Government of Meghalaya

PUBLIC WORKS DEPARTMENT
MEGHALAYA INTEGRATED TRANSPORT PROJECT (MITP)

SOCIAL AND ENVIRONMENTAL STUDY REPORT FOR BRIDGE NO-02

CONSULTANCY SERVICES FOR PREPARATION OF DESIGNS AND DPRs OF MAJOR AND MINOR BRIDGES TO BE CONSTRUCTED AS A REPLACEMENT OF EXISTING SEMI-PERMANENT TIMBER BRIDGES (SPT) IN STATE OF MEGHALAYA - ADDITIONAL 5 Nos OF BRIDGES

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LEA ASSOCIATES SOUTH ASIA PVT. LTD., *India*

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1 INTRODUCTION

Meghalaya Integrated Transport Project (MITP) has been launched by Government of Meghalaya, with the aim of improving transport connectivity and efficiency and enhancing transport sector management in Meghalaya. MITP also includes rehabilitation / up-gradation / improvement of existing roads including that of urban roads of major towns of the State and construction of missing links / bypasses / Bridges in the State of Meghalaya.

The programme is being coordinated at State level by the Meghalaya Public Works Department (PWD Roads), National Highway Division In the name of "Engagement of Consultancy for preparation of design and DPRs of Major and Minor Bridges to be constructed as a replacement of existing Semi Permanent Timber Bridges (SPT) in the State of Meghalaya. For the management & administration of the project, a dedicated Project Management Unit (PMU) has been established in Meghalaya Infrastructure Development Finance Corporation (MIDFC) at Shillong, headed by a Project Director and supported by other staff responsible to implement the project.

The World Bank is participating in MITP program by providing technical assistance and lending operations. Currently, the Bank is supporting the program with Financing of MITP Meghalaya PWD Roads Project with the objective of enhancing the systems and processes of the programme which contributes to the finance of civil works expenditures, institutional strengthening which will support a technical assistance program designed to strengthen the capacity of relevant agencies to implement the program.

This report includes the Social and Environmental study done for the respective bridge locations.

3 ENVIRONMENT STUDY

This chapter briefly describes the baseline environmental profile of the study area. The chapters will also entails about applicable environmental legal policy framework pertains to the project, categorization of the project corridor, Project wise Environmental characteristics and Environmental Monitoring Budget approach for the project development.

3.1 PROJECT INTERVENTIONS

The list of various project bridges across the South, South-West and West Garo Hills districts of Meghalaya is provided in the tables below. This report pertains to Bridge No. 2 (Damalgre Mellim Boldamgre road) in North Tura division and South-West Garo Hills district.

Table 3-1: Feasibility Bridges

Sr. No.	District	Division	Block	Name of Road	Proposed Length (in m)	Latitude (N)	Longitude (E)
1	West Garo Hills	Barengapara	Dalu	NH-51 to Megadop Village	68	25°14'21.01"N	90°12'30.54"E
2	**South-West Garo Hills**	**Tura North**	**Gambegre**	**Damalgre Mellim Boldamgre Road**	**38**	**25°26'44.50"N**	**90° 5'35.31"E**
3	South-West Garo Hills	Tura North	Rerapara	Damalgre Mellim Boldamgre Road	26	25°29'11.55"N	90° 5'20.49"E
4	South Garo Hills	Barengapara	Dalu	Sonagre-Jijikapara Road	95	25°14'46.10"N	90°16'8.39"E
5	West Garo Hills	Barengapara	Dalu	Kherapara-Chengapara Road	53	25°20'33.77"N	90° 8'52.35"E

3.2 ENVIRONMENTAL PROFILE OF MEGHALAYA

3.2.1 Physiography

The state of Meghalaya is situated in the northeast region of India, and extends latitude 20°1'N - 26°5'N and longitude 85°49'E - 92°52'E. It extends for about 300 km in length and about 100 km in width. It is bounded on the north and east by the state of Assam and on the south and west by Bangladesh.

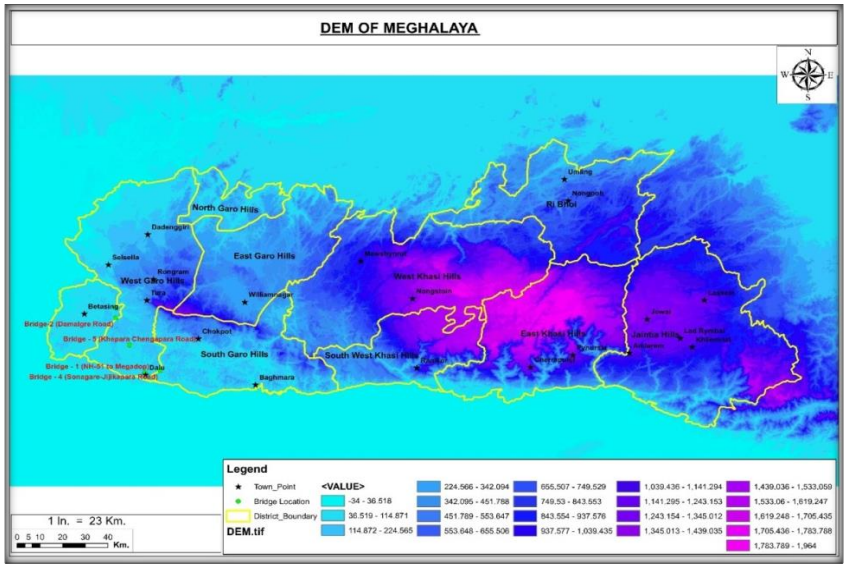


Figure 3-1: DEM Map showing Elevation of the Meghalaya

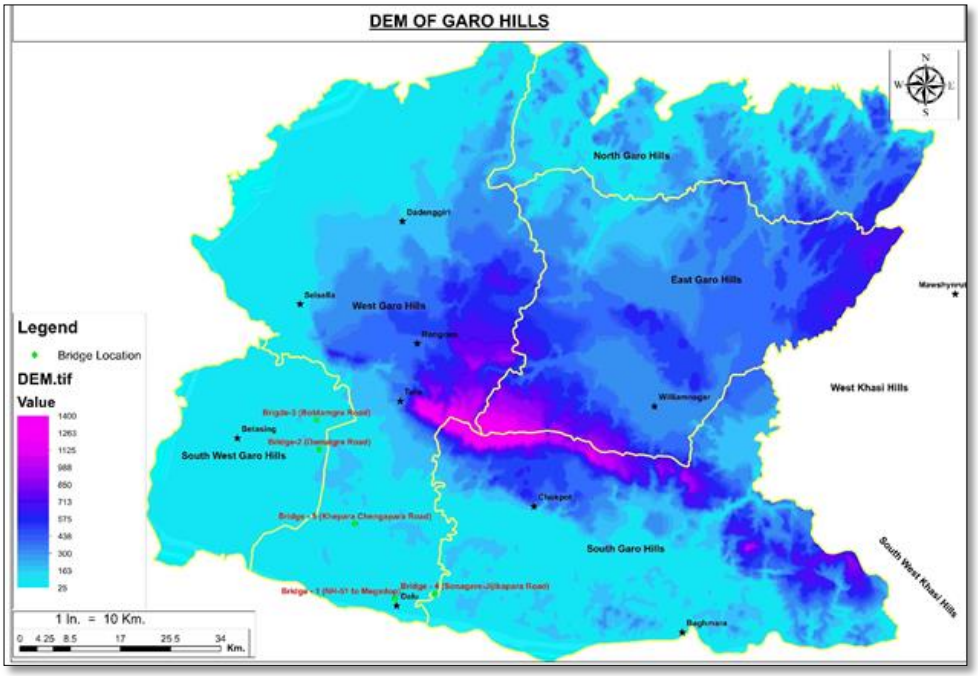


Figure 3-2: DEM Map showing Elevation of the Garo Hills

Meghalaya state is also known as Meghalaya plateau. The state can, broadly, be divided into three physiographic zones, namely:

- Central Plateau Region comprising the Khasi Hills and has the highest elevations between 900-2000mSub-montane region in continuation with the Central Plateau below 900m which gradually merges with the plains in the West and North, namely the Jaintia Hills, and
- Border region which stretches south-wards abruptly from the Central Plateau to the plains in Bangladesh, mainly the Garo Hills region, and is nearly plain.
- The highest point in the state is the Shillong Peak with an altitude of 1961 meters. The project corridors which are following in the north district has snow-fed influenced region.

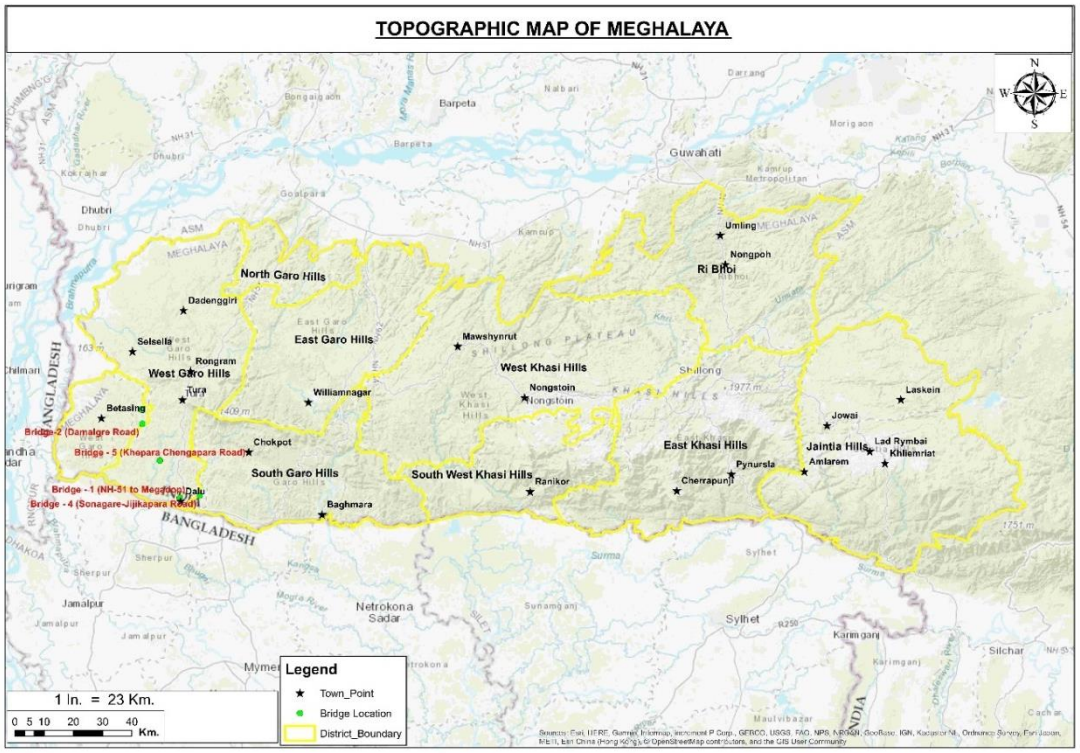


Figure 3-3: Map Showing Topographic of Meghalaya

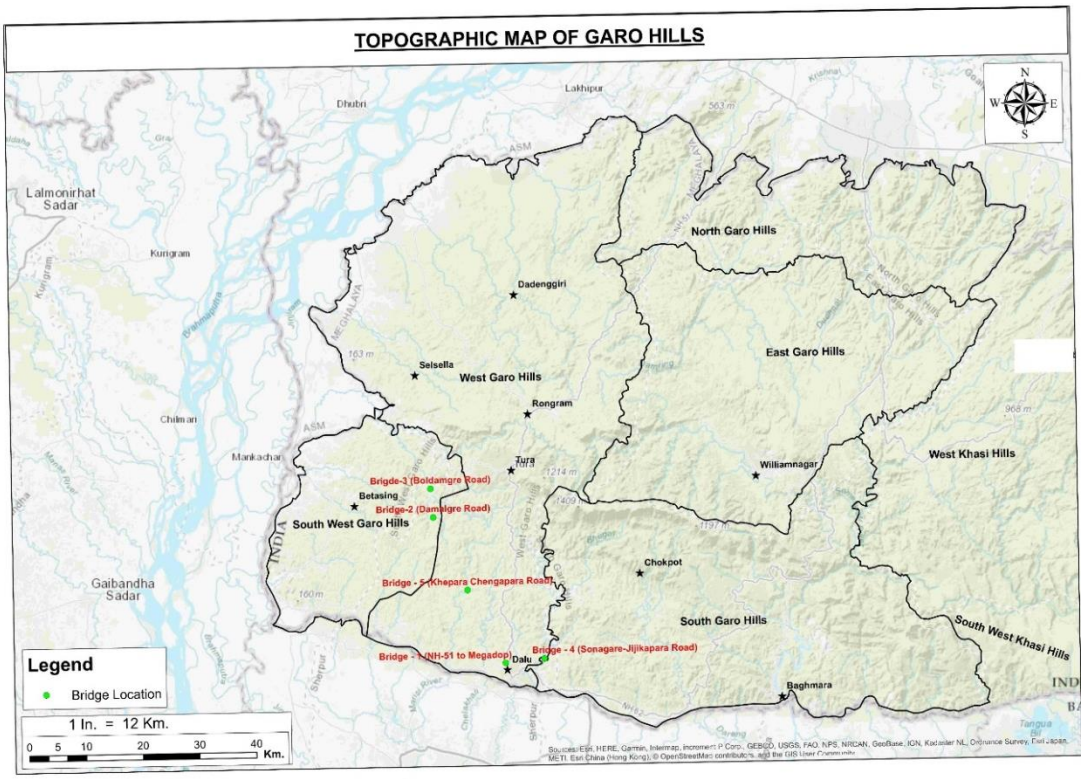


Figure 3-4: DEM Map showing Elevation of the Garo Hills

3.2.2 Soil

The soil of Meghalaya varies from dark brown to dark reddish-brown in colour. The depth of soil varies from 50 to 200 cm in different parts of the state with texture ranging from loamy to fine loamy. The soils are rich in organic carbon with high nitrogen supplying potential, but deficient in phosphorus and potassium. Soil reaction varies from acidic (pH 5.0 to 6.0) to strongly acidic (pH 4.5 to 5.0). Most of the soils occurring on higher altitudes under high rainfall belt are strongly acidic due to intense leaching. There is not much difference in fertility classes of the soils of the state. Four soils fertility classes, namely, High Low Medium (HLM), High Medium Medium (HMM), Medium Medium Low (MML) and Medium Low Medium (MLM) have been established in Meghalaya. (Directorate of Agriculture, Meghalaya)

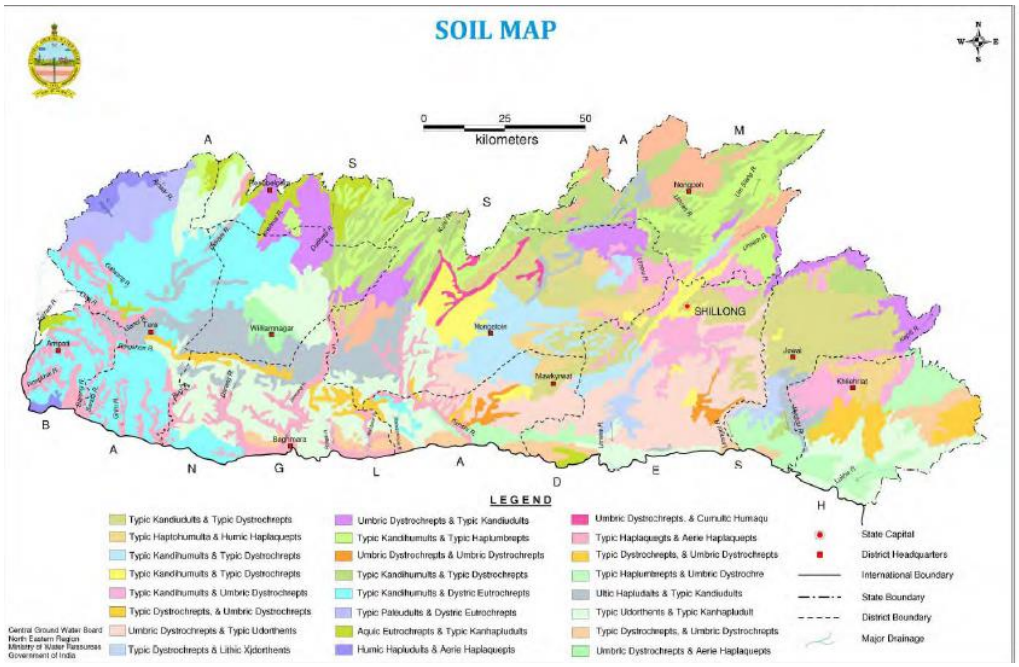


Figure 3-5: Soil Map of Meghalaya

3.2.3 Hazard Profile

Seismicity

The Bureau of Indian Standards has categorized the entire country in various zones depending upon the degree of proneness to earthquakes. The Zone I signify lesser degree while Zone V signifies highest order. The proposed project road falls under the Seismic Zone V, which is susceptible to major earthquakes as per the seismic zone map of India (IS 1893 - Part I: 2002), shown below in Figure. According to GSHAP data, the state of Meghalaya falls in a region of high to very high seismic hazard. As per the 2002 Bureau of Indian Standards (BIS) map, this state also falls in Zone- V The design standard for road shall follow the prevalent BIS standard during construction of the project roads.

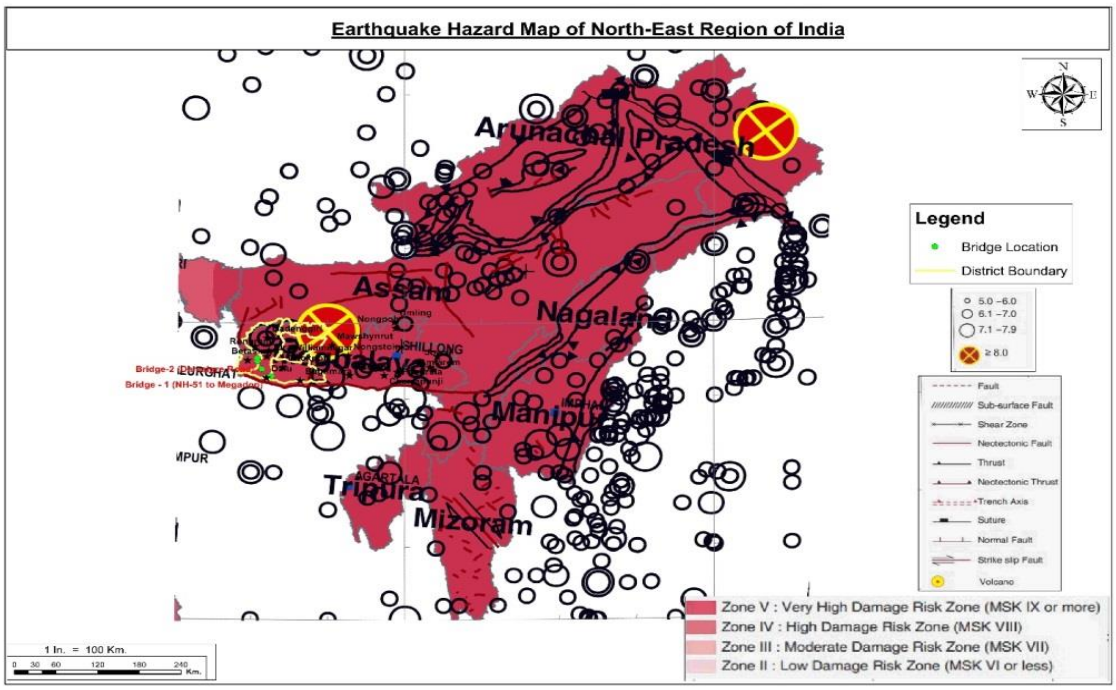


Figure 3-6: Showing Map of North East State

3.2.4 Soil

Meghalaya being a hilly terrain is prone to landslides. Every year a number of landslides have been reported from various localities. These cause a lot of miseries to public, resulting in loss of lives and properties, disruption of communication network, besides causing economic burden on the society. Landslide is primarily attributed to high slope, immature geology, neo-tectonic activity, heavy rainfall, unplanned and improper land use practice in the State. Landslides generally occur during heavy rains, that is during the months of June to October in Meghalaya. The landslide prone areas of Meghalaya are presented in the map below.

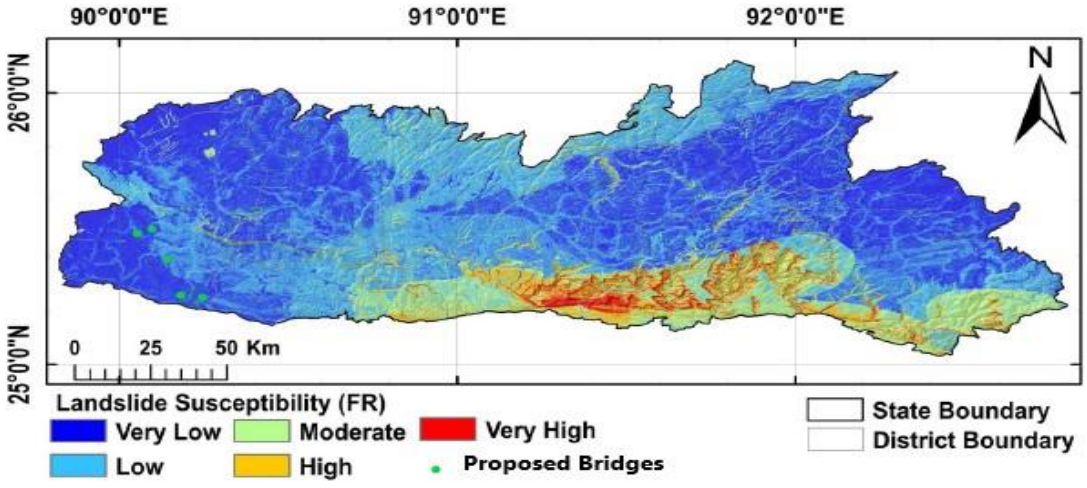


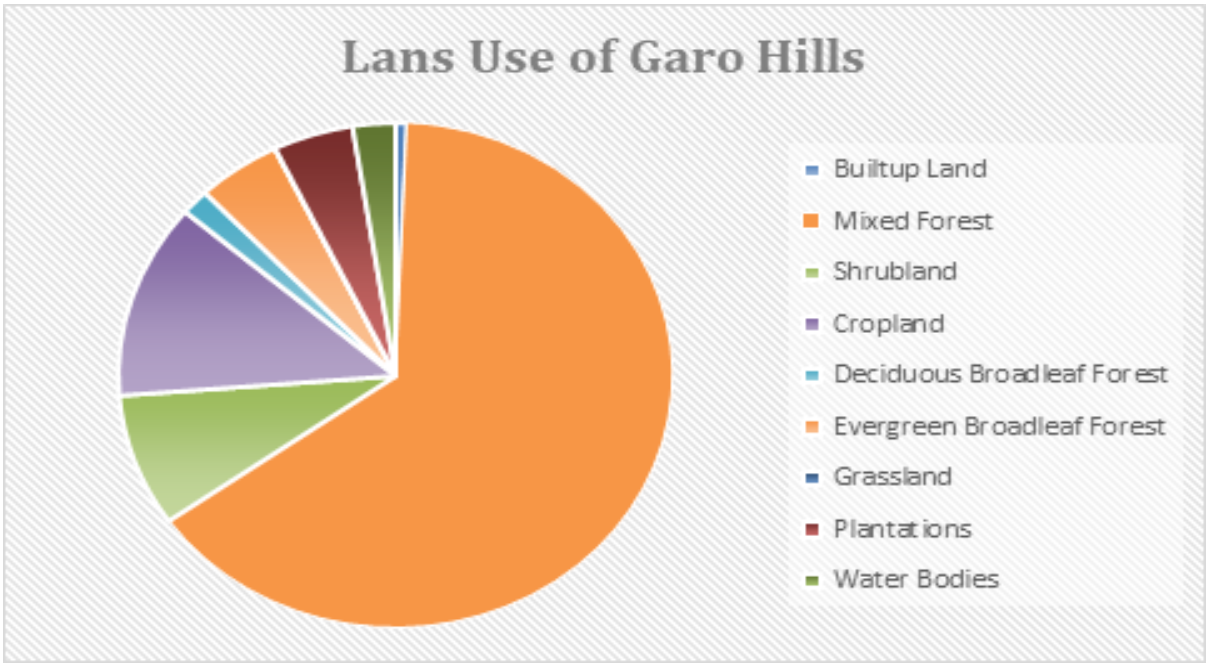
Figure 3-7: Landslide prone location in the project region

3.2.5 Land Use Pattern of Meghalaya

Meghalaya lies between 240 58' North to 260 07' North latitudes and 890 48' East to 920 51' East longitudes. It covers an area of 22,429 sq. km. of which about 70% is endowed with dense forests and rivers cascading down undulating terrain. The State has most of its land covered by hills interspersed with gorges and small valleys.

Most of the land is under rural areas, with Shillong being predominately the main urban settlement. Only 12.74% is net sown area. The principal crop grown in the state is rice covering atleast 80% of the cultivated land, followed by maize and wheat. About 17.4% of the land is under wasteland category, (comprising of scrubland, jhum, abandoned jhum lands and degraded scrub forest, with the highest proportion in the west Khasi hills and Jaintia hills.

The land use of Garo Hills is predominantly Forest followed by crop land.



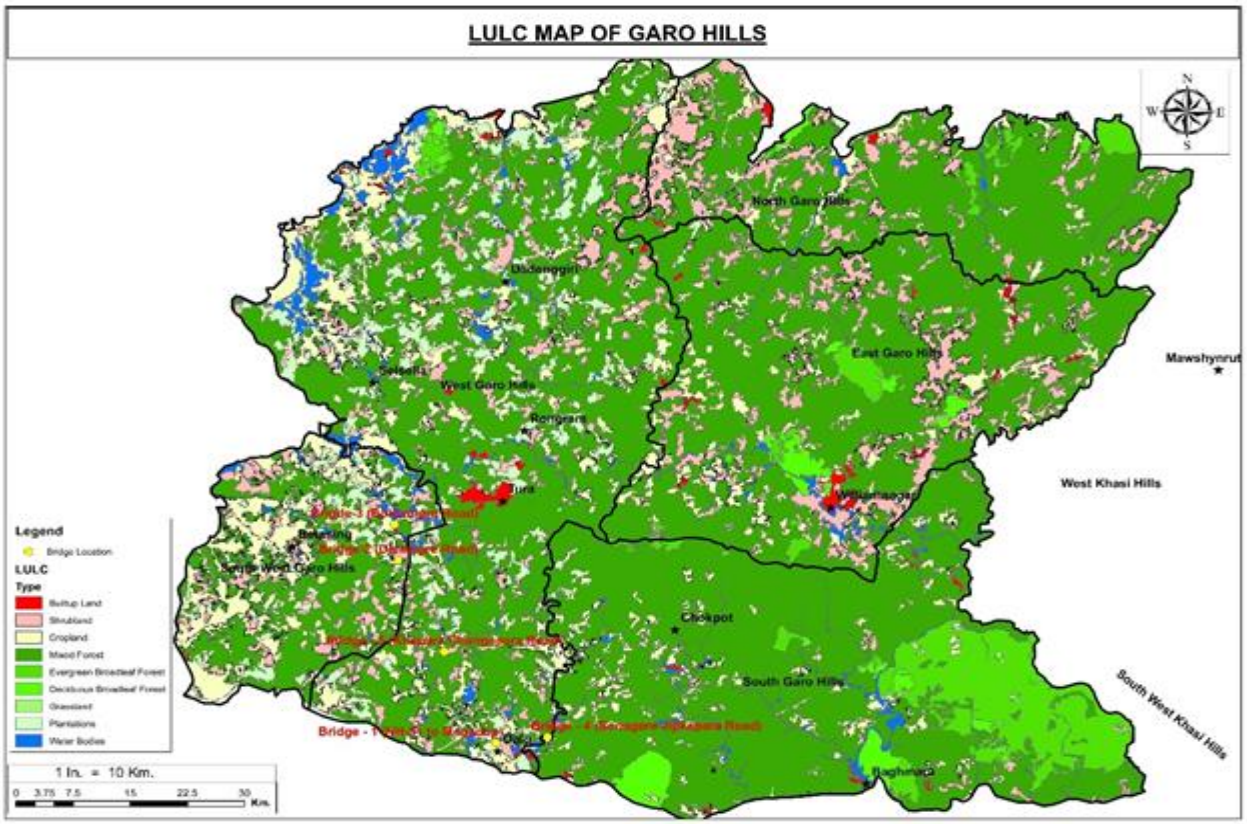


Figure 3-8: Land use map of the Garo Hills

3.2.6 Climate

Climate of Meghalaya plateau is influenced by elevation and distribution of physical relief. On the basis of weather condition, the Meghalaya plateau has 4 distinct seasons. The seasons are:

a) The rainy season from May to early October.
b) The cool season from early October to November.
c) The cold season from December to February.
d) The warm season or hot season from March to April

The salient climatic features of the state are as fallow:

- Average Annual Rainfall - 2000-4000 mm
- Concentration of precipitation - May to October
- Humidity - 67 to 94%
- Cloudiness - Heavily clouded
- Wind - Generally light except rainy season
- Temperature - Summer 23^0C to 25^0C
- Winter 7^0C to 11^0C.

Garo hills experienced higher temperature conditions and humidity from February to October. April and May are the warmest months and January is the coldest month. The Khasi and Jaintia hills experience a moderate climate because of higher elevation. Warm and humid conditions are prevalent in the foothill region in the south and sub-montane region in the north and central uplands. The plateau experiences a temperature of 24oC throughout the year. The southern parts of the plateau have the Cherrapunji - Mawsynram region which receives the heaviest rainfall, an annual average of 12670mm which is the highest amount of rainfall in the world. The Khasi and Jaintia hills receive an average of 7700mm of rainfall and lies in the rain shadow area.

3.2.7 Air environment

Air Quality Parameters are being monitoring twice a week by Meghalaya State Pollution Control Board at 10 locations namely Lumpyngngad (Shillong), 4 1/2 Mile (Shillong), Dawki (West Jaintia Hills), Khliehriat (East Jaintia Hills) Nongstoin (West Khasi Hills) Tura (West Garo Hills), Barik (Shillong), Polo (Shillong), Umiam (Industrial Area), Byrnihat Town (Ri Bhoi). Ambient air quality Index level of representative city from project district has been found well within permissible limit.

As per SPCB, the ambient air quality in the state has been well within the permissible limits as per the provisions of the Air (Prevention and Control of Pollution) Act, 1981. While AQI for majority of the towns are under 'Good' category, two locations in Ri Bhoi district have fallen under 'Satisfactory' category. Proximity of Ri Bhoi district to the National Highway NH6 which is subjected to heavy movement of vehicles can be a reason for these towns to fall under 'Satisfactory' category[1]..

Vehicular pollution is a secondary source of pollution in the state as the traffic density in the entire state is very less. The level of pollution in rural areas is much lower than that of the urban areas. Also the traffic flow in rural areas is much less than that of the urban locations.

3.2.8 Noise environment

Noise is an important environmental attribute in road and bridge projects because vehicular traffic is a source of noise pollution. Noise level was measured before and on Diwali by State Pollution Control Board at the residential, commercial, silence and industrial area in Shillong. The locations are

i. Lumpyngngad (Location A –Board's premises), a residential area.
ii. Police Bazar (Location B - Meghalaya Legislative Assembly office's premises), a commercial area and
iii. Lawmali (Location C – Ganesh Das Hospital premises), a silence zone.
iv. EPIP, Byrnihat (Location-D), an Industrial zone

The result shown in **Table 3-1 to Table 3-4** as Given Below are

1 State Pollution Control Board, Meghalaya

Table 3-1: Noise Quality Result at Lumpyngngad on Pre and Post Diwali

Lumpyngngad						
Location A	Pre Diwali-Day (9.11.2020)			On Diwali (14.11.2020)		
Time Duration	Lmin	Lmax	Leq dB (A)	Lmin	Lmax	Leq dB (A)
18:00 to 19:00 Hr.	50.1	60.3	54.5	51.9	77.0	67.7
19:00 to 20:00 Hr	48.1	56.3	50.9	53.3	72.5	66.7
20:00 to 21:00 Hr.	46.2	63.7	51.8	53.8	70.4	64.7
21:00 to 22:00 Hr.	41.3	57.2	45.2	50.5	74.8	59.8
22:00 to 23:00 Hr.	41.7	54.1	43.2	42.5	74.6	44.6
23:00 to 24:00 Hr.	40.6	53.4	42.9	42.9	58.3	43.7

Table 3-2: Noise Quality Result at Poloce Bazar on Pre and Post Diwali

Police Bazar						
Location : B	Pre-Diwali Day (9.11.2020)			Diwali Day (14.11.2020)		
Time duration	Lmin	Lmax	Leq dB(A)	Lmin	Lmax	Leq dB(A)
18:00 to 19:00 Hr.	48.8	68.7	52.4	53.0	83.5	59.0
19:00 to 20:00 Hr.	48.6	71.1	52.9	55.4	83.3	63.1
20:00 to 21:00 Hr.	50.8	71.6	53.9	56.5	79.8	66.0
21:00 to 22:00 Hr.	44.8	69.3	48.7	58.2	84.5	67.1
22:00 to 23:00 Hr.	43.1	67.7	46.1	55.6	74.9	62.4
23:00 to 24:00 Hr.	40.8	62.4	43.9	53.2	71.8	60.2

Table 3-3: Noise Quality Result at Lawmali on Pre and Post Diwali

Lawmali						
Location: C	Pre-Diwali Day (9.11.2020)			Diwali Day (14.11.2020)		
Time duration	Lmin	Lmax	Leq dB(A)	Lmin	Lmax	Leq dB(A)
18:00 to 19:00 Hr.	39.5	80.7	49.8	40.4	82.2	59.0
19:00 to 20:00 Hr.	37.6	84.6	47.2	44.7	83.4	60.1
20:00 to 21:00 Hr.	39.2	90.1	50.1	45.3	87.5	62.3
21:00 to 22:00 Hr.	45.3	87.6	42.8	42.6	85.2	56.9
22:00 to 23:00 Hr.	36.1	86.2	44.3	42.3	69.1	50.7
23:00 to 24:00 Hr.	35.4	82.4	43.3	40.2	70.2	45.2

Table 3-4: Noise Quality Result at EPIP, Byrnihat on Pre and Post Diwali

EPIP, Byrnihat						
Location: D	Pre-Diwali Day (9.11.2020)			Diwali Day (14.11.2020)		
Time duration	Lmin	Lmax	Leq dB(A)	Lmin	Lmax	Leq dB(A)
18:00 to 19:00 Hr.	49.0	58.8	52.9	45.5	76.6	55.5
19:00 to 20:00 Hr.	45.3	60.6	51.9	45.5	77.7	56.2
20:00 to 21:00 Hr.	39.3	72.8	50.0	39.6	65.1	51.6
21:00 to 22:00 Hr.	45.5	59.1	46.8	43.1	65.1	50.6
22:00 to 23:00 Hr.	43.1	51.2	46.0	45.4	62.9	53.4
23:00 to 24:00 Hr.	42.6	57.0	45.8	43.6	62.7	51.5

It was observed from the above mentioned table that the Leq on Pre-diwali for all the locations are within the permissible limits of CPCB Standard except for Location -C Lawmali where Leq at night time exceeds

the standard (for slience zone) whereas on Diwali the Leq for Location A , B and exceeds the standard limits.

3.2.9 Water Environment

One of the world's wettest regions is found in Meghalaya. Mawsynram and Cherrapunji (Sohra) in the East Khasi Hills district are geographically considered as the rainiest places in the World, with Cherrapunjee, receiving close to 12000 mm of annual rainfall and Mawsynram, a village directly west of Cherrapunji, where rainfall of around 17,800 mm (700 inches) per year. These areas receive rainfall on an average for 160 days in a year, spread over six to eight months between March to October. Paradoxically, even then the state of Meghalaya is water stressed in some regions during summer months. This is mainly due to topographical and geomorphological conditions apart alterations of the natural land surface by way of development, mining and urbanization. Moreover, the characteristic hilly and steep sloping terrain condition in the area with localized small valleys results in very high surface run-off during the monsoon

The rivers of the State are rainfed and therefore their discharge dwindles during summer. Important rivers in Garo Hills region are Daring, Sanda, Bugi, Dareng and Simsang. In the central and eastern part of the plateau are Umkhri, Digaru, Umngot and Myntdu rivers. The surface water resource is tapped in a number of places by constructing dams across the rivers. The reservoirs, like the Umiam and Kopili, so developed are not only used for irrigation and drinking water but also for generating electricity.

The surface water available in Meghalaya on annual basis is roughly estimated at 63.204 billion cubic metres (BCM) and the estimated replenishable ground water resources estimated as 1.15BCM. According to the Central Ground Water Board (CGWB) 1.04BCM of ground water is potentially available for utilization. Figure 3-9 shows spread to two major river basins Brahmaputra and Meghna, and their sub-basins,

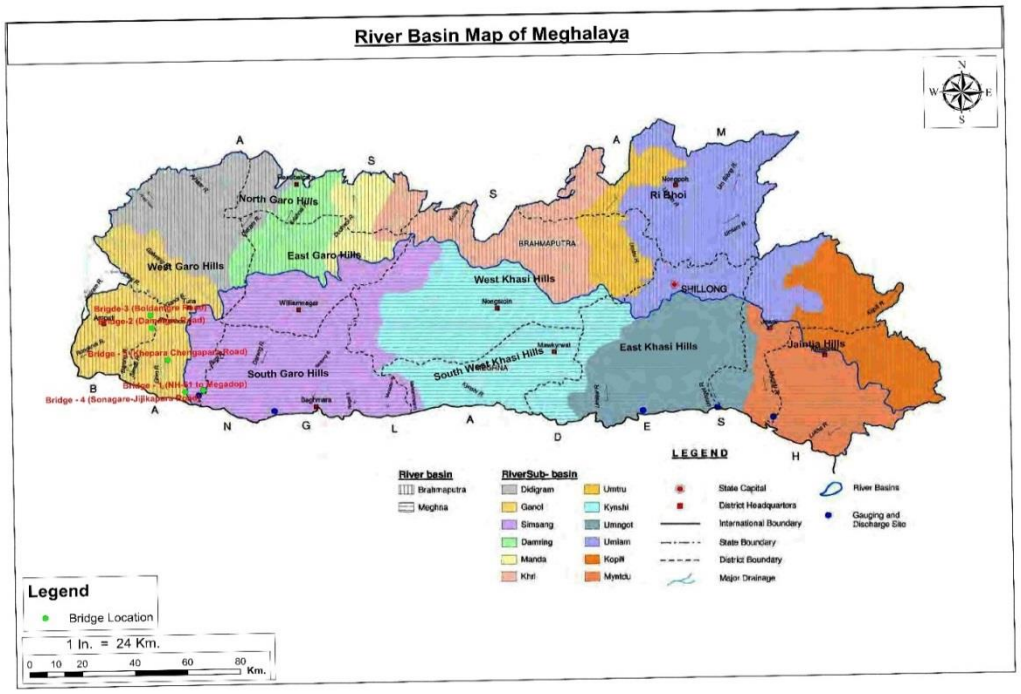


Figure 3-9 : Map Showing River Basin Map of Meghalaya

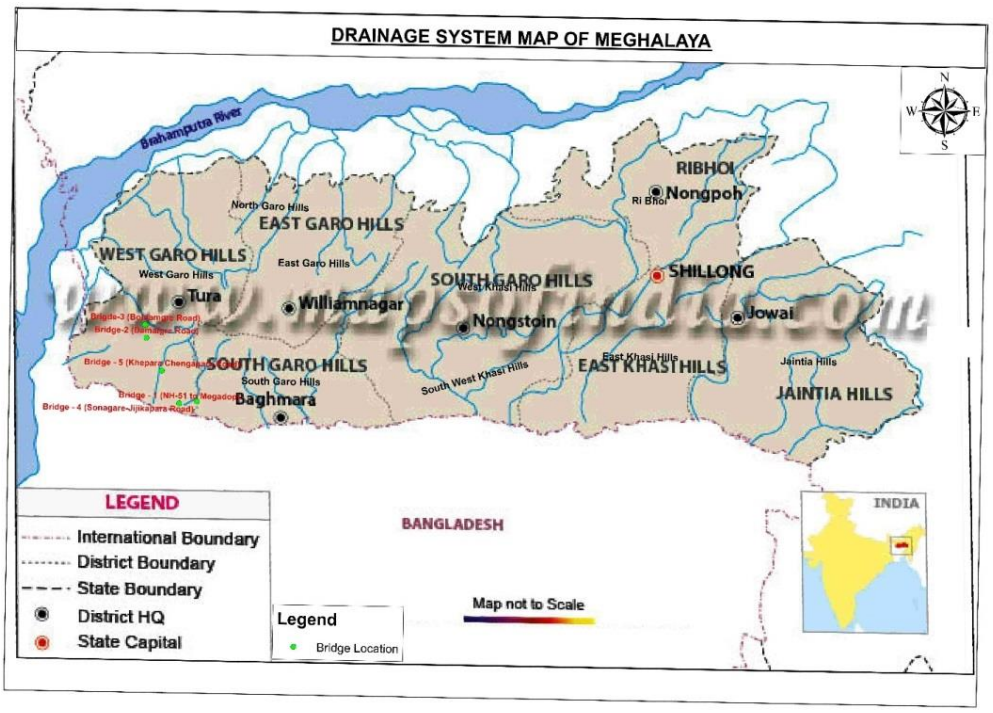


Figure 3-10 : Map Showing Drainage Map of Meghalaya

SPCB Meghalya has been implementing the National Water Quality Monitoring Programme (NWMP) to regularly monitor the water quality in a systematic manner to know the nature and extent of water quality degradations and the existing quality of water in the water bodies. The SPCB Meghalaya collects water samples from 8 (Eight) sampling stations were located in Garo Hills. In all the monitored locations the pH was observed to be in the normal range of 6.5 to 8.5. The dissolved Oxygen content in all the stations was found to be above 4mg/l, which was the minimum oxygen requirement for propagation of wildlife fisheries etc. The Bio-chemical Oxygen Demand was observed to be below 3mg/l in all the monitored water bodies. The total Coliform count was observed to be moderately high in Simsang & Ganol River. The water quality of all monitored water bodies was relatively satisfactory. [2]

3.2.10 Biological Environment

As per the Forest Survey of India report, Meghalaya rank seventh amongst the Indian states in respect of percentage of geographical area uder forest cover. The forests of Meghalaya are rich in biodiversity and endowed with rare species of orchids and medicinal plants. The forest types in Meghalaya are **Subtropical Pine, Subtropical Broadleaf, Tropical Wet Evergreen, Tropical Semi- Evergreen, and Tropical Moist Deciduous Forests**. The Forest and Tree cover in the State is 79.37 % covering 17,803 Sq.km. Out of total forest area of 17,146 sq km (76.44% of the state's geographical area) only 1145.19 sq km of Forest areas (5.10 % of geographical area) comes directly under the control of the State Forest Department in the form of reserved forest, protected forest, national parks, wildlife sanctuaries and parks & gardens. The rest of the forest areas belong to communities, clan and private people and District Councils. There are three Autonomous District Councils (ADCs) i.e., Khasi Hills Autonomous District Councils, Jaintia Hills

2 Meghalaya SPCB Annual Report 2017-2018

Autonomous District Councils and Garo Hills Autonomous District Councils, which have been set up under the provisions of the Sixth Schedule to the Constitution of India. These ADCs have the power to make laws with respect to, among others, the management of any forest not being a reserved forest.

The project connecting road section is passing through plain terrain with land use being agriculture and built-up area. There is no forest area located along the alignment of the proposed bridge connecting road section.

The trees to be cut in corridor of impact of road section are along the existing alignment of connecting road and on river bank are thinly distributed. Trees being next to existing road, these are less preferred for habitat or shelter by birds and animals due to human activities.

Field survey has been carried out to identify the number and type of trees to be affected by the proposed improvement work of road alignment. It is envisaged that about 5 -8 number of trees are likely to be cut for the implementation project.None of the impacted species are rare endangered species.

Meghalaya is a part of Indo-Burma biodiversity hot spot and identified as key area for biodiversity conservation due to high species diversity and high level of endemism. It has attracted the attention of wildlife enthusiasts and research scholars from all over the country.

Data collected from field clearly shows the subproject area is free of fauna. **No rare endangered species as schedule in wild life Protection Act 1972 has been observed in the project immediate influence zone**. No major issues related to human – animal conflict has been reported during consultation and site visits.

The protected area network in Meghalaya occupies 512.61 Sq.km area The Protected Area Network includes two National Parks, four Wildlife Sanctuaries and one Biosphere Reserve playing an important role in in-situ conservation of biodiversity. The Protected Area Network still support viable population of one of the two closely related Apes found in India, the endangered Western Hoolock Gibbon (*Hoolock hoolock*), and the Bengal Slow Loris (*Nycticebus bengalensis*). Other primates including Stumped-tailed Macaque (*Macaca arctoides*), Assamese Macaque (*Macaca assamensis*), Northern Pig-tailed Macaque (*Macaca leonina*), Rhesus Macaque (*Macaca mulatta*), Capped Langur (*Trachypithecuspileatus*) are also found in these areas. Among the carnivores, the Bengal Tiger (*Panthera tigris*) and the Clouded Leopard (*Neofelisnebulosa*) have become extremely rare while the adaptable Common Leopard (*Panthera pardus*) is still widely distributed. Bears including Sun Bear (*Helarctosmalayanus*), Asiatic Black Bear (*Ursus thibetanus*) and the Sloth Bear (*Melursus ursinus*) are found as well. Smaller cats like the Jungle Cat (*Felis chaus*), Marbled Cat (*Pardofelis marmorata*) and Leopard Cat (*Prionailurus bengalensis*) are still found in these protected areas. Smaller carnivores are also abounding, among them mongoose, badger, binturong, dhole, jackal, weasel, otter, fox and marten.

Consultations were held with the local villagers, livestock herders to gather information on the presence of wildlife and their habitats along the project road. Officials from local forest department were also consulted. Local communities and local forest officials informed that there is no National Parks or Wildlife Sanctuary within 5 km of the proposed alignment. It can be seen from the map (Figure 1.12) of the protected (notified) areas in State of Meghalaya.

There is no identified elephant corridor within the project influence area of this subproject. Further there is no Sacred Groves of Meghalaya are located within the subproject influenced area.

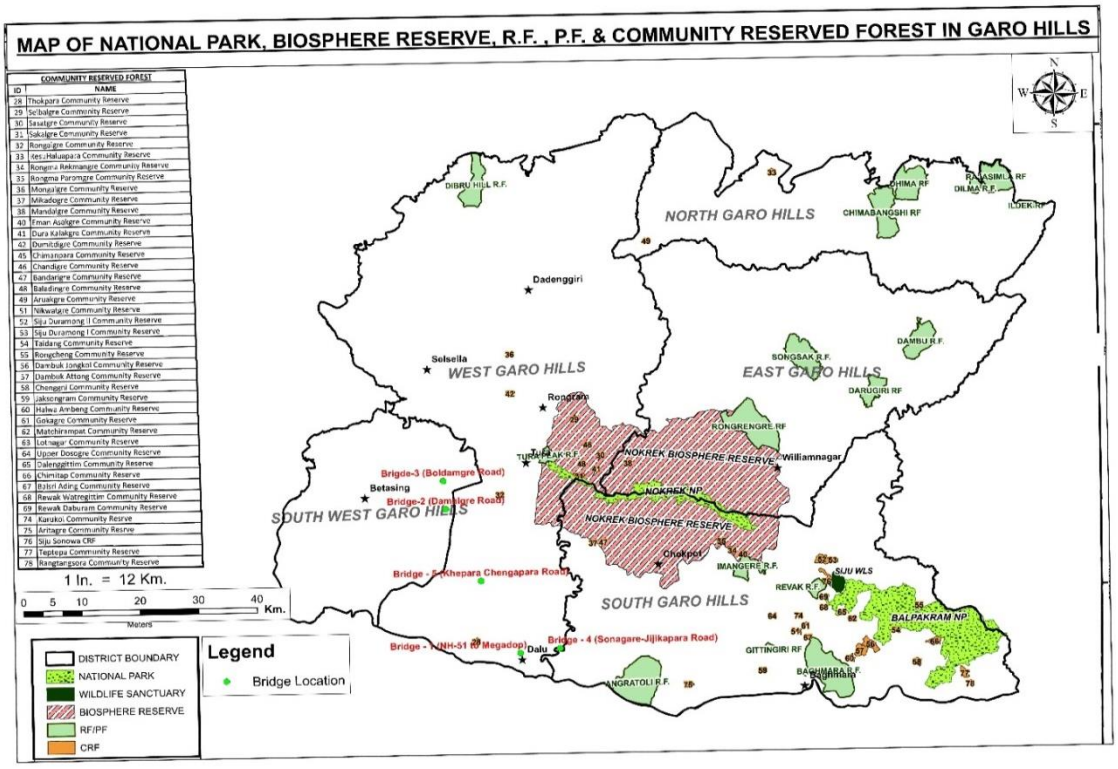


Figure 3-11: Map showing Forest, National Park/ WLs of the Garo Hills

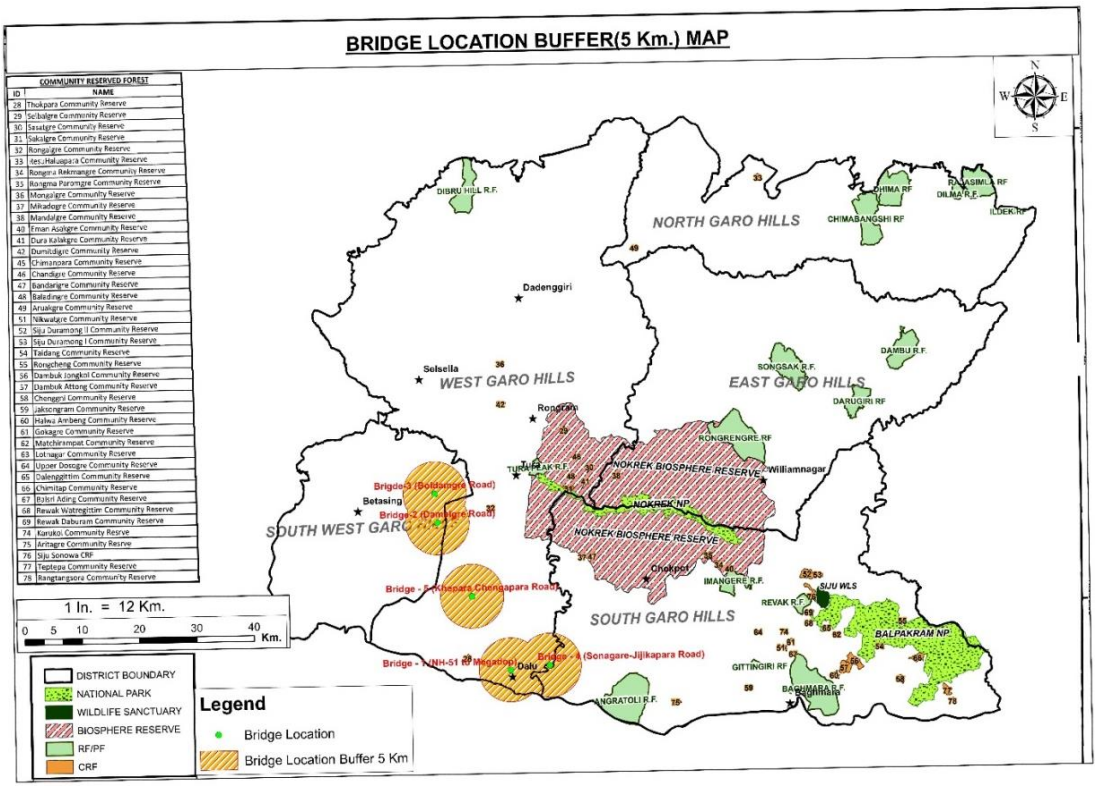


Figure 3-11: 5 KM Buffer zone pertains to forest area / Protected areas

3.2.11 Archaeological Sites

This is a list of Monuments of National Importance as officially recognized by Archaeological Survey of India is listed below in Table below, there are also state protected monuments, archaeological sites that have been recognized by the ASI in Meghalaya, in the West Garo Hills, these include excavated temples, Buddhist Stupa and a Fortress. There is no archaeological and historical monument is located along project alignment.

Table 3-5: Protected Archaeological and Historic Sites

Sl. No	Name of monuments/ sites	Location	District
1.	Megalithic Bridge between Jaraem and Syndai	Um-Nyakaneth	Jaintia Hills
2.	Megalithic Bridge known as Thulum-wi between Jowai and Jarain	Maput	Jaintia Hills
3.	Megalithic Bridge on the Um-Kumbeh	Um-Kumbeh	Jaintia Hills
4.	Stone memorial of U.Mawthaw - dur-briew	Nartiang	Jaintia Hills
5.	Tank, Syndai	Syndai	Jaintia Hills
6.	Stone memorial of U-Mawthoh-dur, Bhoi	Bhoi	East Khasi Hills
7.	Scott's Memorials	Cherrapunji	East Khasi Hills
8.	Manipur Memorial	Shillong	East Khasi Hills

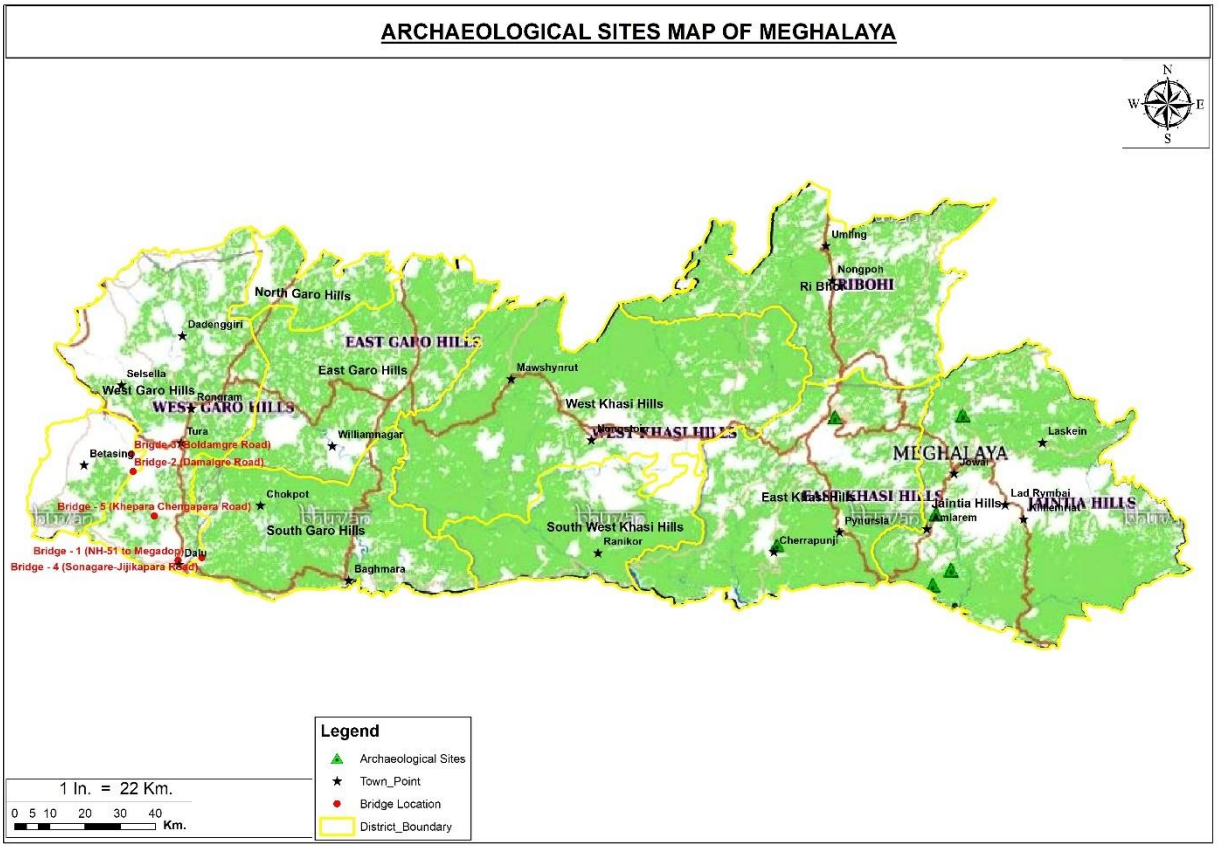


Figure 3-11: Archaeological Monuments of Meghalaya

3.3 APPLICABLE ENVIRONMENTAL LAWS AND REGULATION

The Government of India has laid down various policy guidelines, regulations, acts and legislations pertaining to sustenance and protection of environment and its various components. The policy, legal and regulatory requirements that are relevant to the environmental and social aspects of the proposed project shall comply with the policy, legal and regulatory requirements of the Government of India (GoI,) respective State Governments and World Bank's policies. The following are the key regulations in India applicable for various development Projects.

Table 3-6 : Applicable Environmental National and State Requirements

Sl. No.	Policy/Act/Rule	Project relevance	Requirement	Competent Authority	Responsible Agency for Obtaining Clearance
1.	Environmental (Protection) Act, 1986 amended 1991 and associated rules / notifications	The Environment (Protection) Act is an umbrella legislation on control of pollution (the Water Actand the Air Act) by enacting a general legislation for environment Protection.	The Act and the Rules framed under the act defines the standards for emission and discharges. All the equipment machinery which would be used in the project has to comply with the emission and or discharge standards specified.	MoEFCC	Contractor
2.	EIA Notification 14th Sep-2006 & amendments thereafter	To ensure and regulate the all-new development work which is listed in EIA Schedule	That the construction of a bridge or similar activity covering a build-up area ≥ 1,50,000 sq.mtrs and or covering an area of ≥ 50 hectares, would be covered under Entry 8(b) of the Schedule to the Regulation of 2006. As the built-up area is less than the mentioned above Hence EIA clearance not required	District Level Expert Appraisal Committee/ District Level Impact Assessment Authority	MPWD
3	The Forest Conservation Act 1980 and The Forest Conservation Rules 1981	The central government enacted The Forest (Conservation) Act in1980 to stop largescale diversion of forest land for non-forest use.	The proposed alignment does not pass through any forest area hence no clearance is required.	The Forest Department, Government of Meghalaya and MoEF &CC	MPWD
4	Wildlife (Protection) Act, 1972 amended 1993 and Rules 1995; Wildlife (Protection)	The act was enacted to protect wild animals and birds through the creation of National Parks,	The present alignment does not pass through any wild life sanctuary. Not Applicable	Wildlife Division, Government of Meghalaya/ MoEF &CC	MPWD

Sl. No.	Policy/Act/Rule	Project relevance	Requirement	Competent Authority	Responsible Agency for Obtaining Clearance
	Amendment Act, 2002	Sanctuaries, Conservation Reserve, Tiger Reserve.			
5	Cutting of road side trees	The Forest (Conservation) Act 1980 (Amended 1988) and Rules 1981 (Amended 2003) and Environmental Protection Act of 1986 and as amended Meghalaya Forest Regulation (Application and Amendment) Act, 1973 The Meghalaya Tree (Preservation) Act, 1976	Permit from Autonomous District Councils Garo/Khasi/Jaintia Hills / Forest Department	Autonomous District Councils / State Department of Forests	MPWD
6	Ancient Monuments & Archaeological Sites and Remains Act, 1958	The act has been enacted to prevent damage to archaeological sites identified by Archaeological Survey of India	The present alignment does not encroach within legally marked boundary of any national and state protected heritage sites. Not Applicable	Archaeological Dept. GOI and GoM	MPWD
7	Construction and Demolition Waste Management Rules, 2016	Rules to manage construction waste resulting from construction, remodeling, repair and demolition of any civil structure.	Construction and demolition waste generated from the project construction shall be managed and disposed as per the rules.	State Pollution Control Board	The Contractor
8	Municipal Solid Wastes Management Rules, 2016	Rules to manage municipal solid waste generated; provides rules for segregation, storage, collection, processing and disposal.	Solid waste generated during construction stage at construction camp shall be managed and disposed in accordance with the Rules.	State Pollution Control Board	The Contractor
9	Establishing stone crusher, hot mix plant, wet mix plant and Diesel Generator Sets	Water Act of 1974, Air Act of 1981, Noise Rules of 2000 and Environmental	Consent-for-establishment	State Pollution Control Board	The Contractor

Sl. No.	Policy/Act/Rule	Project relevance	Requirement	Competent Authority	Responsible Agency for Obtaining Clearance
	and construction vehicles	Protection Act of 1986 and as amended Central Motor Vehicle Act, 1988 and Central Motor Vehicle Rules,1989			
10	Operating stone crusher, hot mix plant, wet mix plant and Diesel Generator Sets	Water Act of 1974, Air Act of 1981, Noise Rules of 2000 and Environmental Protection Act of 1986 and as amended	Consent-for-operation	State Pollution Control Board	The Contractor
11	Use and storage of explosive for quarry blasting work	India Explosive Act 1984	Explosive licence for use and storage	Chief Controller of Explosives	The Contractor
12	Storage of fuel oil, lubricants, diesel etc. at construction camp	Manufacture storage and Import of Hazardous Chemical Rules 1989 Hazardous and other Wastes (Management and Transboundary Movement) Rules, 2015	Permission for storage of hazardous chemical	State Pollution Control Board or Local Authority (DM/DC)	The Contractor
13	Quarry operation	State Minor Mineral Concession Rules, The Mines and Minerals (Regulation and Development) Act (MMRD Act), 1957, The Meghalaya Minor Minerals Concession Rules 2016	Quarry Lease Deed and Quarry License	State Department of Mines and Geology	The Contractor
14	Extraction of ground water	Ground Water Rules of 2002	Permission for extraction of ground water for use in road construction activities	State Ground Water Board	The Contractor
15	Use of surface water for construction	-	Permission for use of water for construction purpose	Irrigation Department	The Contractor

Sl. No.	Policy/Act/Rule	Project relevance	Requirement	Competent Authority	Responsible Agency for Obtaining Clearance
16	Engagement of labour	Labour Act	Labour license	Labour Commissioner	The Contractor

3.3.1 Applicable Safeguard Policies of World Bank

As the Project is seeking financing from the World Bank and therefore the Bank's safeguard Policies pertains to environmental and social safeguards are also applicable to this Project. The operational Policies of World Bank applicable to the project under are as follows:

Table 3-7 : Operational Policy of World Bank

WB Safe Guard Policy	Subject Category	Triggered Or Not	Reason For Its Applicability	Mitigation Measures	Documentation
OP 4.01	Environmental Assessment	Triggered	Umbrella policy	All necessary mitigation measures to be incorporated.	EIA required.
OP 4.04	Natural Habitats	Not Triggered	Eco-sensitive-Forestry and wildlife related issues	Avoidance of fragmentation of designated habitat (protected area)	Minimization of habitat loss, establishing and maintaining habitat through compensatory afforestation
OP 4.36	Forestry	Not Triggered	No Forest Land will be diverted for the project.	Only Tree cutting permission required for private trees from Autonomous District Councils.	Not Applicable
OP 4.09	Pest Management	Not Triggered	Not Applicable	Not Applicable	Not Applicable
OP 4.12	Involuntary Resettlement	Triggered	Involuntary Resettlement is triggered as small parcels of land may be required for road improvement. However, the project will duly engage in appropriate land management activities and be cognizant of cases where any loss of livelihood occurs. In that case appropriate measures will be taken through livelihood compensation.	The SIA and ARAP will include standard mitigation methods and procedures, along with appropriate institutional arrangements for screening and reviewing sub-projects and monitoring the implementation of mitigation measures to prevent adverse impacts.	SIA and ARAP

WB Safe Guard Policy	Subject Category	Triggered Or Not	Reason For Its Applicability	Mitigation Measures	Documentation
OP 4.10	Indigenous people	Triggered	The policy is triggered. As 86% of the state's population is tribal, a comprehensive Social Management Framework cum Indigenous People's Development Plan will be prepared.	Road specific Social Assessment will be carried out and IPDP will be prepared if required. SMF includes IPPF.	SMF includes IPPF.
OP 4.11	Physical Cultural Resources	Not Triggered	No Protected monuments are located within project influence area	Not Required	Not Applicable

3.4 CATEGORIZATION OF PROJECT CORRIDORS

To reflect the significance of potential impacts and identify the level of assessment and institutional resources required for the safeguard management under the project, the corridor wise categorization of project has been worked out and presented in ensuing sections. The criteria of Environmental and Social categorization of project based on the World Bank Operational Policies is displayed as below:

Table 3-8 : Conditions of categorization as per World Bank Operational Policies

Safeguard Categorization of World Bank	Proposed Bridge
Category A: A proposed project is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. ***An environmental impact assessment (EIA), including an environmental management plan (EMP), is required.***	Bridge-2 is not traversing through Natural Habitat (legal protected areas –Wild life sanctuary).
Category B: The proposed project's potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. ***An initial environmental examination (IEE), including an EMP, is required.***	**All bridges will be categorized as Category B.** Bridge-2 is not passing through Forest Area. However, tree felling approval will be required for the proposed bridge and approach roads from Autonomous District Council

3.4.1 Clearance Requirements

EIA Notification, 2006

The EIA notification dated 14thSeptember, 2006 imposes certain restrictions and prohibitions on new projects or activities, or on the expansion or modernization of existing projects or activities based on their potential environmental impacts as indicated in the schedule to the notification, being undertaken in any part of India, unless prior environmental clearance has been accorded in accordance with the objectives of National Environment Policy as approved by the Union Cabinet on 18thMay, 2006.

As per the Schedule-I of EIA, Notification 2006; construction of bridges/flyover are not listed under list of Project or Activities requiring Environmental Clearance.

The National Green Tribunal

The National Green Tribunal in original application No. 137 of 2014 in the Matter of Vikrant Kumar Tongad Versus Union of India & Others pronounced on 12th Feburary, 2015:

"That the construction of a bridge or similar activity covering a build-up area ≥ 1,50,000 sq.mtrs and or covering an area of ≥ 50 hectares, would be covered under Entry 8(b) of the Schedule to the Regulation of 2006.

3.4.3 Applicability of Forest Clearance

The proposed bridge/alignment is not passing through any kind of Forest Area. Therefore, forest clearance is not required for the proposed project

3.4.4 Applicability of Wildlife Clearance

No forest land will be required from wildlife sanctuary for the implementation of the project. No wildlife sanctuary is located within 10 km radius of the project road. Therefore, no clearance required under Wildlife Protection Act, 1972**.**

Based on the above criteria, Bridge wise Environmental Sensitive analysis and categorization of corridors has been done and presented in table below.

Table 3-9: Categorization of Bridge

		FEASIBILITY OF BRIDGES-2								
Sl.no.	Bridge	District	Block	Name Of The Road	Length (in m)	Category	Proximity To Pa[3]	Categorization	Tentative Approval Required	Social Categorization
SUB TOTAL OF (Km)										
1	Bridge 2	South West Garo Hills	Gambegre	Damalgre Mellim Boldamgre Road	38	Cat B	More than 15 Km	World Bank CAT B	Tree cutting required from District Autonomous Council	World Bank Category B
					More sensitive, categorized as World Bank CAT A, needs tree/ forest approval, EIA Approval from central EAC, Wild life Approval					
					Less sensitive, categorized as World Bank CAT B, needs tree/ forest approval, EIA Approval from SEAC, Wild life Approval					
					Preferable roads, categorized as World Bank C, only need tree cutting approvals					

3.5 BRIDGE-2 & SENSITIVITY TO ENVIRONMENT

Bridge no. 2, located in a village called Okkapara, Gambegre block of South West Garo Hills district. The structure is located along the Damalgre Mellim Boldamgre Road, Tura North division. The co-ordinate of the bridge is 25°26'44.50"N; 90° 5'35.31"E.

Table 3-10 : Corridor Characteristics

Sl.no.	Bridge Details	
1.	District	South West Garo Hills
2.	Bridge Length	38 m

Sl.no.	Bridge Details	
3.	Terrain	Plain
4.	Bridge Elevation	58 msl,
5.	Carriageway Configuration	7.5m
6.	Width of Footpath	-
7.	Overall Width of the Deck	8.5
8.	Proposed	Steel Composite Girder Bridge design will be carried out as per guidelines given in IRC
9.	Forests / environmentally sensitive areas	No Forest in the alignment
10.	Trees within approach road or Bridge	5-8 trees
11.	Potential Impact on Private Land	Nil
12.	Potential Resettlement Impact	Nil
13.	Religious Structures Affected	None
14.	Heritage trees, sacred grooves	0
15.	River/Canal Name	Ringdi RIver
16.	Other features / issues if any Landslide:	None
Sample photographs of the Bridge		

Approval required under the project:

Forest Approval	Wild Life approval	EIA approval	Any other NOC/ approval
NO: Corridor is not passing through any type of Forest.	**No,** Corridor is not traversing through any protected areas;	**Exempted:** Not Required	Further will be detailed in detailed study report.

3.6 SUMMARY OF CONSULTATIONS

Community consultations were carried out during site visits, at various locations along the corridor. The objective of these consultations was to briefly detail the intent of the project and obtain views and perceptions of the roadside communities on key issues that merit incorporation in the project road designs. Consultations were carried out at major junctions, settlements and institutions like Gram Panchayat Offices, Forest Offices, Joint Forest Management Committees, Eco-Development Committees, etc. These discussions enabled the team to:

- Identify existing issues along the project corridors,
- Appreciate likely impacts due to project interventions,
- Stakeholder suggestions on ways to avoid or mitigate impacts, and
- Stakeholder suggestions on ways to improve road side environment

Summary of the issues discussed are presented in Table 3-11 below, and the detailed consultation will be provided in DPR stage.

Table 3-11 : Summary of Consultation

Sl. No.	Consultation	Name of Locations	Outcome
1	South West Garo Hill District **Number of Consultations:** 1 **Number of Participants:** 26	• Village Council Head (Conference Hall)	• The diversion bridge was washed away in June 2022. • The village head expressed to prepare the permanent bridge as the connectivity to other villages are cut during flood time. • The permanent bridge is very important as in serves various purpose i.e., Market Bazaar, School, Hospitals etc. • Farmers grow rubber, cashew nut, bettle nut, vegetables, fruits, paddy crops etc. They expressed immediate attention for proper permanent bridge facility at this location. • There is no forest near by the alignment • Tree Cutting permission can be obtained from District Autonomous Council with the Consent from Nokma (Village Head) • No Wildlife Sanctuary Nearby Alignment





3.7 BROAD ENVIRONMENTAL MANAGEMENT COST

A broad cost of environmental Management with respect to each corridor wise has been presented in Table 3-12 : The various immediate environmental management measures (Air, water, Soil monitoring, Afforestation Cost, silt trap management cost, Training and capacity building etc.,) have been taken in Environmental Monitoring budget. Please refer Table 3-12 :, showing corridor wise broad environmental budget.

Table 3-12 : Environmental Monitoring Cost

Particulars	Unit Cost	Bridge-2
Environmental Monitoring in Construction Phase* (excluding monsoon season)		1
Air quality Monitoring	7000	42000
Noise Monitoring	2500	15000
Water Quality Monitoring	6000	36000
Soil Quality Monitoring	3000	18000
Travel and Transportation of Monitoring team (Lump sum Amount)	100000	50,000
Silt fencing total	600 rm	120000
Sanitation at construction camp	100000	50000
Sub Total of Sl 1		**331,001**
Afforestation Cost		
Compensatory Plantation (10 times of the number of affected trees) for trees existing on Revenue Land(including PWD Land)	4500	180000
Cost for operation phase		
Ambient Air Quality	7000	70000
Ambient Noise Level	2500	25000
Water Quality Monitoring	6000	60000
Soil Monitoring Location	3000	30000
Training & orientation	100000	100000
Travel and Transportation of Monitoring team (Lump sum Amount)	100000	50000
Cost for operation phase		**3,35,000**
Total Cost		**8,46,000**