have to be identified and parameters indicative of environment in the area has to be reported.	Pre-construction	PIU
3	Tree Cutting	No tree cutting	-	-
4	Tree Plantation	No		
C	Management & Operational Performance Indicators			

Sl. No.	Indicator	Details	Stage	Responsibility
1	Survival Rate of Trees	No Plantation		
2	Status Regarding Rehabilitation of Borrow Areas	The PU will undertake site visits to determine how many borrow areas have been rehabilitated in line with the landowner‟s request and to their full satisfaction.	Operation	The PIU will be responsible for a period of three years.
3	Soil Erosion	Visual monitoring and operation inspection of embankments will be carried out once in three months.	Operation	The PIUwill be responsible for a period of three years.

7.5 Monitoring Plans for Environment Condition

For each of the environmental components, the monitoring plan specifies the parameters to be monitored; location of the monitoring sites and duration of monitoring. The monitoring plan also specifies the applicable standards, implementation and supervising responsibilities. The monitoring plan for the various environmental condition indicators of the project in construction and operation stages is presented in Table 8-5. Monitoring plan does not include the requirement of arising out of Regulation Provision such as obtaining NOC/ consent for plant site operation.

Table 7-2: Environmental Monitoring Plan

Attribute	Project Stage	Parameter	Special Guidance	Standards	Frequency	Duration	Location	Implementation
Air	Construction	SO_2, NO_x, RPM, SPM, O_3,Pb, CO, NH_3, C_6H_6, BaP, As and Ni	High volume sampler to be located 50m from the plant in the Downwind direction. Use method specified by CPCB for analysis	Air (prevention and Control of Pollution) Rules, CPCB, 2009	Three seasons per year	24 hours Sampling	Along the road Hot mix / batching plant	Contractor / PIU
	Operation				Two seasons in a year for three years		Along the road	Contractor / PIU
Water	Construction	All essential characteristics and some of desirable characteristics as decided by the Environmental Specialist of the CSC and PIU	Grab sample collected from source and Analyse as per Standard Methods for Examination of Water and Wastewater	Indian Standards for Inland Surface Waters (IS: 2296, 1982	Four seasons per year	Grab Sampling	Along the road Surface water sources	Contractor PIU /
	Operation				Four seasons for three years			Contractor PIU /
Noise	Construction	Noise levels on dB (A) scale	Equivalent noise levels using an integrated noise level meter kept at a	MoEF Noise Rules, 2000	Three seasons per year	Leq in dB(A) of day time and night	Along the road Hot mix / batching	Contractor PIU /

Attribute	Project Stage	Parameter	Special Guidance	Standards	Frequency	Duration	Location	Implementation
			distance of 15 from edge of pavement Equivalent noise levels using an integrated noise level meter kept at a distance of 15 from edge of pavement			time	plant	
	Operation				Three seasons per year for three years.		Along the road	Contractor / PIU
Soil	Construction	Monitoring of Pb, SAR and Oil & Grease	Sample of soil collected to acidified and analysed using absorption Spectrophotometer	Threshold for each contaminant set by IRIS database of USEPA until national standards are promulgated	Four seasons per year	Grab Sampling	Along the road Hot mix / batching plant	Contractor / PIU
	Operation				Four seasons for three years		Along the road	Contractor / PIU
Borrow area	Construction	As per Guidelines	Visual Observation	-	Once in a month	-	Borrow area location	Contractor

Attribute	Project Stage	Parameter	Special Guidance	Standards	Frequency	Duration	Location	Implementation
Tree plantation	Operation stage	As per Design			Quarterly	-	Areas where plantation is being done	Contractor / PIU

7.6 Pre-Construction Stage

Pre-Construction Activities by PIU

Prior to the contractor mobilization, the PIU will ensure that an encumbrance free CoI is handed over to enable the start of construction. The RoW clearance involves the following activities:

- Clearance of the RoW .
- Relocation of common property resources impacted, including cultural properties as temples and community assets as hand pumps and other utilities

Pre-Construction Activities by Contractor/Engineer

The pre-construction stage involves mobilization of the contractor, the activities undertaken by the contractor pertaining to the planning of logistics and site preparation necessary for commencing construction activities. The activities include:

- Joint field verification of EMP by the Engineer and Contractor
- Modification (if any) of the contract documents by the Engineer
- Procurement of construction equipment / machinery such as crushers, hot mix plants, batching plants and other construction equipment and machinery
- Identification and selection of material sources (quarry and borrow material, water, sand etc)
- Selection, design and layout of construction areas, hot mix and batching plants, labour camps etc
- Planning traffic diversions and detours, including arrangements for temporary land acquisition

7.7 Construction Stage

Construction stage activities by the contractor

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

- The Contractors will submit the Construction-ESMP, including OHS Plan, for approval by PMU prior to mobilization. The world bank will also review the Construction-ESMP, including OHS Plan through the PMU.

- Imbibing environmental principles at all stages of construction as good engineering practices
- Implementation of site-specific mitigation/management measures suggested
- Monitoring the quality of environment along the construction sites (as air, noise, water and soil)

There are several other environmental issues that have been addressed as part of good engineering practices, the costs for which have been accounted for in the Engineering Costs. They include improvement of roadside drainage, provision of additional cross drainage structures or rising of road height in flood prone stretches, provision of cattle crossings and reconstruction and improvement of bunds of the affected water bodies.

Construction Stage Activities by the PIU

The construction stage involves the following activities by PIU:

- Tree plantation along the project corridor and landscaping along junctions by the PIU.
- Monitoring of environmental conditions through approved monitoring agency

7.8 Operation Stage

Operation stage actives are to be carried out by the Environmental Cell includes mostly environmental monitoring of operational performance of the various mitigation/enhancement measures carried out as a part of MITP.

Other Activities

- Orientation of Implementation agency staff towards project specific issues of EMP implementation
- Conducting additional studies for issues identified during any stage of project preparation/ implementation

Table 7-3: Summary Matrix of Environmental Management Plan

Sl. No	Activities	Management Measure	Location	Reference[1]
1.0	PRE-CONSTRUCTION STAGE			
1.1	Pre-construction activities by PIU			
1.1.1	Tree Cutting	No tree cutting	-	-
1.1.2	Utility Relocation	No	All locations	-
1.1.3	Relocation of Cultural Properties	No	All locations	-
1.1.4	Replacement of Common Property	No	All locations	-

[1] MoRTH Clause 111.1 with modifications mentioned in Appendix 3.15 shall be applicable for all the EMP Clauses

Sl. No	Activities	Management Measure	Location	Reference[1]
	Resources			
1.2	Pre-construction activities by the Contractor/Engineer of SC			
1.2.1	Joint Field Verification	The Engineer and the Contractor will carry out joint field verification of the EMP. The efficacy of the mitigation/enhancement measures suggested in the EMP will be checked. Design changes recommended as part of the independent review shall be included in the designs by the Engineer.	Project Corridor	EMP
1.2.2	Modification of the Contract Documents	If required, the Engineer will modify the EMP and Contract document.	Project Corridor	EMP
1.2.3	Procurement of Machinery			
1.2.3.1	Crushers, Hot-mix Plants & Batching Plants	Specifications of crushers, hot mix plants and batching plants will comply with the requirements of the relevant current emission control legislations.		Contract, MoRTH: 111.1, GoI Air & Noise Standards, OSHA Standards
1.2.3.2	Other Construction Vehicles, Equipment and Machinery	The discharge standards promulgated under the Environment Protection Act, 1986 will be strictly adhered to. All vehicles, equipment and machinery to be procured for construction will conform to the relevant Bureau of Indian Standard (BIS) norms. Noise limits for construction equipments to be procured such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws will not exceed 75 dB (A), measured at one metre from the edge of the equipment in free field, as specified in the Environment (Protection) Rules, 1986.		Contract, Environment Protection Act, 1986 & MoRTH: 111.1
1.2.4	Identification & Selection of Material Sources			
1.2.4.1	Borrow Areas	Arrangement for locating the source of supply of material for embankment and sub-grade as well as compliance to environmental requirements, as applicable, will be the sole responsibility of the contractor. The environmental personnel will be required to inspect every borrow area location prior to approval. Planning of haul roads for accessing borrow materials will be undertaken during this stage. The haul roads should be routed to avoid agricultural areas.	Ecologically sensitive area	MoRTH: 305.2.2.2
1.2.4.2	Quarries	The Contractor will identify materials from existing licensed quarries with the suitable materials for construction. Apart from approval of the quality of the quarry materials, the Engineer‟s representative will verify the legal status of	All quarries recommended to be used in the project	MoRTH: 111.3

Sl. No	Activities	Management Measure	Location	Reference[1]
		the quarry operation, as to whether approval from Meghalaya State Government is obtained.		
1.2.4.3	Water	The contractor will source the requirement of water preferentially from surface water bodies, as rivers and tanks in the project area. The contractor will be allowed to pump only from the surface Water bodies. Boring of any tube wells will be prohibited. To avoid disruption/disturbance to other water users, the contractor will extract water from fixed locations. The contractor shall consult the local people before finalizing the locations. Only at locations where surface water sources are not available, the contractor can contemplate extraction of ground water. Consent from the Engineer that no surface water resource is available in the immediate area for the project is a pre-requisite prior to extraction of ground water. The contractor will need to comply with the requirements of Department of Irrigation, Meghalaya and seek their approval for doing so.	All rivers / surface water bodies that can be used in the project	Contract
1.2.4.4	Sand	The contractor will identify sand quarries with requisite approvals for the extraction of sand under The Land Acquisition Act, 1894 for use in the project	All riverbeds recommended for sand extraction for the project.	
1.2.5	Labour Requirements	The contractor will use unskilled labour drawn from local communities to avoid any additional stress on the existing facilities (medical services, power, water supply, etc.)	Along project corridor at construction sites	Contract
1.2.6	Setting up construction sites			
1.2.6.1	Construction Camp Locations – Selection, Design & Layout	Construction camps will not be proposed: (i) Within 1000m of Ecologically sensitive areas (ii) Within 1000m from the nearest habitation to avoid conflicts and stress over the infrastructure facilities, with the local community. Layout of construction camps will be as per the conceptual design presented in Annexure 1 Locations for stockyards for construction materials will be identified at least 1000 m from watercourses. The waste disposal and sewage system for the camp will be designed, built and operated such that no odour is generated. Unless otherwise arranged by the local sanitary authority, arrangements for disposal of excreta suitably approved by the local medical health or municipal	All Construction Workers Camps including areas in immediate vicinity.	Contract Annexure

Sl. No	Activities	Management Measure	Location	Reference[1]
		authorities or as directed by Engineer will need to be provided by the contractor.		
1.2.6.2	Hot Mix Plants & Batching Plant Location	Hot mix plants and batching plants will be sited sufficiently away from habitation, agricultural operations or industrial establishments. Such plants will be located at least 1000m away from the nearest habitation, preferably in the downwind direction.		Contract Appendix 3.15, Sub clause 111.5
1.2.6.3	Arrangements for Temporary Land Requirement	The contractor as per prevalent rules will carry out negotiations with the land owners for obtaining their consent for temporary use of lands for construction sites/ hot mix plants /traffic detours /borrow areas etc. The Engineer will be required to ensure that the clearing up of the site prior to handing over to the owner (after construction or completion of the activity) is included in the contract.	Areas temporarily acquired for construction sites / hot mix plants / borrow areas / diversions / detours	
2.0	CONSTRUCTION STAGE			
2.1	Construction Stage Activities by Contractor			
2.1.1	Site Clearance			
2.1.1.1	Clearing and Grubbing	Vegetation will be removed from the CoI before the commencement of Construction. All works will be carried out such that the damage or disruption to flora is minimised. Only ground cover / shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval from the Engineer. The contractor, under any circumstances will not damage trees (in addition to those already felled with prior permission from the forest department).	Corridor of Impact	Design MoRTH 201
2.1.1.2	Dismantling of/ Culverts	All necessary measures will be taken especially while working close to cross drainage channels to prevent earthwork, stonework, materials and appendage as well as the method of operation from impeding cross-drainage at rivers, streams, water canals and existing irrigation and drainage systems.	At locations were bridge works and culverts are proposed.	MoRTH 202.2
2.1.1.3	Generation & disposal of Debris	Generated debris material shall be suitably disposed off by the contractor either through filling up of borrow areas created for the project or at pre-designated disposal locations, subject to the approval of the Engineer. Debris generated from pile driving or other construction activities shall be disposed such that it does not flow into the surface water bodies or form mud puddles in the area. Disposal sites shall be: • Located in the downwind side of residential areas • Located at least 100m away from Ecological sensitive areas	Throughout Project Corridor	MoRTH 202.5 MoRTH 517

Sl. No	Activities	Management Measure	Location	Reference[1]
		• Not contaminate any water sources, rivers etc., and should have adequate capacity equal to the amount of debris generated. • Finalized taking in to account the Public perception about the location • Obtain permission from the Village Panchayat • Avoid productive lands • Give preference to available waste lands		
2.1.1.4	Non-bituminous construction wastes disposal	Location of disposal sites will be finalized prior to completion of the earthworks on any particular section of the road. The Engineer shall approve these disposal sites conforming to the following (a) These are not located within designated forest area (b) The dumping does not impact natural drainage courses (c) No endangered/rare flora is impacted by such dumping. (d) Settlements are located at least 1.0km away from the site.	Disposal site locations	Contract MoRTH: 201.4 & 202.5 Section 2.1.1.3
2.1.1.5	Bituminous wastes disposal	The disposal of residual bituminous wastes will be done by the contractor at secure land fill sites, with the requisite approvals for the same from the concerned government agencies.	Throughout Project Corridor	Contract MoRTH: 201.4
2.1.2	Procurement of Construction Materials			
2.1.2.1	Borrow Areas	No borrow area will be opened without permission of the Engineer Borrow pits will not be dug continuously in a stretch. The location, shape and size of the designated borrow areas will be as approved by the Engineer and in accordance to the IRC recommended practice for borrow pits for road embankments (IRC 10: 1961). The borrowing operations will be carried out as specified in the guidelines for siting and operation of borrow areas The unpaved surfaces used for the haulage of borrow materials will be maintained dust free by the contractor. Since dust rising is the only impact along the haul roads sprinkling of water will be carried out twice a day along such roads during their period of use.	All along the project corridor, all access roads, sites temporarily acquired & all borrow areas	MoRTH: IRC 10 1961
2.1.2.2	Stripping, stocking and preservation of top soil	The topsoil from borrow areas, areas of cutting and areas to be permanently covered will be stripped to a specified depth of 150mm and stored in stockpiles. At least 10% of the temporarily acquired area will be earmarked for storing topsoil. The stockpile will be designed such that the slope does not exceed 1:2 (vertical to	Throughout Project Corridor, where productive land is acquired.	MoRTH: 301.3.2 & MoRTH: 305.3.3 MoRTH: 301.7 & MoRTH: 305.3.9

Sl. No	Activities	Management Measure	Location	Reference[1]
		horizontal), and the height of the pile is to be restricted to 2m. Stockpiles will not be surcharged or otherwise loaded and multiple handling will be kept to a minimum to ensure that no compaction will occur. The stockpiles will be covered with gunny bags or tarpaulin. It will be ensured by the contractor that the topsoil will not be unnecessarily trafficked either before stripping or when in stockpiles. Such stockpiled topsoil will be returned to cover the disturbed area and cut slopes.		
2.1.2.3	Quarries	The quarry operations will be undertaken within the rules and regulations in force.	All along the project corridor and all haul roads	Forest department as per Meghalaya Government Regulation
2.1.2.4	Blasting	Except as may be provided in the contract or ordered or authorized by the Engineer, the Contractor will not use explosives. Where the use of explosives is so provided or ordered or authorized, the Contractor will comply with the requirements of the following Sub-Clauses of MoRTH 302 besides the law of the land as applicable. The Contractor will at all times take every possible precaution and will comply with appropriate laws and regulations relating to the importation, handling, transportation, storage and use of explosives. The contractor will at all times when engaged in blasting operations, post sufficient warning flagmen, to the full satisfaction of the Engineer. The Contractor will at all times make full liaison with and inform well in advance and obtain such permission as is required from all Government Authorities, public bodies and private parties whomsoever concerned or affected or likely to be concerned or affected by blasting operations. Blasting will be carried out only with permission of the Engineer. All the statutory laws, regulations, rules etc., pertaining to acquisition, transport, storage, handling and use of explosives will be strictly followed. Blasting will be carried out during fixed hours (preferably during mid-day) or as permitted by the Engineer. The timing should be made known to all the people within 1000m (200m for pre-splitting) from the blasting site in all directions.	All blasting and Pre-splitting Sites.	MoRTH: 302.4
2.1.2.5	Transporting Construction Materials	All vehicles delivering materials to the site will be covered to avoid spillage of materials. All existing highways and roads used by	All along the Project corridor and all haul roads	MoRTH: 111.9

Sl. No	Activities	Management Measure	Location	Reference[1]
		vehicles of the contractor, or any of his sub -contractor or suppliers of materials and similarly roads which are part of the works will be kept clean and clear of all dust/mud or other extraneous materials dropped by such vehicles The unloading of materials at construction sites close to settlements will be restricted to daytime only.		
2.1.2.6	Water Extraction	Procurement of water is to be carried out as per Section 1.2.4.3. The contractor will minimize wastage of water during construction.	All water bodies recommended to be used in the project	Section 1.2.4.3
2.1.3	Infrastructure provisions at construction camps	The contractor during the progress of work will provide, erect and maintain necessary (temporary) living accommodation and ancillary facilities for labour to standards and scales approved by the resident Engineer. There shall be provided within the precincts of every workplace, latrines and urinals in an accessible place, and the accommodation, separately for each for these, as per standards set by the Building and other Construction Workers (regulation of Employment and Conditions of Service) Act, 1996. Except in workplaces provided with water-flushed latrines connected with a water borne sewage system, all latrines shall be provided with dry-earth system (receptacles) which shall be cleaned at least four times daily and at least twice during working hours and kept in a strict sanitary condition. Receptacles shall be tarred inside and outside at least once a year. If women are employed, separate latrines and urinals, screened from those for men (and marked in the vernacular) shall be provided. There shall be adequate supply of water, close to latrines and urinals. All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp must be designed, built and operated so that no health hazard occurs and no pollution to the air, ground or adjacent watercourses takes place. Compliance with the relevant legislation must be strictly adhered to. Garbage bins must be provided in the camp and shall be regularly emptied and the garbage disposed off in a hygienic manner. Construction camps are to be sited at least 1000m away from the nearest habitation and adequate health care is to be provided	Construction camps	Contract

Sl. No	Activities	Management Measure	Location	Reference[1]
		for the work force. Unless otherwise arranged for by the local sanitary authority, arrangement for disposal of excreta by putting a layer of night soils at the bottom of a permanent tank prepared for the purpose shall be taken up by the contractor. It should be covered with 15 cm layer of waste or refuse and then with a layer of earth for a fortnight (by then it will turn into manure).		
2.1.4	Operation of construction equipments and vehicles	All vehicles and equipment used for construction will be fitted with exhaust silencers. During routine servicing operations, the effectiveness of exhaust silencers will be checked and if found to be defective will be replaced. Noise limits for construction equipment used in this project (measured at one metre from the edge of the equipment in free field) such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws will not exceed 75 dB(A), as specified in the Environment (Protection) Rules, 1986 Notwithstanding any other conditions of contract, noise level from any item of plant(s) must comply with the relevant legislation for levels of noise emission. The contractor will ensure that the AAQ concentrations at these construction sites are within the acceptable limits of industrial uses in case of hot mix plants and crushers and residential uses around construction camps. Dust screening vegetation will be planted on the edge of the RoW for screening dust crusher. Monitoring of the exhaust gases and noise levels will be carried out by the agency identified for Environmental Monitoring for the project.	All construction equipments and vehicles	Environment (Protection) Rules, 1986 Monitoring Plan Table 8-2
2.1.5	Material Handling at Site	All workers employed on mixing asphaltic material, cement, lime mortars, concrete etc., will be provided with protective footwear and protective goggles. Workers, who are engaged in welding works, would be provided with welder‟s protective eye-shields. Workers engaged in stone breaking activities will be provided with protective goggles and clothing and will be seated at sufficiently safe intervals. The use of any herbicide or other toxic chemical will be strictly in accordance with the manufacturer‟s instructions. The Engineer will be given at least 6 working days notice of the proposed use of any	All construction sites	MoRTH: 111.6 MoRTH: 105

Sl. No	Activities	Management Measure	Location	Reference[1]
		herbicide or toxic chemical. A register of all herbicides and other toxic chemicals delivered to the site will be kept and maintained up to date by the Contractor. The register will include the trade name, physical properties and characteristics, chemical ingredients, health and safety hazard information, safe handling and storage procedures, and emergency and first aid procedures for the product. No man below the age of 14 years and no woman will be employed on the work of painting with products containing lead in any form. No paint containing lead or lead products will be used except in the form of paste or readymade paint. Face masks will be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint dry rubbed and scrapped.		
2.1.6	Precautionary/Safety Measures During Construction	All relevant provisions of the Factories Act, 1948 and the Building and other Construction Workers (regulation of Employment and Conditions of Service) Act, 1996 will be adhered to. Adequate safety measures for workers during handling of materials at site will be taken up. The contractor has to comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress.	All construction sites	Factories Act, 1948 and the Building and other Construction Workers (regulation of Employment and Conditions of Service) Act, 1996 MoRTH 105
2.1.7	Protection of Religious Structures and Shrines	All necessary and adequate care shall be taken to minimize impact on cultural properties (which includes cultural sites and remains, places of worship including temples, mosques, churches and shrines, etc., graveyards, monuments and any other important structures as identified during design and all properties/sites/remains notified under the Ancient Sites and Remains Act). No work shall spillover to these properties, premises and precincts. Access to such properties from the road shall be maintained clear and clean.	All construction sites	
2.1.8	Chance found Archaeological property	All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government, and shall be dealt with as per provisions of the relevant legislation. The contractor shall take reasonable precaution to prevent his workmen or any other persons from removing and damaging any such article or thing. He shall,	All construction sites	

Sl. No	Activities	Management Measure	Location	Reference[1]
		immediately upon discovery thereof and before removal acquaint the Engineer of such discovery and carry out the Engineer"s instructions for dealing with the same, awaiting which all work shall be stopped. The Engineer shall seek direction from the Archaeological Society of India (ASI) before instructing the Contractor to recommence work on the site.		
2.1.9	Earthworks			
2.1.9.1	Excavations	All excavations will be done in such a manner that the suitable materials available from excavation are satisfactorily utilized as decided upon beforehand. The excavations shall conform to the lines, grades, side slopes and levels shown in the drawings or as directed by the engineer. While planning or executing excavation the contractor shall take all adequate precautions against soil erosion, water pollution etc (clause 306) and take appropriate drainage measures to keep the site free of water (clause 311), through use of mulches, grasses, slope drains and other devices. The contractor shall take adequate protective measures to see that excavation operations do not affect or damage adjoining structures and water bodies. For safety precautions guidance may be taken from IS:3764	All along the project corridor	MoRTH 301.3.3 MoRTH 304.3.6 IS:3764
	Earth fill	Embankment and other fill areas, unless otherwise permitted by the Engineer, be constructed evenly over their full width and the contractor will control and direct movement of construction vehicles and machinery over them	Along earth fill areas	MoRTH 305.3.5.3
2.1.9.2	Stripping, stocking and preservation of top soil	Stock piling of top soil as per Section 2.1.2.2 The stockpiles will be located at least 100m from watercourses.	All along the project corridor	Section 2.1.2.2
2.1.9.3	Slope protection and control of erosion	While planning or executing excavations the contractor will take all adequate precautions against soil erosion as per MoRTH 306. Dry stone pitching for apron and revetment will be provided for bridges and cross drainage structures.		MoRTH 306 MoRTH 307 & MoRTH 308
2.1.9.4	Drainage requirements at construction sites	In addition to the design requirements, the contractor will take all desired measures as directed by the Engineer such measures to prevent temporary or permanent flooding of the site or any adjacent area.	All along the project corridor	
2.1.9.5	Dust	All earthwork will be protected in a manner acceptable to the Engineer to minimise generation of dust. The contractor will take every precaution to reduce the level of dust along construction	All along the project corridor	MoRTH 111.8

Sl. No	Activities	Management Measure	Location	Reference[1]
		sites involving earthworks, by frequent application of water.		
2.1.9.6	Contamination of soil	Vehicle/machinery and equipment operation, maintenance and refueling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. Oil interceptor will be provided for vehicle parking, wash down and refueling areas within the construction camps as per the Figure 8-2. Fuel storage will be in proper bunded areas. All spills and collected petroleum products will be disposed off in accordance with MoEF and PCB, Meghalaya guidelines. Fuel storage and refilling areas will be located at least 1000m from rivers and irrigation ponds or as directed by the Engineer. In all fuel storage and refueling areas, if located on agricultural land or areas supporting vegetation, the topsoil will be stripped, stockpiled and returned after cessation of such storage and refueling activities.	All along the project corridor	MoRTH 306 & MoRTH 311 Drawing 3.1
2.1.9.7	Compaction of soil	To minimize soil compaction construction vehicle, machinery and equipment will move or be stationed in designated area (RoW or CoI, haul roads as applicable) only. The haul roads for construction materials should be routed to avoid agricultural areas	All along the project corridor	Annexure „A" to MoRTH 501
2.1.9.8	Silting, Contamination of Water bodies	Silt fencing will be provided around stockpiles at the construction sites close to water bodies. The fencing needs to be provided prior to commencement of earthworks and continue till the stabilization of the Construction materials containing fine particles will be stored in an enclosure such that sediment-laden water does not drain into nearby watercourses. All discharge standards promulgated under Environmental Protection Act, 1986, will be adhered to. All liquid wastes generated from the site will be disposed off as acceptable to the Engineer.	Water bodies close to the project corridor	Environmental Protection Act, 1986
2.1.9.9	Cutting/Filling of Surface water bodies	Earth works shall be undertaken such that the existing embankments of water bodies are not disturbed. In case of cutting of embankments, the same shall be reconstructed with appropriate slope protection measures and adequate erosion control measures. Filling of surface water bodies will be compensated by digging an equal volume of soil for water storage. Such dug-up soil will be used for spreading as topsoil. Wherever digging is undertaken, the banks	Surface Water bodies whose water storage capacity is affected by the project and whose embankments are being cut	Contract

Sl. No	Activities	Management Measure	Location	Reference[1]
		will be protected as designed or as approved by the Engineer. The excavation will be carried out in a manner so that the side slopes are no steeper than 1 vertical to 4 horizontal, otherwise slope protection work, as approved by the Engineer will be provided. As far as practicable, and as approved by the Engineer, excavation for replacement of water bodies will be at the closest possible place/location, with respect to the original water body or part thereof consumed by filling.		
2.1.10	Sub-Base & Base	The contractor will take all necessary measures/ precautions to ensure that the execution of works and all associated operations are carried out in conformity with statutory and regulatory environmental requirements including those prescribed in Annexure A to MoRTH 501. The contractor will plan and provide for remedial measures to be implemented in event of occurrence of emergencies such as spillage of oil or bitumen or chemicals. The contractor will provide the Engineer with a statement of measures that he intends to implement in event of such an emergency, which will include a statement of how he intends to adequately train personnel to implement such measures. Adequate safety measures for workers during handling of materials at site will be taken up. The contractor will take every precaution to reduce the level of dust along construction sites by frequent application of water. Noise levels from all vehicles and equipment used for construction will conform to standards as specified in Section 1.2.3. Construction activities involving equipments with high noise levels will be restricted to the daytime. Transport of materials for construction will be as per Section 2.1.2.5 The contractor will provide for all safety measures during construction as per Section 2.1.6	All along the project corridor	Annexure A to MoRTH 501 Section 2.1.5 Section 1.2.3 Section 2.1.2.5. Section 2.1.3.5 Section 2.1.6
2.1.11	Surfacing	The contractor will take all necessary means to ensure that works and all associated operations are carried out in conformity with Annexure A to MoRTH 501. All workers employed on mixing asphaltic material etc. will be provided with protective footwear as specified in Section 2.1.5.	All along the project corridor	Annexure A to MoRTH 501 Section 2.1.5 Section 1.2.3 Section

Sl. No	Activities	Management Measure	Location	Reference[1]
		Noise levels from all vehicles and equipment used for surfacing will conform to standards as specified in Section 1.2.3. Construction activities involving equipments with high noise levels will be restricted to the daytime. Transport of materials for construction will be as per Section 2.1.2.5 The contractor will provide for all safety measures during construction as per Section 2.1.6		2.1.2.5 Section 2.1.6
2.1.12	Bridge Works & Culverts	While working across or close to the rivers, the Contractor will not disrupt the flow of water. If for any bridgework, etc., closure of flow is required, the Contractor apart from obtaining the requisite clearances from the PWD (Irrigation Department) will seek approval of the Engineer. The Engineer will have the right to ask the Contractor to serve notice on the downstream users of water sufficiently in advance. Construction over and close to the non-perennial streams will be undertaken in the dry season. Construction work expected to disrupt users and impacting community water bodies will be taken up after serving notice on the local community. Dry stone pitching for apron and revetment will be provided for bridges and cross drainage structures.	At locations were bridge works and culverts are proposed.	MoRTH 2500
2.1.13	Road Furniture	Road furniture including footpaths, railings, storm water drains, crash barrier, traffic signs, speed zone signs, pavement markers and any other such items will be provided as per design	All along the project corridor	MoRTH 801
2.1.14	Monitoring Environmental Conditions	The contractor will undertake seasonal monitoring of air, water, and noise through an approved monitoring agency. The parameters to be monitored, frequency and duration of monitoring as well as the locations to be monitored will be as per the Monitoring Plan prepared (Refer Table 8-1, Table 8-2 and Table 8-4).		Environmental Monitoring Plan Table 8-8
2.2	Contractor Demobilization			

Sl. No	Activities	Management Measure	Location	Reference[1]
2.2.1	Clearing of Construction of Camps & Restoration	Contractor to prepare site restoration plans for approval by the Engineer. The plan is to be implemented by the contractor prior to demobilization. On completion of the works, all temporary structures will be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor‟s expense, to the entire satisfaction of the Engineer. Residual topsoil will be distributed on adjoining/proximate barren/rocky areas as identified by the Engineer in a layer of thickness of 75mm - 150mm.	All Construction Workers‟ Camps	
2.2.2	Redevelopment of Borrow Areas	Redevelopment of borrow areas will be taken up in accordance with the plans approved by the Engineer.	At all borrow area locations suggested for the project.	
2.2.3	Tree Plantation	No	No	No
3.0	OPERATION STAGE ACTIVITIES BY PIU-ENVIRONMENTAL CELL			
3.1	Monitoring Operational Performance	The PIU will monitor the operational performance of the various mitigation measures carried out.	See monitoring table	See monitoring table
4.0	OTHER ACTIVITIES			
4.1	Orientation of implementing agency and contractors	The PIU shall organize orientation sessions during all stages of the project. The orientation session shall involve all staff of Environmental Cell, field level implementation staff of PIU, Engineer and Contractor.		

.

Table 7-4: Environmental Monitoring Plan

Attribute	Project Stage	Parameter	Special Guidance	Standards	Frequency	Duration	Location	Implementation
Air	Construction	SO_2, NO_x, RPM, SPM, O_3,Pb, CO, NH_3, C_6H_6, BaP, As and Ni	High volume sampler to be located 50m from the plant in the Downwind direction. Use method specified by CPCB for analysis	Air (prevention and Control of Pollution) Rules, CPCB, 2009	Three seasons per year	24 hours Sampling	Along the road Hot mix / batching plant	Contractor / PIU
	Operation				Two seasons in a year for three years		Along the road	Contractor / PIU
Water	Construction	All essential characteristics and some of desirable characteristics as decided by the Environmental Specialist of the CSC and PIU	Grab sample collected from source and Analyse as per Standard Methods for Examination of Water and Wastewater	Indian Standards for Inland Surface Waters (IS: 2296, 1982	Four seasons per year	Grab Sampling	Along the road Surface water sources	Contractor / PIU
	Operation				Four seasons for three years			Contractor / PIU
Noise	Construction	Noise levels on dB (A) scale	Equivalent noise levels using an integrated noise level meter kept at a distance of 15 from edge of pavement Equivalent noise levels using an integrated noise level meter kept at a distance of 15 from edge of pavement	MoEF Noise Rules, 2000	Three seasons per year	Leq in dB(A) of day time and night time	Along the road Hot mix / batching plant	Contractor / PIU
	Operation				Three seasons per year for three years.		Along the road	Contractor / PIU
Soil	Construction	Monitoring of Pb, SAR and Oil &	Sample of soil collected to acidified and analysed using absorption Spectrophotometer	Threshold for each contaminant	Four seasons per year	Grab Sampling	Along the road Hot mix /	Contractor / PIU

Attribute	Project Stage	Parameter	Special Guidance	Standards	Frequency	Duration	Location	Implementation
		Grease		set by IRIS database of USEPA until national standards are promulgated			batching plant	
	Operation				Four seasons for three years		Along the road	Contractor / PIU
Borrow area	Construction	As per Guidelines	Visual Observation	-	Once in a month	-	Borrow area location	Contractor
Tree plantation	Operation stage	As per Rehabilitation Plan			Quarterly	-	Areas where plantation is being done	Contractor / PIU

8. IMPLEMENTATION ARRANGEMENT

8.1Project Implementation Arrangement

The Environmental Management Plan, EMP process does not stop once a project (planning and design) got approval for implementation. During implementation of project MPWD (MITP), Construction Supervision Consultant, CSC (if any) and Contractor will be responsible for ensuring that the environmental commitments made to regulatory agencies, lending agencies and other stakeholders during the EIA process are met. To execute EMP is a cumulative responsibility of all three parties involved, indicative responsibility mechanism has been presented in Table 9-3, as developed for upgradation projects.

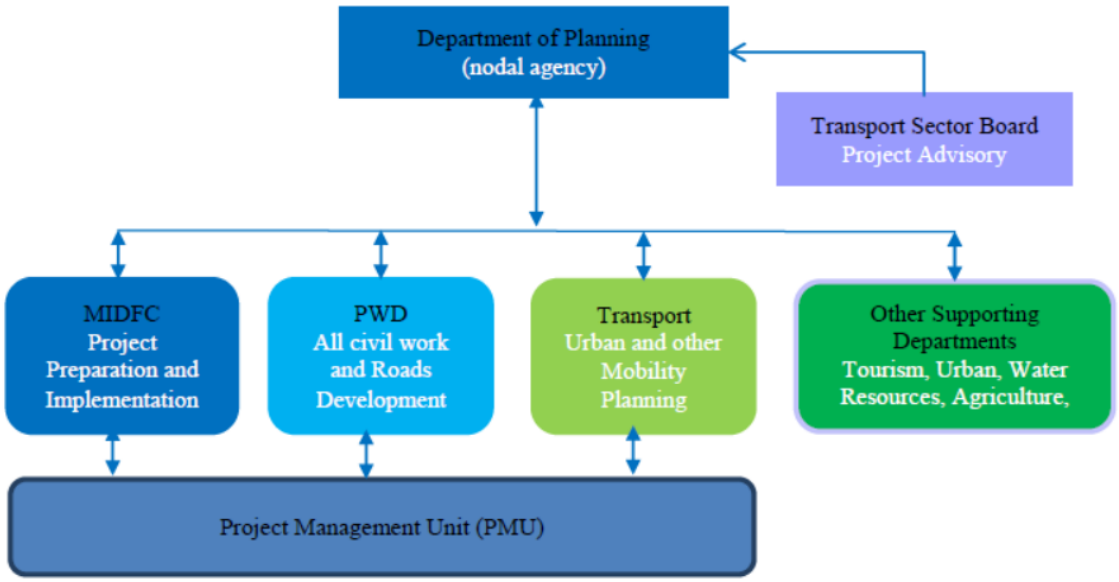


Figure 8-1: Organisation Setup for EMP Implementation

Table 8-1: Institutional Responsibilities

System	Designation	Responsibilities
Coordinating/Facilitating Agency	Chief Engineer MPWD	• Overview of the project implementation • Ensure timely budget for the EMP • Coordination with different state level committee, to obtain Regulatory Clearances • Participate in state level meetings • Monthly review of the progress.
	Chief Engineer MPWD (NH)	• Overall responsible for EMP implementation • Reporting to various stakeholders (World Bank, Regulatory bodies) on status of EMP implementation • Coordination with PIU Staff (Environmental officer). • Responsible for obtaining Regulatory Clearances • Review of the progress made by contractors

System	Designation	Responsibilities
		• Ensure that BOQ items mentioned in EMP are executed as per Contract provisions.
	Environmental Officer (PMU)	• Recommend for approval to PMU all document and ensure that design and documents include all relevant EHS Safeguards • Recommend for approval to PMU the Contractor‟s Environmental Management Plan after approval of the Environmental Engineer of the PMC; • Review the environmental performance of the project through Monthly Reports and Monthly • Environmental Audits reports submitted by the Project Management Consultants and report to the Management; • Carry out quarterly environmental audits and report back to the management • Review Corrective Action Plan for closure of the Environmental Audit Findings • Overall coordination and management through PIU supported by PMC and Authority Engineer for implementation of Environment Safeguards. • Review and action on all grievance related to environment through the Grievance Redress Mechanism. • Prepare the Annual Safeguards Monitoring &closure Reports to the Management for review and onwards submission to the Bank and its closure; • Review of all the finding in the monitoring and auditing report and ensuring corrective action are implemented so that it does not reoccur; • Updating of the EMP if any new or unanticipated environmental impacts occur during project implementation due to design change or other reasons • Organise training for Capacity building of the PMU and the PIU for effective implementation of safeguard requirements
	Environmental Specialist (PMC)	• Ensure that Contractor is in compliance with all the statutory requirement and the Safeguard requirement mentioned in the EMP. • Review and approve the Contractor‟s EMP Implementation Plan; • Ensure that the weekly environmental reports are compiled by Contractor, reviewed and submitted to PMC; • Carry out any specialized designs which would be required for the environmental safeguards; • Facilitating the Contractor to obtain necessary permissions/ approvals and its submission to PMC • Directly interact with aggrieved persons and

System	Designation	Responsibilities
		record their views and grievances in the Grievance Management System. • Work with the contractor to ensure grievances if any at field level is resolved • Review and approve the package specific EMP"s and make necessary modifications if required. • Ensure that all mitigation measures as given in the EMP are implemented properly by the Contractor during the study. • Conduct weekly environmental monitoring of all project during preconstruction, construction and operation phases. • Ensure monthly, quarterly and annual environmental monitoring reports are prepared and submitted to PMC • Work with the Contractor and PMC for preparation of the environmental corrective actions on audit observations.
	Environmental Specialist (Contractor)	• Responsible for integration of the mitigation measures proposed in the Environmental Management Plans (EMP) associated with the construction activities into the construction processes. • Responsible for daily monitoring of the environmental compliance and submission of the information to the Authority Engineer. • Preparation of Contract Specific management and submission of the same to the Authority Engineer for approval. • Ensure that adequate budget provisions are made for implementing • all mitigation measures specified in the Contract specific EMP. • Participate in induction training on EMP provisions and requirements delivered by the PMU and carry out the same for all contract staff. • Carry out liasoning with the regulatory agencies for necessary environmental license(s), permitions.. • Assist the PIU with support required for obtaining necessary environmental permits • Participate in resolving issues as a member of the Grievance Redressal Cell. • •Respond promptly to grievances raised by

System	Designation	Responsibilities
		the local community or and implement corrective actions.
	Health and Safety Office (Contractor)	• Responsible for ensuring integration of the health and safety aspects in the work processes associated with the construction activities. • • Responsible for day -to day monitoring of the occupational health and safety performance and submission of the information to the Authority Engineer. • • Preparation of a Safety Plan and submission of the same to the • Authority Engineer for approval. • • Participate in induction training on EMP provisions and • requirements delivered by the PMU and carry out the same for all contract staff. • • Carry out Construction safety Audits and report it to the Team Leader of the Contractor. • • Assist the PMC with the health safety performance of the project • • Respond promptly to grievances raised by the local community for the safety and implement corrective actions.

8.2 Monitoring Plan

Reporting system for the suggested monitoring plan, operating at two levels are as follows:

- Reporting for environmental management (EM) indicators to assess the progress of the EMP Implementations
- Review of the Environmental management implementation to assess the effectiveness of the implementation. The monitoring responsibilities and their reporting authority over the period of one year is presented in Table-9.2 . This cycle would be replicated over the tenure of the project.

Table 8.2 : Reporting requirement details of the project

Reports	Responsibility	Reporting authority
Before Starting of Project	Contractor-Must Submit Individual Site Specific Environmental Management Plan SEMP.	**Authority Engineer-review of reports and Approval. EMP budget shall be utilized by contractor only after having approved SEMP from Authority Engineer and accepted by MPWD.**

Daily	Contractor-Summery of all environmental issues and activities	Authority Engineer-review of reports and corrective action
Monthly	PMC- Monitoring of all projects and compilation nd review of all corrective actions	PMU- review the action taken repeat and develop new strategies
Quarterly	PMU- review of project progress and auditing of the process of implementation	Management- review of progress and process of implementation, Approve of the Corrective Action Plan
Annual External	Audit External Agency- review of progress EMP of implementation	Management/World Bank- Review of findings and approve of the corrective Action Plan; Report to the World Bank

8.2.1 Monitoring

.Periodic Monitoring of the EMP is required for assessing the progress of the implementation of the EMP. The monitoring would include regular activities related to the activities proposed in the EMP.The following Monitoring reports would be submitted as per the protocol described earlier:

- Daily Monitoring Report: by the Contractor to the PMC on the environmental actions which has been implemented on site on a daily basis. The complains received from the community, observations at site for EHS issues, daily site audit, unsafe acts etc. would also record;
- Monthly Monitoring: by the PMC for reporting to the PMU, would include a monitoring of all the packages and report the observations. The Completed Action would also be assessed for its effectiveness and sustainability.
- Quarterly Monitoring: by the PMU for reporting to the World Bank, would include a monitoring of all observations and Completed Action would also be assessed for its effectiveness and sustainability.

8.3 Cost Estimates for Environmental Management

Mitigation measures proposed in the EMP will be implemented by the Contractor. The works to be undertaken by the Contractor have been quantified and the quantities included in the respective BOQ items such as earth works, slope protection, noise barriers, road safety features, and shrub plantation.

Provisional quantities have also been included for additional measures that may be identified during construction and for silt fencing which will depend on the Contractors work methods and site locations. Items and quantities have also been included for enhancement measures.

More general environmental management measures to be followed by the contractor have been included in the specifications and this EMP. These cannot be quantified and are to be included in the contract rates. A total of Rs. 121.88 lakhs has been allocated for the environmental management for all the Project road.

8.3.1 Environmental Management Cost For Mawklot to Umiam Road

Environmental Management Cost For Mawklot to Umiam Road				
Component	**Stage**	**Items**	**Estimated Rate**	**Total Cost (Rs)**
Environmental Monitoring	Construction and Operation Period	Monitoring of air, water, soil, noise and Soil	Lump Sum	5,00,000
Air	Construction	Dust Suppression at the project site @ Rs 1500/trip x 1 trip/day x 300 days x 1 year	Lump Sum	4,50,000
Solid waste	Construction	Demolition wastes and scrap disposal as per C & D rules 2016	Lump Sum	2,00,000
Flora	Construction	Plantation of grass for protection of soil erosion which is to be planted on the muck disposal sites/waste lands or on the van panchayat land and its maintenance/fencing	Lump Sum	1,45,000
		Maintenance for the period of 1 year including causality replacement of tree	Lump Sum	50,000
Wildlife	Construction	Signage for wildlife	Lump Sum	25,000
		Provision of Hoarding /Posters at construction camps and provision of health checks at construction sites	Lump Sum	50,000
		Provision for helmet, gumboots, jackets, goggles etc. to labours	Lump Sum	50,000

Construction Camps	Construction	Sanitary Facilities	Lump Sum	50,000
Corporate Environment Responsibility (CER)	Construction and Operation	Drinking water supply, sanitation, health, education, skill development, solid waste management facilities, avenue plantation etc.	1 % of the total project cost	13,50,000
			Total	27,70,000
			Contingency @ 10%	2,77,000
			Total	30,47,000

8.3.2 Environmental Management Cost For Mawphanlur to Mawthadraishan Road

Environmental Management Cost For Mawphanlur to Mawthadraishan Road				
Component	**Stage**	**Items**	**Estimated Rate**	**Total Cost (Rs)**
Environmental Monitoring	Construction and Operation Period	Monitoring of air, water, soil, noise and Soil	Lump Sum	5,00,000
Air	Construction	Dust Suppression at the project site @ Rs 1500/trip x 1 trip/day x 300 days x 1 year	Lump Sum	4,50,000
Solid waste	Construction	Demolition wastes and scrap disposal as per C & D rules 2016	Lump Sum	2,00,000
Flora	Construction	Plantation of grass for protection of soil erosion which is to be planted on the muck disposal sites/waste lands or on the van panchayat land and its maintenance/fencing	Lump Sum	1,45,000
		Maintenance for the period of 1 year including causality replacement of tree	Lump Sum	50,000
Wildlife	Construction	Signage for wildlife	Lump Sum	25,000
		Provision of Hoarding /Posters at construction camps and provision of health checks at construction sites	Lump Sum	50,000
		Provision for helmet, gumboots, jackets, goggles etc. to labours	Lump Sum	50,000
Construction Camps	Construction	Sanitary Facilities	Lump Sum	50,000
Corporate Environment	Construction	Drinking water supply, sanitation, health, education,	1 % of the total	13,50,000

Responsibility (CER)	and Operation	skill development, solid waste management facilities, avenue plantation etc.	project cost	
			Total	27,70,000
			Contingency @ 10%	2,77,000
			Total	30,47,000

8.3.3 Environmental Management Cost For Niangmer to Sohmylleng Road

Environmental Management Cost For Niangmer to Sohmylleng Road				
Component	**Stage**	**Items**	**Estimated Rate**	**Total Cost (Rs)**
Environmental Monitoring	Construction and Operation Period	Monitoring of air, water, soil, noise and Soil	Lump Sum	5,00,000
Air	Construction	Dust Suppression at the project site @ Rs 1500/trip x 1 trip/day x 300 days x 1 year	Lump Sum	4,50,000
Solid waste	Construction	Demolition wastes and scrap disposal as per C & D rules 2016	Lump Sum	2,00,000
Flora	Construction	Plantation of grass for protection of soil erosion which is to be planted on the muck disposal sites/waste lands or on the van panchayat land and its maintenance/fencing	Lump Sum	1,45,000
		Maintenance for the period of 1 year including causality replacement of tree	Lump Sum	50,000
Wildlife	Construction	Signage for wildlife	Lump Sum	25,000
		Provision of Hoarding /Posters at construction camps and provision of health checks at construction sites	Lump Sum	50,000
		Provision for helmet, gumboots, jackets, goggles etc. to labours	Lump Sum	50,000
Construction Camps	Construction	Sanitary Facilities	Lump Sum	50,000
Corporate Environment	Construction	Drinking water supply, sanitation, health, education,	1 % of the total	13,50,000

Responsibility (CER)	and Operation	skill development, solid waste management facilities, avenue plantation etc.	project cost	
			Total	27,70,000
			Contingency @ 10%	2,77,000
			Total	30,47,000

8.3.4 Environmental Management Cost For Laitartet to Nonglyput Road

Environmental Management Cost For Laitartet to Nonglyput Road				
Component	**Stage**	**Items**	**Estimated Rate**	**Total Cost (Rs)**
Environmental Monitoring	Construction and Operation Period	Monitoring of air, water, soil, noise and Soil	Lump Sum	5,00,000
Air	Construction	Dust Suppression at the project site @ Rs 1500/trip x 1 trip/day x 300 days x 1 year	Lump Sum	4,50,000
Solid waste	Construction	Demolition wastes and scrap disposal as per C & D rules 2016	Lump Sum	2,00,000
Flora	Construction	Plantation of grass for protection of soil erosion which is to be planted on the muck disposal sites/waste lands or on the van panchayat land and its maintenance/fencing	Lump Sum	1,45,000
		Maintenance for the period of 1 year including causality replacement of tree	Lump Sum	50,000
Wildlife	Construction	Signage for wildlife	Lump Sum	25,000
		Provision of Hoarding /Posters at construction camps and provision of health checks at construction sites	Lump Sum	50,000
		Provision for helmet, gumboots, jackets, goggles etc. to labours	Lump Sum	50,000
Construction Camps	Construction	Sanitary Facilities	Lump Sum	50,000
Corporate Environment	Construction	Drinking water supply, sanitation, health, education,	1 % of the total	13,50,000

Responsibility (CER)	and Operation	skill development, solid waste management facilities, avenue plantation etc.	project cost	
			Total	27,70,000
			Contingency @ 10%	2,77,000
			Total	30,47,000

Appendix-1: Environment Management Plan

Sl.No.	Environmental Issue/Component	Management Measures	Institutional Responsibility	
			Planning	Supervision
Pre- construction activities by Project Implementation Unit				
1	Land Acquisition	• The acquisition of land and private properties will be carried out in accordance with the RAP and entitlement framework for the project. PIU has to ascertain that any additional environmental impacts resulting from acquisition of land shall be addressed and integrated into the EMP and other relevant documents. • No land acquisition is involved in this road section.	PIU, Revenue Dept., NGOs, Collaborating Agencies	PIU
2	Preservation of Trees	• No cutting		
3	Relocation of Community Utilities and Common Property Resources	• No impact		
4	Relocation of affected Cultural and Religious Properties	• No impact		
Pre-construction activities by the Contractor/Environmental Expert of Authority Engineer				
5. Field Verification and Suggested Changes in Design				
5.1	Joint Field Verification	• The Environmental Expert of the Authority Engineer and the Contractor will carry out joint field verification to ascertain the possibility to saving trees, environmental and	Contractor/ Environmental Expert of the	PIU

		community resources. The verification exercise should assess the need for additional protection measures or changes in design/scale/nature of protection measures including the efficacy of enhancement measures suggested in the EMP. Proper documentation and justifications/reasons shall be maintained in all such cases where deviation from the original EMP is proposed.	Authority Engineer	
5.2	Construction-ESMP, including OHS Plan	• The Contractors will submit the Construction-ESMP, including OHS Plan, for approval by PMU prior to mobilization. The world bank will also review the Construction-ESMP, including OHS Plan through the PMU.	Contractor	Contractor/PIU/ WB
5.3	Assessment of Impacts due to Changes/Additions in the Project	• The Environmental Expert of the Authority Engineer will assess impacts and revise/modify the EMP and other required sections of the project document/s in the event of changes/revisions (including addition or deletion) in the project‟s scope of work.	Contractor/ Environmental Expert of the Authority Engineer	PIU
5.4	Crushers, hot-mix plants and Batching Plants Location	• Hot mix plants and batching plants will be sited sufficiently away from settlements and agricultural operations or any commercial establishments. Such plants will be located at least 1000 m away from the nearest village/settlement preferably in the downwind direction. • The Contractor shall submit a detailed lay-out plan for all such shall be necessary prior to their establishment. • Arrangements to control dust pollution through provision of wind screens, sprinklers, dust encapsulation will have to be provided at all such sites. • Specifications of crushers, hot mix plants and batching plants will comply with the requirements of the relevant	Contractor/ Environmental Expert of the Authority Engineer	PIU

		current emission control legislations and Consent/NOC for all such plants shall be submitted to the SC and PIU. • The Contractor shall not initiate plant/s operation till the required legal clearances are obtained and submitted		
5.5	Other Construction Vehicles, Equipment and Machinery	• All vehicles, equipment and machinery to be procured for construction will confirm to the relevant Bureau of India Standard (BIS) norms. The discharge standards promulgated under the Environment Protection Act, 1986 will be strictly adhered to. • Noise limits for construction equipment to be procured such as compactors, rollers, front loaders concrete mixers, cranes (moveable), vibrators and saws will not exceed 75 dB (A), measured at one meter from the edge of the equipment in free field, as specified in the Environment (Protection) Rules, 1986. • The Contractor shall maintain a record of PUC for all vehicles and machinery used during the contract period.	Contractor/ Environmental Expert of the Authority Engineer	PIU
6	**Identification and Selection of Material Sources**			
6.1	Borrow Areas	• Finalizing borrow areas for borrowing earth and all logistic arrangements as well as compliance to environmental requirements, as applicable, will be the sole responsibility of the contractor. The Contractor will not start borrowing earth from select borrow area until the formal agreement is signed between land owner and contractor and a copy is submitted to the SC and the PIU. • Locations finalized by the contractor shall be reported to the Environmental Expert of the Authority Engineer and who will in turn report to PIU. Format for reporting will be	Contractor/ Environmental Expert of the Authority Engineer	PIU

		as per the Reporting Format for Borrow Area and will include a reference map. Planning of haul roads for accessing borrow materials will be undertaken during this stage. The haul roads shall be routed to avoid agricultural areas as far as possible (in case such a land is disturbed, the Contractor will rehabilitate it as per Borrow Area Rehabilitation Guidelines) and will use the existing village roads wherever available. • In addition to testing for the quality of borrow materials by the SC, the environmental personnel of the SC will be required to inspect every borrow area location prior to approval (follow criteria for evaluation of borrow areas).		
6.2	Quarry	• Contractor will finalize the quarry for procurement of construction materials after assessment of the availability of sufficient materials and other logistic arrangements In case the contractor decides to use quarries other than recommended by DPR consultant, then will be selected based on the suitability of the materials. • The contractor will procure necessary permission for procurement of materials from Mining Department, District Administration and State Pollution Control Board and shall submit a copy of the approval and the rehabilitation plan to the PIU and Environmental Expert of the SC. • Contractor will also work out haul road network and report to Environmental Expert of the Authority Engineer and SC will inspect and in turn report to PIU before approval.	Contractor	Environmental Expert of the Authority Engineer and PIU
6.3	Arrangement for Construction	• To avoid disruption/disturbance to other water users, the contractor will extract water from fixed locations and	Contractor	Environmental Expert of the

	Water	consult the Environmental Expert of the Authority Engineer before finalizing the locations. • The Contractor will provide a list of locations and type of sources from where water for construction will be used. • The contractor will not be allowed to pump from any irrigation canal and surface water bodies used by community. • The contractor will need to comply with the requirements of the State Ground Water Department and seek their approval for doing so and submit copies of the permission to SC and PIU.		Authority Engineer and PIU
6.4	Labour Requirements	• The contractor preferably will use unskilled labor drawn from local communities to give the maximum benefit to the local community.	Contractor	Environmental Expert of the Authority Engineer and PIU
6.5	Construction Camp Locations – Selection, Design and Lay-out	• Siting of the construction camps will be as per the guidelines below. Locations identified by the contractor will report as per format given. • Construction camps will not be proposed within 500 m from the nearest settlements to avoid conflicts and stress over the infrastructure facilities with the local community. • Location for stockyards for construction materials will be identified at least 1000 m from water courses. • The waste disposal and sewage system for the camp will be designed, built and operated such that no odor is generated. Unless otherwise arranged by the local sanitary authority, arrangements for disposal of night soils (human excreta) suitably approved by the local medical health or municipal authorities or as directed by Environmental	Contractor	Environmental Expert of the Authority Engineer and PIU

		Expert of the Authority Engineer will have to be provided by the contractor.		
6.6	Arrangements for Temporary Land Requirement	• The contractor as per prevalent rules will carry out negotiations with the landowners for obtaining their consent for temporary use of lands for construction sites/hot mix plants/traffic detours/borrow areas etc. • The Environmental Expert of the Authority Engineer will be required to ensure that the clearing up of the site prior to handing over to the owner (after construction or completion of the activity) is included in the contract.	Contractor	Environmental Expert of the Authority Engineer and PIU
6.7	Orientation of Implementing Agency and Contractors	• The PIU shall organize orientation sessions and regular training sessions during all stages of the project. This shall include on-site training (general as well as in the specific context of a subproject). These sessions shall involve all staff of Environmental Cells, field level implementation staff of PIU, Environmental Experts of SCs and Contractors.	PMU/PIU	PIU
Construction Stage (Activities to be carried out by the Contractor)				
7 Site Clearance				
7.1	Clearing and Grubbing	• Vegetation will be removed from the construction zone before commencement of civil works. All works will be carried out such that the damage or disruption to flora other than those identified for cutting is avoided or minimal. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval from the Environmental Expert of the Authority Engineer. • The contractor, under any circumstances will not cut or damage trees.	Contractor	Contractor

7.2	Stripping, stocking and preservation of top soil	• The top soil from all areas of cutting and all areas to be permanently covered will be stripped to a specified depth of 150 mm and stored in stockpiles. A portion of the temporarily acquired area and/or Right of Way will be earmarked for storing topsoil. The locations for stock piling will be pre identified in consultation and with approval of Environmental Expert of the Authority Engineer. The following precautionary measures will be taken to preserve them till they are used: a) Stockpile will be designed such that the slope does not exceed 1:2 (vertical to horizontal), and height of the pile is restricted to 2 m. To retain soil and to allow percolation of water, the edges of the pile will be protected by silt fencing. b) Stockpiles will not be surcharged or otherwise loaded and multiple handling will be kept to a minimum to ensure that no compaction will occur. The stockpiles shall be covered with gunny bags or vegetation. c) It will be ensured by the contractor that the top soil will not be unnecessarily trafficked either before stripping or when in stockpiles. • Such stockpiled topsoil will be utilized for - – covering all disturbed areas including borrow areas (not those in barren areas) top dressing of the road embankment and fill slopes – filling up of tree pits, in the median and in the agricultural fields of farmers, acquired temporarily. • Residual topsoil, if there is any will be utilized for the plantation at median and side of the main carriageway.	Contractor	Contractor

		Construction on the cleared soils shall begin as soon as possible to avoid soil erosion. • Top soil shall not be unnecessarily trafficked either before stocking or when in stockpiles. Slope stabilization shall be done by turfing and planting bush grass. Stockpiled top soil shall be returned to cover the disturbed area & cut slopes. Residual top soil shall be used for redevelopment of borrow areas, landscaping along slopes, medians etc.		
7.3	Compaction of Soil	• Heavy, wide and slow-moving vehicles should be kept away from the sensitive routes such as agricultural land. Use of heavy machinery on productive land is to be minimized. • Limitation on the axle load shall be identified such that topsoil is protected from compaction.	Contractor	Contractor
7.4	Generation of Muck, Debris from hill cutting and dismantling structures and road surface	• Debris generated due to the dismantling of the existing structures or scarification of the road will be suitably reused in the proposed construction, subject to the suitability of the materials and approval of the Authority • Engineer (Resident Engineer and Environmental Expert) as follows: – The sub grade of the existing pavement shall be used as embankment fill material. – The existing base and sub-base material shall be recycled as sub-base of the haul road or access roads – The existing bitumen surface may be utilized for the paving of cross roads, access roads and paving works in construction sites and campus, temporary traffic diversions, haulage routes etc. • The contractor will suitably dispose off unutilized debris materials either through filling up pre-designated disposal locations, subject to the approval of the Environmental	Contractor	Contractor

		Expert of the Authority Engineer. • At locations identified for disposal of residual bituminous wastes, the disposal will be carried out over a 60-mm thick layer of rammed clay so as to eliminate the possibility of leaching of wastes into the ground water. The contractor will ensure that the surface area of such disposal pits is covered with a layer of soil. • All arrangements for transportation during construction including provision, maintenance, dismantling and clearing debris, will be considered incidental to the work and will be planned and implemented by the contractor as approved and directed by the Environmental Expert of the Authority Engineer. • The pre-designed disposal locations will be a part of Comprehensive Solid Waste Management Plan to be prepared by Contractor in consultation and with approval of Environmental Expert of the Authority Engineer. • Debris generated from pile driving or other construction activities shall be disposed such that it does not flow into the surface water bodies or form mud puddles in the area. • The contractor shall identify dumping sites. The identified locations will be reported to the Environmental Expert of the Authority Engineer. These locations will be checked on site and accordingly approved by Environmental Expert of the Authority Engineer prior to any disposal of waste materials.		
7.5	Other Construction Wastes Disposal	• The pre-identified disposal locations will be a part of Comprehensive Waste Disposal Solid Waste Management Plan to be prepared by the Contractor in consultation and	Contractor	Contractor

	including balance quantity of muck	with approval of Environmental Expert of the Authority Engineer. Location of disposal sites will be finalized prior to completion of the earthworks on any particular section of the road. • The Environmental Expert of the Authority Engineer will approve these disposal sites after conducting a joint inspection on the site with the Contractor. • Contractor will ensure that any spoils of material unsuitable for embankment fill will not be disposed off near any water course, agricultural land, and natural habitat like grass lands or pastures. Such spoils from excavation can be used to reclaim borrow pits and low-lying areas located in barren lands along the project corridors (is so desired by the owner/community). • No muck will be disposed in any disposal site. Contractor will take care of residual muck, if any that remains after construction work. Either this will be returned to the source or used in construction of embankment elsewhere with proper protection measures. Authority Engineer will keep strict vigil on this aspect. • Non-bituminous wastes other than fly ash may be dumped in borrow pits (preferably located in barren lands) covered with a layer of the soil. No new disposal site shall be created as part of the project, except with prior approval of the Environmental Expert of the Authority Engineer. • All waste materials will be completely disposed, and the site will be fully cleaned and certified by Environmental Expert of the Authority Engineer before handing over. • The contractor at its cost shall resolve any claim, arising		

		out of waste disposal or any noncompliance that may arise on account of lack of action on his part.		
8	**Procurement of Construction Material**			
8.1	Earth from Borrow Areas for Construction	• No borrow area will be opened without permission of the Environmental Expert of the Authority Engineer. The location, shape and size of the designated borrow areas will be as approved by the Environmental Expert of the Authority Engineer and in accordance to the IRC recommended practice for borrow pits for road embankments (IRC 10: 1961). The borrowing operations will be carried out as specified in the guidelines for siting and operation of borrow areas. • The unpaved surfaces used for the haulage of borrow materials, if passing through the settlement areas or habitations; will be maintained dust free by the contractor. Sprinkling of water will be carried out twice a day to control dust along such roads during their period of use. • During dry seasons (winter and summer) frequency of water sprinkling will be increased in the settlement areas and Environmental Expert of the Authority Engineer will decide the numbers of sprinkling depending on the local requirements. Contractor will rehabilitate the borrow areas as soon as borrowing is over from a particular borrow area in accordance with the Guidelines for Redevelopment of Borrow Areas or as suggested by Environmental Expert of the Authority Engineer.	Contractor	Contractor
8.2	Quarry Operations	• The contractor shall obtain materials from quarries that are the licensed one. If new quarries are to be opened, the	Contractor	Contractor

		contractor shall obtain permission from Department of Mining & Geology of the respective state as well as from Environmental Clearance from SEIAA/MOEF&CC and consents from State Pollution Control Board. The quarry operations will be undertaken within the rules and regulations in force.		
8.3	Construction Water	• Contractor will arrange adequate supply and storage of water for the whole construction period at his own costs. • The Contractor will submit a list of source/s from where water will be used for the project to Authority Engineer and PIU. • The contractor will source the requirement of water preferentially from ground water but with prior permission from the Ground Water Board. A copy of the permission will be submitted to Authority Engineer and PIU prior to initiation of construction. • The contractor will take all precaution to minimize the wastage of water in the construction process/ operation.	Contractor	Contractor
8.4	Transporting Construction Materials and Haul Road Management	• Contractor will maintain all roads (existing or built for the project), which are used for transporting construction materials, equipment and machineries as précised. All vehicles delivering fine materials to the site will be covered to avoid spillage of materials. • All existing highways and roads used by vehicles of the contractor or any of his sub-contractor or suppliers of materials and similarly roads, which are part of the works, will be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. • Contractor will arrange for regular water sprinkling as	Contractor	Contractor

		necessary for dust suppression of all such roads and surfaces. The unloading of materials at construction sites in/close to settlements will be restricted to daytime only.		
9	**Safety During Construction**			
9.1	Increased Accident Risks in Work Zones - Planning for Traffic Diversions and Detours	• Detailed Traffic Management Plans prepared prior to commencement of works on any section of road shall be executed fully. Temporary diversions will be constructed with the approval of the Resident Engineer and Environmental Expert of the Authority Engineer. • Detailed Traffic Control Plans will be prepared and submitted to the Environmental Expert of the Authority Engineer for approval, seven days prior to commencement of works on any section of road. The traffic control plans shall contain details of temporary diversions, traffic safety arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, safety measures undertaken for transport of hazardous materials and arrangement of flagmen. • The Contractor will provide specific measures for safety of pedestrians and workers at night as a part of traffic control plans. The Contractor will ensure that the diversion/detour is always maintained in running condition, particularly during the monsoon to avoid disruption to traffic flow. • The contractor will also inform local community of changes to traffic routes, pedestrian access arrangements with assistance from Authority Engineer and PIU. The temporary traffic detours will be kept free of dust by	Contractor	Contractor

		sprinkling of water three times a day and as required under specific conditions (depending on weather conditions, construction in the settlement areas and volume of traffic). • The contractor shall make sure that adequate traffic measures are available especially near sensitive receptors. • The contractor shall take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, marking flags, lights and flagmen as may be required by the Engineer for the information and protection of traffic approaching or passing through the section of the highway under improvement. Before taking up any construction, an agreed phased programme for the diversion of traffic or closer of traffic on the highway shall be drawn up. • One-way traffic operation shall be established whenever the traffic is to be passed over part of the carriageway inadequate for two-lane traffic. This shall be done with the help of temporary traffic signals or flagmen kept positioned on opposite sides during all hours. • For regulation of traffic, the flagmen shall be equipped with red and green flags and lanterns/lights Temporary diversion shall be constructed with the approval of the Engineer. • The Contractor shall ensure that the running surface is always properly maintained, particularly during the monsoon so that no disruption to the traffic flow occurs.		

		• The Contractor shall take all necessary measures for the safety of traffic during construction. Care shall be taken to ensure that the working conditions for the workers in stone quarries are up to the required standards. • Construction related activity resulting in direct release of criteria pollutants (CO, NO2, SO2, PM2.5, PM10) to be avoided at busy locations at night during winters.		
9.2	Traffic and Safety	• The contractor will take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as proposed in the Traffic Control Plan/Drawings and as required by the Environmental Expert of the Authority Engineer for the information and protection of traffic approaching or passing through the section of any existing cross roads. • The contractor will ensure that all signs, barricades, pavement markings are provided as per the MoRTH specifications. Before taking up of construction on any section of the existing lanes of the highway, a Traffic Control Plan will be devised and implemented to the satisfaction of the Environmental Expert of the Authority Engineer.	Contractor	Contractor
9.3	Loss of Accessibility and Unsafe Access	• The construction works shall not interfere with the convenience of the public or the access to use and occupation of public or private roads, railways and any other access footpaths to or of properties, whether public or private. • Temporary access shall be built at the interchange of the project road and other roads.	Contractor	Contractor

		• The contractor will provide safe and convenient passage for vehicles, pedestrians and livestock to and from roadsides and property accesses connecting the project road, providing temporary connecting road. • The contractor will also ensure that the existing accesses will not be undertaken without providing adequate provisions and to the prior satisfaction of the Authority Engineer. • The contractor will take care that the cross roads are constructed in such a sequence that construction work over the adjacent cross roads are taken up one after one so that traffic movement in any given area not get affected much.		
9.4	Personal Safety Measures for Labour	• Contractor will provide: – Protective footwear and protective goggles to all workers employed on mixing asphalt materials, cement, lime mortars, concrete etc. – Welder's protective eye-shields to workers who are engaged in welding works – Protective goggles and clothing to workers engaged in Factories Act, 1948 stone breaking activities and workers will be seated at sufficiently safe intervals – Earplugs to workers exposed to loud noise, and workers working in crushing, compaction, or concrete mixing operation. – Adequate safety measures for workers during handling of materials at site are taken up. – The contractor will comply with all regulations regarding	Contractor	Contractor

		safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. • The contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labor Organization (ILO) Convention No. 62 as far as those are applicable to this contract. • The contractor will make sure that during the construction work all relevant provisions of the Factories Act, 1948 and the Building and other Construction Workers (regulation of Employment and Conditions of Services) Act, 1996 are adhered to. • The contractor will not employ any person below the age of 14 years for any work and no woman will be employed on the work of painting with products containing lead in any form. • The contractor will also ensure that no paint containing lead or lead products is used except in the form of paste or readymade paint. • Contractor will provide facemasks for use to the workers when paint is applied in the form of spray or a surface having lead paint dry is rubbed and scrapped. • The Contractor will mark „hard hat" and „no smoking" and other „high risk" areas and enforce non - compliance of use of PPE with zero tolerance. These will be reflected in the Construction Safety Plan to be prepared by the Contractor during mobilization and will be approved by Authority Engineer and PIU.		
9.5	First Aid	• The contractor will arrange for -	Contractor	Contractor

		– a readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in every work zone – availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital equipment and trained nursing staff at construction camp.		
9.6	Risk from Electrical Equipment(s)	• The Contractor will take all required precautions to prevent danger from electrical equipment and ensure that - – No material will be so stacked or placed as to cause danger or inconvenience to any person or the public. – All necessary fencing and lights will be provided to protect the public in construction zones. • All machines to be used in the construction will conform to the relevant Indian Standards (IS) codes, will be free from patent defect, will be kept in good working order, will be regularly inspected and properly maintained as per IS provision and to the satisfaction of the Environmental Expert of the Authority Engineer.	Contractor	Contractor
9.7	Risk Force Measure	• The contractor will take all reasonable precautions to prevent danger to the workers and public from fire, flood etc. resulting due to construction activities. • The contractor will make required arrangements so that in case of any mishap all necessary steps can be taken for prompt first aid treatment. Construction Safety Plan prepared by the Contractor will identify necessary actions in the event of an emergency.	Contractor	Contractor
9.8	Informatory Signs	• The contractor will provide, erect and maintain	Contractor	Contractor

	and Hoardings	informatory/safety signs, hoardings written in English and local language, as required in line with IRC:55 or as suggested by the Environmental Expert of the Authority Engineer.		
10	**Management of Water**			
10.1	Loss of Community Water Resources	• No Loss		
10.2	Drainage and Flood Control	• No flood		
10.3	Water logging	• Adequate water-harvesting structures shall be made part of the project design, all along the storm water drains, at appropriate intervals. • The contractor shall provide RCC covered drains in urban locations in areas with high water table for storm water runoff management. The drains shall be connected to proximal culverts.	Contractor	Contractor
10.4	River Training and Disruption to Other Users of Water	• No river Training		
10.5	Disruption to other users	• While working across or close to the Rivers, the contractor shall not prevent the flow of water. If for any bridgework, etc., closure of flow is required, the contractor shall seek approval of the Engineer. • The engineer shall have the right to ask the contractor to serve notice on the downstream users of water sufficiently in advance.	Contractor	Contractor

		• Construction work expected to disrupt users and impacting community water bodies shall be taken up after serving notice on the local community.		
11	**Pollution**			
a	**Water Pollution**			
11.1	Water Pollution from Construction Wastes	• The Contractor will take all precautionary measures to prevent the wastewater generated during construction from entering into streams, water bodies or the irrigation system. Contractor will avoid construction works close to the streams or water bodies during monsoon. • All waste arising from the project is to be disposed off in the manner that is acceptable to the State Pollution Control Board or as directed by Environmental Expert of the Authority Engineer. • The Environmental Expert of the Authority Engineer will certify that all liquid wastes disposed off from the sites meet the discharge standards.	Contractor	Contractor
11.2	Siltation of Water Bodies and Degradation of Water Quality	• No Such areas near the roads		
11.3	Slope Protection and Control of Soil Erosion	• Contractor will ensure the following aspects: – During construction activities on road embankment, the side slopes of all cut and fill areas will be graded and covered with stone pitching, grass and shrub as per design specifications. – Turfing works will be taken up as soon as possible provided the season is favorable for the establishment of	Contractor	Contractor

		grass sods. Other measures of slope stabilization will include mulching netting and seeding of batters and drains immediately on completion of earthworks. – In borrow pits, the depth shall be so regulated that the sides of the excavation will have a slope not steeper than 1 vertical to 2 horizontals, from the edge of the final section of the bank. – Along sections abutting water bodies, stone pitching as per design specification will protect slopes. Soil shall be monitored for erosion at select locations as per the monitoring plan mentioned in General EMP.		
11.4	Water Pollution from Fuel and Lubricants	• The contractor will ensure that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refueling sites will be located at least 500 m from rivers and irrigation canal/ponds. • All location and lay-out plans of such sites will be submitted by the Contractor prior to their establishment and will be approved by the Environmental Expert of the Authority Engineer and PIU. • Contractor will ensure that all vehicle/machinery and equipment operation, maintenance and refueling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. Oil interceptors will be provided for vehicle parking, wash down and refueling areas as per the design provided. • In all, fuel storage and refueling areas, if located on agricultural land or areas supporting vegetation, the top	Contractor	Contractor

		soil will be stripped, stockpiled and returned after cessation of such storage. • Contractor will arrange for collection, storing and disposal of oily wastes to the pre-identified disposal sites (list to be submitted to Authority Engineer and PIU) and approved by the Environmental Expert of the Authority Engineer. • All spills and collected petroleum products will be disposed off in accordance with MoEF and state PCB guidelines. • Environmental Expert of the Authority Engineer will certify that all arrangements comply with the guidelines of PCB/ MoEF or any other relevant laws.		
11.5	Contamination of Water Resources	• To prevent contamination of water resources due to contaminants from construction camps, adequate sewage disposal measures shall be taken care of at construction camps. • Contaminated discharges containing oil/grease contributed by vehicle parking/repair areas and workshops and construction sites shall be collected and treated using oil interceptors. • Construction work close to water bodies shall be avoided during monsoon. The contractor shall ensure that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites shall be located at least 1000 m from rivers and stream/reservoir/tanks or as directed by the Engineer. • Both ground and surface water quality shall be monitored	Contractor	Contractor

		as per the monitoring plan at select locations		
b	**Air Pollution**			
11.6	Dust Pollution	• The contractor will take every precaution to reduce the level of dust from crushers/hot mix plants, construction sites involving earthwork by sprinkling of water, encapsulation of dust source and by erection of screen/barriers. • All the plants will be sited at least 1 km in the downwind direction from the nearest human settlement. • The contractor will provide necessary certificates to confirm that all crushers used in construction conform to relevant dust emission control legislation. • The suspended particulate matter value at a distance of 40m from a unit located in a cluster should be less than 500 g/m3. The pollution monitoring is to be conducted as per the monitoring plan. • Alternatively, only crushers licensed by the PCB shall be used. Required certificates and consents shall be submitted by the Contractor in such a case. • Dust screening vegetation will be planted on the edge of the RoW for all existing roadside crushers. Hot mix plant will be fitted with dust extraction units. • All crushers identified to be used in construction shall conform to relevant dust emission control legislation of the respective SPCB. • Clearance for siting shall be obtained from the respective SPCB. Alternatively, only those crushers hat are already licensed by the SPCB shall be used. • All Hot mix plants shall be fitted with dust extraction	Contractor	Contractor

		systems SPM value at a distance of 40 m from a unit located in a cluster should be less than 600 microgram/m3. The monitoring is to be conducted as per the monitoring plan. • Excavation and transport of earth shall be done during the daytime only to minimize risks of the spills etc. from the earthwork on the community. • Transport of the soil/earth shall be done by covering the haulage vehicles with tarpaulin or any other good quality material. • Dust suppression measures in the form of water sprinkling on the lime / cement and earth mixing sites, asphalt mixing site and temporary service and access roads. • Traffic detours shall not be located on areas with loose soils. Temporary pavement shall be made by using dismantled pavement material from existing roads. • All construction workers shall be provided with pollution masks to mitigate the effect of dust generation on the health of workers. • Muck shall be transported in covered dump trucks to the project site and shall be directly dumped on the disposal sites. This shall not be stock piled at the project site.		
11.7	Emission from Construction Vehicles, Equipment and Machineries	• All vehicles, plants and machinery used during construction shall conform to the emission standards promulgated under the Environment (Protection) Act, 1986. Contractor will ensure that all vehicles, equipment and machinery used for construction are	Contractor	Contractor

	(Generation of Exhaust Gases)	regularly maintained and confirm that pollution emission levels comply with the relevant requirements of PCB. • The Contractor will submit PUC certificates for all vehicles/ equipment/machinery used for the project. Monitoring results will also be submitted to Authority Engineer and PIU as per the monitoring plan. • Traffic detours and diversions shall be designed such as to minimize bottlenecks and ensure smooth traffic. • Air pollution monitoring shall be carried out at specified locations as described in the monitoring plan to verify that air pollution norms are being followed by the contractor and the air quality at the construction site does not exceed the prescribed limits. Contractor will ensure that all vehicles, equipment and machinery used for construction are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of PCB.		
c	**Noise Pollution**			
11.8	Noise Pollution: Noise from Vehicles, Plants and Equipment	• The Contractor will confirm the following: – All plants and equipment used in construction (including the and PIU, MPWD aggregate crushing plant) shall strictly conform to the MoEF/CPCB noise standards. – All vehicles and equipment used in construction will be fitted with exhaust silencers. – Servicing of all construction vehicles and machinery will be done regularly and during routine servicing	Contractor	Contractor

		operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced. – Limits for construction equipment used in the project such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws shall not exceed 75 dB (A) (measured at one meter from the edge of equipment in the free field), as specified in the Environment (Protection) rules, 1986. – Maintenance of vehicles, equipment and machinery shall be regular and up to the satisfaction of the Environmental Expert of the Authority Engineer to keep noise levels at the minimum. – At the construction sites within 150 m of the nearest habitation, noisy construction work such as crushing, concrete mixing, batching will be stopped during the night time between 9.00 pm to 6.00 am. – No noisy construction activities will be permitted around educational institutes/health centers (silence zones) up to a distance of 100 m from the sensitive receptors i.e., school, health centers and hospitals between 9.00 am to 5.00 pm. – – Workers in the vicinity of high noise levels must wear ear plugs, helmets and should be engaged in diversified activities to prevent prolonged exposure to noise levels of more than 90 dB(A). – Blasting operations, if required shall be undertaken so as to produce minimum vibrations in sensitive areas.		

		– Traffic management plans prepared during construction mobilization period shall also be implemented during construction stage. Effective traffic management shall especially be taken care of in sensitive locations, major built-up areas and along important highway junctions. – Asphalt mixing sites and the batching plants should be at a distance of at least 200 m from sensitive receptor locations. – Monitoring shall be carried out at the construction sites as per the monitoring schedule and results will be submitted to Authority Engineer and PIU. Environmental Expert of the Authority Engineer will be required to inspect regularly to ensure the compliance of EMP.		
12	**Land/Soil Pollution**			
12.1	Contamination of Soil	• Fuel shall be stored in proper bounded and covered areas. • All spills and collected petroleum products shall be disposed off in accordance with the guidelines framed by Ministry of Environment, Forests &, Climate Change and State Pollution Control Board. • Maintenance and refuelling of vehicles, machinery and other construction equipment shall be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. • An "Oil Interceptor" shall be provided for wash down and refuelling areas. • Debris generated due to the dismantling of the existing	Contractor	Contractor

		road shall be suitably reused in the proposed construction, subject to the suitability of the materials and approval of the Engineer as follows: – The sub-grade of the existing pavement shall be used as embankment fill materials – The existing base and sub- base material shall be recycled as sub-base of the haul road or access roads – The existing bitumen surface may be utilized for the paving of cross roads, access roads and paving works in construction sites, temporary traffic diversions, haulage routes etc. – The contractor shall suitably dispose off un-utilized debris materials including spoils of material unsuitable for embankment; either through filling up of borrow area located in wasteland or at pre-designated dump locations, subject to the approval of the Engineer. – At locations identified for dumping of residual bituminous wastes, the dumping shall be carried out over a 60 mm thick layer of rammed clay so as to eliminate the possibility of leaching of wastes into the ground water. – The contractor shall ensure that the surface area of such dumping pits is covered with a layer of preserved topsoil. – All arrangement for transportation during construction including provision, maintenance, dismantling and clearing debris, where necessary shall be considered incidental to the work and shall be planned and implemented by the contractor as approved and directed		

		by the Engineer. – The pre-designed dump locations shall be a part of comprehensive solid waste management plan to be prepared by Contractor in consultation with Engineer. – Debris generated from pile driving or other construction activities shall be disposed such that it does not flow into the surface water bodies or form mud puddles in the area. The contractor shall identify dumping sites. The identified locations shall be reported to the Engineer. Location of dump sites shall be finalised prior to earth works on any particular section of the road. – No fly ash shall be disposed in any disposal site. Care shall be taken to return the remaining fly ash after construction work to the source or to use it in construction of embankment elsewhere with proper construction measures. IE shall keep strict vigil on this aspect. – Non-bituminous wastes other than fly ash may be dumped in borrow areas covered with a layer of the conserved topsoil. No new disposal sites shall be created as part of the project, except with prior approval of the Engineer. – All waste materials shall be completely disposed and the site shall be fully cleaned before handing over. – Soil shall be monitored for contamination as per the monitoring plan at locations to be identified by the Engineer. The Engineer shall certify the site after approval.		

		– The contractor at his cost shall resolve any claim arising out of waste disposal.		
13	**Flora and Fauna: Plantation/Preservation/Conservation Measures**			
13.1	Road side Plantation Strategy	• No plantation as there was no tree cutting		
13.2	Flora and Chance found Fauna	• The contractor will take reasonable precaution to prevent his workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal. If any wild animal is found near the construction site at any point of time, the contractor will immediately upon discovery thereof acquaint the Environmental Expert of the Authority Engineer and carry out the Authority Engineer's instructions for dealing with the same. IE shall be responsible to intimate the wildlife protection authorities in the area. • The Environmental Expert of the Authority Engineer will report to the nearby forest office (range office or divisional office) and will take appropriate steps/ measures, if required in consultation with the forest officials.	Contractor	Contractor
14	**Archaeological Resources and Cultural Properties**			
14.1	Chance Found Archaeological Property	• All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation.	Contractor	Contractor

		• The contractor will take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing. He will, immediately upon discovery thereof and before removal acquaint the • Environmental Expert of the Authority Engineer of such discovery and carry out the Authority Engineer's instructions for dealing with the same, waiting which all work shall be stopped. • The Authority Engineer will seek direction from the Archaeological Survey of India (ASI) before instructing the Contractor to recommence the work in the site.		
14.2	Impact/s on Cultural/Religious Properties	• No such property found		
15	**Labor Camp Management**			
15.1	Accommodation	• Contractor will follow all relevant provisions of the Factories Act, 1948 and the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp. • The location, layout and basic facility provision of each labour camp will be submitted to Authority Engineer and PIU prior to their construction. • The construction will commence only upon the written approval of the Environmental Expert of the Authority Engineer. • The contractor will maintain necessary living	Contractor	Contractor

		accommodation and ancillary facilities in functional and hygienic manner and as approved by the Authority Engineer.		
15.2	Potable Water	• The Contractor will construct and maintain all labour accommodation in such a fashion that uncontaminated water is available for drinking, cooking and washing. • The Contractor will also provide potable water facilities within the precincts of every workplace in an accessible place, as per standards set by the Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996. • The contractor will also guarantee the following: a) Supply of sufficient quantity of potable water (as per IS) in every workplace/labor camp site at suitable and easily accessible places and regular maintenance of such facilities. b) If any water storage tank is provided that will be kept such that the bottom of the tank at least 1mt. from the surrounding ground level. c) If water is drawn from any existing stream/reservoir/well, which is within 30mt. proximity of any toilet, drain or other source of pollution, the water from source will be disinfected before water is used for drinking. d) All such wells will be entirely covered and provided with a trap door, which will be dust proof and waterproof. e) A reliable pump will be fitted to each covered well. The trap door will be kept locked and opened only for	Contractor	Contractor

		cleaning or inspection, which will be done at least once in a month. f) Testing of water will be done every month as per parameters prescribed in IS 10500:1991. g) Environmental Expert of the Authority Engineer will be required to inspect the labour camp once in a week to ensure the compliance of the EMP.		
15.3	Sanitation and Sewage System	• The contractor will ensure that - – the sewage system for the camp are designed, built and operated in such a fashion that no health hazards occurs and no pollution to the air, ground water or adjacent water courses take places – separate toilets/bathrooms, wherever required, screened from those from men (marked in vernacular) are to be provided for women – adequate water supply is to be provided in all toilets and urinals – all toilets in workplaces are with dry-earth system (receptacles) which are to be cleaned and in a strict sanitary condition – night soil is to be disposed off by putting layer of it at the bottom of a permanent tank prepared for the purpose and covered with 15 cm. layer of waste or refuse and then covered with a layer of earth for a fortnight.	Contractor	Contractor
15.4	Waste Disposal	• The contractor will provide garbage bins in the camps and ensure that these are regularly emptied and disposed off in a hygienic manner as per the	Contractor	Contractor

		Comprehensive Solid Waste Management Plan approved by the Environmental Expert of the Authority Engineer. • Unless otherwise arranged by local sanitary authority, arrangements for disposal of night soils (human excreta) suitably approved by the local medical health or municipal authorities or as directed by Environmental Expert of the Authority Engineer will have to be provided by the contractor.		
15.5	Health and Hygiene Impacts on Construction Camps	• The contractor shall provide erect and maintain necessary (temporary) living accommodation and ancillary facilities for labour up to living standards and scales approved by the IE at the locations identified for such facilities in pre-construction phase. • The contractor shall also guarantee the following: – Supply of sufficient quantity of potable water (as per IS) in every work place/labour campsite at suitable and easily accessible places and regular maintenance of such facilities. – If any water storage tank is provided it shall be kept at a distance of not less than 15m from any latrine drain or other sources of pollution. – If water is drawn from any existing reservoir which is within close proximity of any latrine, drain or other source of pollution the well shall be disinfected before water is used for drinking. – All such reservoir shall be entirely covered and provided with a trap door, which shall be dust proof and	Contractor	Contractor

		waterproof. – A reliable pump shall be fitted to each covered well. The trap door shall be kept locked and opened only for cleaning or inspection, which shall be done at least once a month. – Testing of water shall be done every month as per parameters prescribed in IS 10500:1991. – Engineer shall be required to inspect the labour camp once in a week to ensure the compliance of the EMP. – Contractor shall be responsible for proper functioning and management of sanitation and sewage system as per applicable national and state regulations. – All latrines shall be provided with dry-earth system (receptacles), which shall be cleaned at least four times daily, and at least twice during working hours and kept in a strict sanitary condition. Receptacles shall be tarred inside and outside at least once a year. – Adequate health care is to be provided for the work force. On completion of the works, all such temporary structures shall be cleared away, all rubbish burnt, excreta tank and other disposal pits or trenches filled in and effectively sealed off and the outline site left clean and tidy, at the Contractor‟s expense, to the entire satisfaction of the engineer.		
15.6	Deterioration of indoor air quality and risk of water	• It shall be the responsibility of the contractor to make adequate provisions for workers at labour camps under the Factories Act, 1948. Dwelling units shall be	Contractor	Contractor

	borne diseases	supplied with clean fuel for domestic purpose. Generation of carbon monoxide under any circumstance shall not be allowed. • Contractor shall make sure that no water stagnation happens in the vicinity of construction camp as well as anywhere along the project stretch to prevent spread of malaria & other water borne diseases		
16	**Contractor's Demobilization**			
16.1	Clean-up Operations, Restoration and Rehabilitation	• Contractor will prepare site restoration plans, which will be approved by the Environmental Expert of the Authority Engineer. The clean-up and restoration operations are to be implemented by the contractor prior to demobilization. The contractor will clear all temporary structures; dispose all garbage, night soils and POL waste as per Comprehensive Waste Management Plan and as approved by Authority Engineer. • All disposal pits or trenches will be filled in and effectively sealed off. Residual topsoil, if any will be distributed on adjoining/ proximate barren land or areas identified by Environmental Expert of the Authority Engineer in a layer of thickness of 75 mm-l50 mm. • All construction zones including river-beds, culverts, road-side areas, camps, hot mix plant sites, crushers, batching plant sites and any other area used/affected by the project will be left clean and tidy, at the contractor's expense, to the entire satisfaction to the Environmental Expert of the Authority Engineer	Contractor	Contractor