INITIAL ENVIRONMENT ASSESSMENT REPORT (IEAR)

FOR

T & D NETWORK IN KAMRUP RURAL, UDALGURI & SONITPUR DISTRICTS UNDER NERPSIP TRANCHE-1, ASSAM



Prepared By

ENVIRONMENT AND SOCIAL MANAGEMENT

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For

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SECTION - I: PROJECT DESCRIPTION

1.0 BACKGROUND

The North Eastern Region (NER) in India is endowed with rich energy resources but faces significant bottlenecks in electricity access and availability levels. The per capita power consumption in NER is one-third of the national average. No significant generation capacity has been added between 2004 and 2011 as a result of which inadequate power supply remains a critical constraint to sustainable and inclusive growth, and to scaling up private investment and economic competitiveness in the NER.

The road-map for development of power sector specifying the need for strengthening of overall Transmission, Sub-transmission system of NER and Sikkim was brought out in the "Pasighat Proclamation on Power" released during the first Sectoral Summit of North Eastern Council at Pasighat in Arunachal Pradesh in January 2007.

Pursuant to recommendations of Pasighat summit, a Sub-Group was constituted under the Chairmanship of Member (Power System), Central Electricity Authority (CEA) on Transmission, Sub-transmission related issues in North Eastern Region. The sub-group submitted its report in December, 2007 wherein a comprehensive scheme for strengthening of transmission, sub-transmission system was evolved by CEA in consultation with POWERGRID and States of North Eastern Region and Sikkim.

Subsequently, a number of meetings took place regarding methodology for execution and funding of the scheme. In the meeting taken by Member, Planning Commission on February 24, 2009 and meeting of Committee of PIB chaired by Secretary, Department of Expenditure on March 24, 2009, it was decided that DPRs of the scheme comprising transmission, sub-transmission system should be prepared by POWERGRID. Accordingly, DPRs for strengthening of transmission, distribution system in Assam were prepared and submitted to Ministry of DONER / Ministry of Power / Govt. of Assam by POWERGRID.

Among the NER States and Sikkim, the project in Arunachal Pradesh and Sikkim is proposed to be funded by Govt. of India. Implementation of the scheme in other 6 States in NER viz. Assam, Meghalaya, Tripura, Mizoram, Manipur & Nagaland is proposed through funding from World Bank / Govt. of India. The scheme is proposed to be funded by World Bank in three tranches. Accordingly, priority transmission, distribution schemes to be taken up under tranche-1 of the World Bank fund has been finalized by CEA in consultation with the concerned States and POWERGRID.

Ministry of Power (MoP), Gol has appointed POWERGRID as Design cum Implementation Supervision Consultant (i.e. Project Management Consultant-PMC) and now re-designated as Implementing Agency (IA) to the six (6) North Eastern States for the said project. However, the ownership of the assets shall remain with the respective State government or State Utilities, which upon progressive commissioning shall be handed over to them for taking care of Operation and Maintenance of assets. The present report deals with Initial Environment Assessment for part of priority works of strengthening of transmission & distribution system in Assam under Tranche-1 of the World Bank Fund.

1.1 BENEFITS OF THE PROJECT:

The proposed transmission and distribution schemes not only improve overall power supply situation but also improve reliability, quality, security and enhancement of power supply in the State.

1.2 PROJECT JUSTIFICATION

The State of Assam is endowed with rich energy resources but faces significant bottlenecks in electricity access and availability levels. The present per capita energy consumption is of the order of 205 units (kWh) against the regional per capita consumption of about 258 units and national per capita consumption of about 779 units. The State meets its power requirement through about 460 MW of self-generation and about 600MW of power allocation from various central sector generation projects of NHPC and NEEPCO. The present demand (met) is of the order of 1150 MW whereas the un-restricted demand is about 1300 MW. As most of the generation projects in the north eastern region are hydro in nature, the State faces acute shortage of power during low-hydro generation condition.

Presently, the State draws its share of power from central sector generating stations through various intra-state lines connected to the following substations of inter-state transmission system:

- Misa 400/220 kV substation (2x315 MVA)
- Balipara 400/220 kV substation (315 MVA)
- Bongaigaon 400/220 substation (315 MVA)
- Silchar 400/132 substation (2x200 MVA)
- Salakati 220/132 kV substation (2x50 MVA)
- Haflong 132/33 kV substation (2x5 MVA)
- Badarpur Switching Station

Besides this, the State draws power from 220/132 kV Mariani substation of AEGCL, wherein the one circuit of Kathalguri-Misa 400 kV D/C line (operated at 220 kV level) has been looped-in and looped-out and from 132 kV Gohpur substation of AEGCL which is connected to 132 kV Itanagar (Nirjuli) substation of POWERGRID. Another 220 kV substation namely New Mariani has recently been commissioned in the State by POWERGRID. AEGCL is also constructing a 2x315 MVA, 400/220 kV substation at Azara by looping in and looping out Silchar-Bongaigaon 400 kV D/C line (one ckt via Byrnihat). This will further enhance the interconnection of transmission system of Assam with the inter-state transmission network.

As per the 18th Electric Power Survey of CEA, the future demand of the State is expected to grow to about 1817 MW by year 2016-17 and 2534 MW by year

2021-22. This shall be met through various hydro and thermal projects coming up in the north-eastern region in near future, which are as follows:

 Pallatana GBPP 	: 726 MW
 Bongaigaon TPS 	: 750 MW
 Kameng HEP 	: 600 MW
 Lower Subansiri HEP 	: 2000 MW

The State has a share of about 894 MW from these future generation schemes. With this, the total share of the State from central sector generating stations shall be about 1500 MW.

The present intra-state transmission system of the State is quite old & weak and is unable to cater to the growing power requirements of the State. Although the present Transmission & Distribution (T&D) system covers many areas of the State, it is inadequate in its reach and due to non-availability of redundant T&D system, breakdown of any transmission system element results in long term power shortages making the system highly unreliable. Besides, some of the network elements have undergone long term outage due to break-down. Therefore, it has become essential to address the above situation through remedial measures in the transmission and distribution system. Accordingly, phase-wise strengthening of transmission & subtransmission system has been proposed.

The transmission & distribution schemes proposed under this report are priority schemes under Tranche-1 and are essential for improving the power supply situation in the State. Implementation of these schemes will improve quality, reliability, security and enhancement of the power supply in the State.

1.3 PROJECT HIGHLIGHTS

a)	Project Name	:	NER Power System Improvement Project (NERSPIP) – Tranche- I, Assam
b)	Location	:	Different parts of Assam State
c)	Beneficiary States/UT	:	Assam
d)	Project Cost	:	Rs 1473.80 Crores
e)	Commissioning Schedule	:	2019

1.4 PROJECT SCOPE & PRESENT STUDY

The present Initial Environment Assessment Report (IEAR) is a document developed to identify possible environmental and social issues associated with the construction of 220 kV & 132 kV transmission lines and associated 220/132 kV, 132/33 kV substations in Kamrup Rural, Udalguri & Sonitpur districts of Assam, covered under "NER Power System Improvement Project, Tranche-1". It also includes the associated 33 kV lines and 33/11 kV substations which are envisaged for strengthening of the existing distribution network of the State. The IEAR provides insight on possible environment & social issues and also describe management

measures to minimize/mitigate it based on AEGCL/APDCL's Environment and Social Policy & Procedures Framework (ESPPF). The scope of IEAR covers the following subprojects;

SI. No.	Name of the Line	Name of the New / Existing Substation
Α.	Transmission Scheme	
1.	Rangia - Amingaon 220 kV D/C line - 30 km	Establishment of 2X160 MVA, 220/132 kV new substation at Amingaon (GIS)
2.	Amingaon – Hazo 132 kV D/C line – 18.5 km	Establishment of 2X31.5 MVA, 132/33 kV new substation at Hazo
3.	Sonabil – Tezpur 132 KV D/C line – 13.3 km	Establishment of 2X50 MVA, 132/33 kV new substation at Tezpur
4.	LILO of one circuit of Rangia – Rowta 132 KV D/C line at Tangla – 7 km	Establishment of 2X31.5 MVA, 132/33 kV new substation at Tangla
5	LILO of one circuit of 132 KV S/C Kamalpur – Sishugram line at Amingaon – 0.6 km	Extension of 132/33 kV substation at Sonabil
6	LILO of one circuit of 132 KV S/C Kamalpur – Kamakhya line at Amingaon – 0.8 km	Extension of 220/132 kV substation at Rangia
В.	Distribution Scheme	
1.	33 KV line from 132/33 kV Hazo (New) s/s to 33/11kV Mukalmuwa existing s/s - 21.1 KM	Strengthening of Mukalmuwa 33/11kV (Existing) Substation
2.	33 KV line from 132/33kV Tangla (New) s/s to 33/11kV Khairabari (existing) S/s - 13.7 km	Strengthening of Khairabari 33/11kV (Existing) Substation
3.	33 KV line from 132/33 kV Hazo (New) s/s to 33/11kV Sesa (New) s/s - 4.39 KM	Establishment of 2x5 MVA, 33/11 KV new substation at Sesa
4.	33 KV line from 132/33 kV Hazo (New) s/s to 33/11kV Ramdiya (New) s/s - 8.92 KM	Establishment of 2x5 MVA, 33/11 KV new substation at Ramdiya
5	33 KV line from 132/33 kV Hazo (New) s/s to 33/11kV Domdoma- hazo (New) s/s -3.3 KM	Establishment of 2x5 MVA, 33/11 KV new substation at Domdoma-hazo
6	33 KV line from 132/33kV Tangla (New) s/s to Harsingha (New) s/s - 9.3 KM	Establishment of 2x5 MVA, 33/11 KV new substation at Harsingha
7	33 KV line from 132/33kV Tangla (New) s/s to Paneri Existing 33/11kV S/s - 6.6 km	Strengthening of 33/11kV Paneri (Existing) Substation
8	33 KV line from 132/33kV Tangla (New) s/s to 33/11 kV Kalaigaon (existing) S/s - 9.11 km	Strengthening of 33/11kV Kalaigaon (Existing) Substation

9	33 KV line from 132/33kV Tangla (New) s/s to 33/11kV Tangla (existing) S/s - 5.1 km	Strengthening of 33/11 kV Tangla (Existing) Substation.
10	33 kV line from 132/33kV Tezpur (New) s/s to 33/11kV LGM hospital (New)s/s - 8.8 KM.	Establishment of 2x10 MVA 33/11 kV new substation at LGM hospital
11	33 kV line from 132/33kV Tezpur (New) s/s to 33/11 kV Parowa (existing) s/s - 3.7 KM	Strengthening of 33/11kV Parowa (Existing) Substation
12	33 kV line from 132/33kV Tezpur (New) s/s to 33/11 kV Dolabari (existing) s/s - 4.7 KM.	Strengthening of 33/11kV Dolabri (Existing) Substation

The project activities include the survey for finalizing the route alignment and installation of transmission/distribution lines and construction of substations (civil and electrical installation). Lattice towers/ poles are then erected on designated places using normal excavation and foundations thereafter conductors are strung across these using manual/stringing machines. The construction of substations is regular civil works for small buildings. The electrical installations consist of the transformers, breakers, capacitors etc. and other protection/controlling devices to ensure required power flow.

A power map showing the transmission grid of Assam highlighting the above lines and other new projects placed as **Exhibit - I**. Schematic map showing the various subprojects covered under the subject IEAR is placed in **Exhibit – 2**.

SECTION – II: BASELINE DATA

2.0 The proposed subprojects comprising of both transmission and associated distribution networks are scattered in three (3) districts namely Kamrup Rural, Udalguri and Sonitpur in the State of Assam. The basic environmental settings of the State and sub-project area districts are given below:

2.2 ASSAM:

Assam has a geographic area of 7.84 million ha, which constitutes 2.39% of the country's total area. It is situated between latitude 24°07' to 28°00' N and longitude 89° 42' to 96° 02'E.

Topographically, the State can be divided into three parts, viz. the Brahmaputra valley, the Surma valley and the Assam range. The first two parts are plain areas, while the Assam range is a mountainous region. The general land use pattern of the State is given in **Table 2.1**.

Land Use	Area in '000 ha	Percentage
Total geographical area	7,844	
Reporting area for land utilization	7,850	100.00
Forests	1,853	23.60
Not available for cultivation	2,620	33.37
Permanent pastures and other grazing lands	160	2.04
Land under misc. tree crops & groves	196	2.49
Culturable wasteland	78	0.99
Fallow lands other than current fallows	52	0.66
Current Fallows	81	1.03
Net area sown	2,811	35.80

Table-2.1: Land Use Pattern

Source: Land use statistics, Ministry of Agriculture, GOI, 2011-12

By the bifurcation of Old Kamrup district in year 2003, two districts i.e. Kamrup Metropolitan and Kamrup Rural were created. Kamrup Rural district occupies an area of 2740.74 sq. km. The district extends from 25°46' N to 26° 49' N and 90°48' E to 91°50'E. It is bounded by Udalguri and Baska districts in North, by Meghalaya in South, by Darrang district and Kamrup Metropolitan district in East and by Goalpara district and Nalbari district in west. Amingaon is the district headquarters.

Udalgiri district was created in year 2004 by the bifurcation of district Darrang. Udalguri district lies between co-ordinates 26°46' N to 27° 77' N and 92° 08' E to 95° 15' E and has a Geographical Area of 1985.68 sq kms. The district is bounded by Bhutan & Arunachal Pradesh on the North, Sonitpur district on the East, Darrang district on the south and by Baksa district on West. Udalguri town is the district headquarters.

Sonitpur is the second largest district of Assam after Karbi-Anglong district, having an area of 5324 Sq kms. The co-ordinates of the district are $26^{\circ}30'$ N to 27° 01' N and 92° 16' E to 93° 43' E. The district is bounded by Arunachal Pradesh in the North, Lakhimpur district in the east and Darrang district in the west. River

Brahmaputra forms the south boundary of the district. Tezpur town is the district headquarters.

Climate:

Assam has four well defined seasons in a year viz. summer, monsoon, winter and spring. Climate of Assam is sub-tropical. October to April offer a mild and moderate climate. Assam is never extremely cold or hot.

Rainfall, one of the highest in the world (between 178 and 305 cm), is concentrated in 4 months, June to September. The State experiences floods and droughts. Annual rainfall varying from 1,500 mm to 3,750 mm. The average temperature in January ranges from 10°C to 23° C and in July it ranges from 26° C to 32° C.

The climate of Kamrup district is described as Sub tropical with semi-dry summer and cold in winter. Annual Rainfall ranges between 1500 mm to 2600 mm. Temperature in the district varies from 7°C to 38.5°C.

Udalguri district also has sub tropical climate with semi-dry summer and cold in winter. During summer (May to early September), heavy rainfall occurs due to south-west monsoon for which the district experiences flood. Annual rainfall in the district is around 2000 mm and temperature in the district varies from 13.50° C to 34.50° C.

Sonitpur district falls in the Sub Tropical climate region and enjoys Monsson type of climate. Summers are hot and humid with an average temperature of 29°C. Winters extend from the month of October to February and are cold and generally dry with an average temperature of 16°C. Summer rain is heavy and takes place from late June to early September by the moisture laden South-West Monsson.

Minerals:

Coal, petroleum and natural gas, limestone and minor minerals are produced in Assam. Coal occurs in Tinsukia, Dibrugarh, North Cachar Hills, Sivasagar and Lakhimpur districts. Assam coal is friable in nature and has high sulphur content Deposits of banded magnetic quartzite occurs in Kamrup and Goalpara districts, Limestone occurs in Lakhimpur, North Cachar Hills, Karbi Anglong, Nagaon and Sivasagar districts. Kaolin is found in Karbi Anglong and Lakhimpur district. The Digboy oil fields in Lakhimpur district and Moran and Rudrasagar oil fields in Sivasagar district are the major source of oil and gas. Hydrocarbons are struck in Borsilla, Changmaigaon, Kurgaon and Rajgarh in the past. Sillimanite bearing rocks occur in Karbi Anglong district. Assam continued to be the 3rd largest producer of Petroleum (crude) and natural gas in the country accounting for 16% and 8% respectively of the total production of this mineral in the country.

Soil :

Mainly three types of soil found in Assam State viz. Alluvial, Red Loam, and Lateritic Soil. Alluvial Soil covers entire Darrang, Kamrup, Lakhinpur, Goalpara, Sibsagar and part of Garo Hills. Red Loam Soil is found in Garo Hills, Mizo Hills, Khasi-Jaintia Hills and part of Cachar & Sibsagar district. Lateritic Soil found in part of Shibsagar,

Jaintia Hills, Khasi Hills, Cachar, Nowgaon area. The most typical characteristics of Assam soil is acidity, where pH of the soils generally ranges between 4.2 to 5.8. The soil found in the subproject area is mostly alluvial type.

Water Resources:

Brahmaputra Basin comprises of sub-basin of Subansiri, Jia Bharali, Badeng-Pubnoi, Dhansiri, Anas, Champamati, Dholai, Buridihing, Disang, Kopili, Kalang and Meghna Basin comprises of sub- Basin of Barak River. Assam is dominated by the Brahmaputra river (length: 2900 km). Its drainage area is roughly 935,500 sq. km.

The major rivers flowing through sub-projects area districts are Brahmaputra, Puthimari, Bornoi, Nona, Kulsi, Pagladiya, Kalajal, Pachnoi, Dhansari, Jiya Dhansari, Mora Dhansari, Dipila etc. In the instant scheme, there are 11 nos of river crossings involving various rivers. However, all possible efforts shall be made to avoid placing of tower in the river bed while crossing the rivers.

Ecological Resources:

Forest: The recorded forest area is 26,832 sq. km which constitutes 34.21% of the geographic area of the State. According to legal status, Reserved Forests constitute 66.58 % and Un-classed Forest 33.42% of the total forest area. Forest Map of Assam is enclosed as **Map-1**. Forest types occurring in the State are Tropical Wet Evergreen, Tropical Semi-Evergreen, Tropical Moist Deciduous, Sub Tropical Broad Leaved Hill, Sub Tropical Pine and Littoral and Swamp Forests. Based on interpretation of satellite data, total forest cover is 27, 671 sq. km which is 35.28% of State's geographical area. In terms of forest canopy density classes, the State has 1, 444 sq. km very dense forest, 11,345 sq. km moderately dense forest and 14,882 sq. km is open forest.

The proposed transmission and distribution subprojects shall pass through 3 districts namely Kamrup, Udalguri and Sonitpur of Assam. However, by adopting careful route selection technique, forest involvements along routes of all transmission and distribution lines under the subject scheme have been completely avoided thereby minimizing ecological disturbance. The details of forest resources available in the subproject area district are as follows:

District	Geographic	nic (Area in Sq. km)				% Forest	
		Very Dense forest	Mod. Dense forest	Open forest	Total	cover	
Kamrup (including Kamrup Rural)	4345	68	612	753	1433	13.50	
Darrang (Udalguri)	3481	12	91	367	470	32.98	
Sonitpur	5324	56	280	624	960	18.03	

Source: Indian State of Forest Report 2013

Protected Areas: There are 5 National Parks and 18 Wildlife Sanctuaries in the State (List of protected areas enclosed as **Annexure-1**). Total protected area is 0.40 million ha. which constitutes 4.98% of the total geographic area of the State. The State has three Tiger Reserves namely Kaziranga, Manas and Nameri. Manas Tiger Reserves has also been declared as a Biosphere Reserve. Kaziranga National Park

and Manas Wildlife Sanctuary are also included in the World Heritage sites. Besides, the State also 1 Ramsar Site & 46 Important Bird Areas (IBA).

The State is famous for One Horned Rhino & Elephant. There are five Elephant Reserves and Eight Elephant Corridors (List enclosed as **Annexure-2**) connecting these Elephant Reserves, Protected Forest and nearby forests locating in the neighboring states (viz. Arunachal Pradesh and Meghalaya). Some of these corridors are 0.5 km wide and are proximity to or on the major settlement. Moreover, these corridors also recorded man-elephant conflict due to forest degradation and encroachment of corridor land by settlement and agricultural land.

The protected areas found in the subproject districts are Kaziranga National Park, Orang National Park, Nameri National Park, Burhachapori Wildlife Sanctuary, Sonai-Rupai Wildlife Sanctuary, Barnadi Wildlife Sanctuary and Sonitpur Elephant Reserve. However, the proposed transmission and distribution network doesn't pass through any protected areas like national parks, sanctuaries, elephant reserves/corridors and biosphere reserves etc. In the instant scheme all such areas are completely avoided through careful route selection. It is also observed that there is no ecologically sensitive area within a radius of 10 Km from the transmission and distribution lines proposed under this scheme.

Wetlands

In Assam, the total wetland area estimated is 764372 Ha. which is around 9.74% of the total geographical area of Assam. Natural wetlands dominate the State. The major wetland types are River stream accounting for 84% of the wetlands (637164 Ha.), lake/ponds (51247 Ha.), waterlogged (47141 Ha.) Ox-bow lake (14173 Ha.). Wetlands occupy as high as 21.43% of geographical area (Dibrugarh district) and as low as 1.35% (North Cachar district). The Deepor Beel Bird Sanctuary of Assam is also covered under International Convention (Ramsar Convention) by MoEF. The districts where the said subprojects are to be implemented have following wetland coverage which includes river, lake etc.:

District	Geographic area (sq.km.)	Wetland area (Ha)	% of total wetland area(Ha)	% of district geographic area
Kamrup (incl Kamrup Rural)	4345	43655	5.71	10.05
Darrang (incl Udalguri)	3481	48983	6.41	14.07
Sonitpur	5324	83427	10.91	15.67

Source: National Wetland Atlas

However, none of these wetlands are getting involved/impacted due to the said subprojects which are proposed to be implemented in the above districts. The distance to nearest and largest wetland i.e Deepor Beel Ramsar site from the proposed Amingaon line/substation is about 13km (Map-1a). Similarly, another wetland i.e. Bordoibam Bilmukh is approx 163 km from the proposed Tezpur line/substation (Map-1b).

Human and Economic Development

Assam is a state rich in natural resources like natural oil, natural gas, coal, rubber, tea and some minerals like granite, limestone and kaolin. The present state is much smaller than what it was forty years ago. It is still the largest economy in the North East. Although it is more industrially developed than the other North Eastern states,

it is primarily an agrian economy with 63% of its population engaged in agriculture and allied activities.

Tea is a major industry in Assam which contributes 15 % of world's tea production and 55% of the country's tea output. A large section of the labor force of the State is employed in the tea estates of Assam. The other agricultural produce involves rice, sugarcane, pulses, potatoes and jute. The secondary sector of the economy comprises of the industries in Assam with large and medium scale productions. Agro based industries prevail in the State coupled with the tea industry that has a major contribution to the economy of the State of Assam. Assam is first State in the country where oil was struck in 1889 at Digboy. Assam has four oil refineries located at Guwahati, Digboi, Numaligarh and Bongaigaon with a total capacity of 7 MMTPA (Million Metric Tonnes per annum).The State also earns revenue from the mining industry that produces the four important industrial minerals of coal, limestone, sillimanite and oil. Important cottage industries are handloom, sericulture, manufacture of cane and bamboo articles, carpentry, smithy and manufacture of brass utensils. Assam is also the largest producer in the world of the golden colored muga silk.

Kamrup district has a population of around 15,17,202 (2011 census) with a population density of 346 per sq km. Population density is 346 and sex ratio of the district is 946 females per 1000 males. The staple crop of the district is rice, of which there are three crops. The indigenous manufactures are confined to the weaving of silk and cotton cloths for home use, and to the making of brass cups and plates. The chief exports are rice, oil seeds, timber and cotton; the imports are fine rice, salt, piece goods, sugar, betel nuts, coconuts and hardware. A section of the Assam-Bengal railway starts from Guwahati, and a branch of the Eastern Bengal railway has recently been opened to the opposite bank of the river.

Udalguri district has a population of 8,32,769 (2011 census), out of which around 2,42,686 belong to Schedule Tribes and 31,015 belong to Schedule Castes. Population density of the district is 497 per sq km and sex ratio of the district is 966 females per 1000 males. Udalguri is one of the four districts included in BTAD (Bodoland Territorial Autonomous District). Around 54% of the district population belongs to BPL (Below Poverty Line) and literacy rate of the district is a meager 34%. These facts indicate a low economic base of the district. Agriculture is the main profession and rice is the staple crop. There are around 12,977 household/cottage industries in the district.

Sonitpur district has a population of 19,25,975 as per the 2011 census. Population density of the district is 365 per sq km and sex ratio of the district is 946 females per 1000 males. Literacy rate of the district is 60.29%. Sonitpur district has an agrarian economy with around 80% of the population depending upon agriculture sector for livelihood. Paddy is the main crop. Both Rabi and Kharif cropping is done in the district. A large number of tea gradens numbering around 73 are present in the district covering an area of around 2,81,660 bighas. Monabari near Biswanath Chariayali is Asia's largest tea garden. Apart from this, various other small scale economic activities such as Piggery, Poultry production, Fishery, Weaving, Sericulture etc are also practiced.

Additional/detailed information regarding the environmental and social features along the alignment is provided in Section- IV

SECTION - III : POLICY, LEGAL & REGULATORY FRAMEWORK

3.0 Power transmission and distribution project activities by their inherent nature and flexibility have negligible impacts on environmental and social attributes. Indian laws relating to environmental and social issues have strengthened in the last decade both due to local needs and international commitments. AEGCL/ APDCL undertakes its activities within the purview of Indian and State specific laws keeping in mind appropriate international obligations and directives and guidelines with respect to environmental and social considerations of Funding Agencies.

3.1 ENVIRONMENTAL

3.1.1 CONSTITUTIONAL PROVISIONS

Subsequent to the first United Nations Conference on Human Environment at Stockholm in June, 1972, which emphasized the need to preserve and protect the natural environment, the Constitution of India was amended through the historical 42nd Amendment Act, 1976 by inserting Article 48-A and 51-A (g) for protection and promotion of the environment under the Directive Principles of State Policy and the Fundamental Duties respectively. The amendment, *inter alia* provide:

"The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country". (New Article 48A)

"It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures". (New Article 51 A(g)

Article 21 of the constitution provides, "no person shall be deprived of his life or personal liberty except according to procedure established by law".

Article 21 is the heart of the fundamental rights and has received expanded meaning from time to time after the decision of the Supreme Court in 1978. The Article 21 guarantee fundamental right to life – a life of dignity to be lived in a proper environment, free of danger of disease and infection. The right to live in a healthy environment as part of Article 21 of the Constitution. Recently, Supreme Court has broadly and liberally interpreted the Article 21, transgressed into the area of protection of environment, and held that the protection of environment and citizen's right to live in eco-friendly atmosphere interpreted as the basic right guaranteed under Article 21.

Thus the Indian Constitution has now two fold provision:

- (a) On the one hand, it gives directive to the State for the protection and improvement of environment.
- (b) On the other hand the citizens owe a constitutional duty to protect and improve natural environment.

Sixth Schedule

In Assam, special provisions also have been extended to the Tribal Areas under the 6th Schedule [Articles 244(2) and 244(A) of the constitution] in addition to basic fundamental rights. The Sixth Schedule provides for administration of tribal areas as autonomous entities. The administration of an autonomous district is vested in a District Council and of an autonomous region, in a Regional Council. These Councils are endowed with legislative, judicial, executive and financial powers. These institutions were expected to integrate these areas with the modern system of administration while preserving the traditional autonomy and local self-governing institutes of the tribal people. The three ADC viz. Bodoland Territorial Council, Karbi Anglong Autonomous Council, Dima Hasao Autonomous District Council in sixth schedule areas enjoy these privileges. Details of ADC in Assam are as follows;

S. N. Autonomous District Council		Revenue District
1.	Bodoland Territorial Council	Baksha, Kokrajhar, Chirang and Udalguri
2.	Karbi Anglong	Karbi Anglong
3.	Dima Hasao	Dima Hasao

Source: North East India: Status of Governance in the Sixth Schedule Areas

3.1.2 MANDATORY REQUIREMENTS (NATIONAL/STATE)

• GoA order/sanction under The Electricity Act, 2003:

Sanction of GoA is a mandatory requirement for taking up any new transmission/ distribution project under the section 68(1) of The Electricity Act, 2003. The sanction authorize AEGCL/APDCL to plan and coordinate activities to commission the new project. Electricity act does not explicitly deal with environmental implications of activities related to power transmission, distribution and construction of substation. However, AEGCL/APDCL integrates environmental protection within its project activities.

• Forest Clearance under the Forest (Conservation) Act, 1980:

When transmission projects pass through forest land, clearance has to be obtained from relevant authorities under the Forest (Conservation) Act, 1980. This Act was enacted to prevent rapid deforestation and environmental degradation. State governments cannot de-reserve any forest land or authorize its use for any non-forest purposes without approval from the Central government. AEGCL/APDCL projects, when involving forest areas, undergo detailed review and approval procedures to obtain a Forest Clearance certificate from MoEF, Government of India before starting any construction activity in designated forest area.

• Environmental Clearances under Environment (Protection) Act, 1986:

Since transmission & distribution line projects are environmentally clean and do not involve any disposal of solid waste, effluents and hazardous substances in land, air and water they are kept out of the purview of Environment (Protection) Act, 1986. However, amendment in the Environment (Protection) Act, 1986 on 7th May' 1992 made it necessary to obtain clearance from MoEF for power transmission projects in three districts in the Aravalis (*viz.*, Alwar in Rajasthan and Gurgaon & Mewat in

Haryana). The Aravali range, in these areas, is heavily degraded, hence, any industrial activity there becomes critical. Environment Impact Notification, 1994 & 2006 lays down specific project categories that require clearance from MoEF Power transmission and distribution projects are not included in this list.

• Ozone Depleting Substances (Regulation and Control) Rules, 2000 :

MoEF vide its notification dated 17th July, 2000 under the section of 6, 8 and 25 of the Environment (Protection) Act, 1986 has notified rules for regulation /control of Ozone Depleting Substances under Montreal Protocol adopted on 16th September 1987. As per the notification certain control and regulation has been imposed on manufacturing, import, export and use of these compound. AEGCL/APDCL shall follow provisions of notification and phase out all equipments which uses these substances and planning to achieve CFC free organization in near future.

• Batteries (Management and Handling) Rules, 2001:

MoEF vide its notification dated 16th May, 2001 under the section of 6, 8 and 25 of the Environment (Protection) Act, 1986 has put certain restriction on disposal of used batteries and its handling. As per the notification it is the responsibility of bulk consumer (AEGCL/ APDCL) to ensure that used batteries are not disposed of, in any manner, other than by depositing with the dealer/manufacturer/registered recycler/importer/reconditioner or at the designated collection centres and to file half yearly return in prescribed form to the concerned State Pollution Control Board.

• Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 :

Vide notification dated 24th September, 2008 under the EPA, 1986, MoEF notified rules for environmentally sound management of hazardous wastes to ensure that the hazardous wastes are managed in a manner which shall protect health and the environment against the adverse affects that may result from such waste. The used transformer oil has been declared as hazardous wastes vide this notification.

AEGCL/ APDCL, being a bulk user of transformer oil shall comply with the provisions of the said rules (MoEF notification dated 24th September 2008) if the practice of storing of used oil is maintained. In case it is decided to outsource the process of recycle of used oil to registered recycler as per the provisions of notification then AEGCL/ APDCL shall submit the desired return in prescribed form to concerned State Pollution Control Board at the time of disposal of used oil.

• E-waste (Management and Handling) Rules, 2011:

Vide notification dated 12th May 2011 under the EPA, 1986, MoEF notified rules for environmentally sound management of e-waste to ensure that e-waste are managed in a manner which shall protect health and the environment against the adverse effects that may result from hazardous substance contained in such wastes. Thus, it is the responsibility of the bulk consumer (AEGCL/APDCL) to ensure that e-waste generated is channelized to authorized collection center(s) or registered dismantler(s) or recycler(s) or is returned to the pick-up of take back services provided by the producer. AEGCL/APDCL, being a bulk consumer of electrical and electronics equipments shall maintain the record as per Form-2 for scrutiny by State Pollution Control Board.

• The Biological Diversity Act, 2002 :

Under the United Nations Convention on Biological Diversity signed at Rio de Janeiro on the 5th June, 1992 of which India is also a party, MoEF has enacted the Biological Diversity Act, 2002 to provide for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith. As per the provision of act certain area which are rich in biodiversity and encompasses unique and representative ecosystems are identified and designated as Biosphere Reserve to facilitate its conservation. All restrictions applicable to protected areas like National Park & Sanctuaries are also applicable to these reserves. AEGCL/APDCL will abide by the provision of act wherever applicable and try to totally avoid these biosphere reserves while finalizing the route alignment.

• The Scheduled Tribes & Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006:

This act recognizes and vests the forest rights and occupation in forest land to forest dwelling. Scheduled Tribes and other traditional forest dwellers who have been residing in such forests for generations but whose rights could not be recognized.

The definitions of forest dwelling schedule tribes, forestland, forest rights, forest villages, etc. have been included in Section 2 of the Act. The Union Ministry of Tribal Affairs (MoTA) is the nodal agency for implementation of the Act while field implementation is the responsibility of the government agencies. Its implementation has also been linked with forest clearance process under Forest (Conservation) Act, 1980 w.e.f. August 2009 by MoEF. AEGCL/APDCL shall abide by the provisions of the act if any portion of the transmission line is passing through forest land, in occupation of the forest dwelling scheduled tribes and other traditional forest dwellers for laying of transmission lines. However, for linear projects including transmission lines obtaining of NoC from the gram sabha has been exempted for the requirement of FRA compliance as per MoEF circular dated 5th February 2013.

• Assam control of Tree Felling Rules, 2002:

These rules prescribe how tree plantations raised in non recorded forest areas by individuals or institutions are to be governed. They specify which plantations need to be registered, which tree species do not require felling permission, what process is to be followed in order to fell trees outside non recorded forest areas, how is the transit of timber originating from non recorded forest areas regulated and how and why timber can be confiscated to the Government. AEGCL/APDCL follows all provisions of this rule for felling of trees from non-forest land.

3.1.3 FUNDING AGENCY:

For AEGCL/ APDCL, mandatory environment requirements with respect to WB Operational Policies (OP) are as follows:

• World Bank (WB) OP 4.01: Environmental Assessment

The policy objective is to ensure the environmental and social soundness and sustainability of investment projects and support integration of environmental and social aspects of projects in the decision-making process.

AEGCL/APDCL takes remedial measures to prevent, minimize, mitigate, or compensate for adverse impact and improve environmental performance. Environment Assessment will take into account the natural environment, human health and safety, and social aspects and trans- boundary and global environmental aspects. During EA process public is also informed at every stage of project execution and their views are considered during decision-making process.

• World Bank OP 4.04: Natural Habitats

The policy objective is to promote sustainable development by supporting the protection, conservation, maintenance, and rehabilitation of natural habitats and their functions.

• World Bank OP 4.11: Physical Cultural Resources

The policy objective is to preserve PCR and in avoiding their destruction or damage. PCR includes resources of archeological, paleontological, historical, architectural, and religious (including graveyards and burial sites), aesthetic, or other cultural significance.

• World Bank OP 4.36: Forests

The objective of this policy is to realize the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests.

3.2 SOCIAL

3.2.1 CONSTITUTIONAL PROVISIONS

Constitutional provisions in regard to social safeguards are well enshrined in the preamble such as **JUSTICE**, social, economic and political; **LIBERTY** of thought, expression, belief, faith and worship; **EQUALITY** of status and of opportunity; **FRATERNITY** assuring the dignity of the individual and the unity and integrity of the Nation. Fundamental Rights and Directive Principles guarantee the right to life and liberty. Health, safety and livelihood have been interpreted as part of this larger right. Social safeguards provisions are dealt in detail in different Article such as Article-14, 15 17, 23, 24, 25, 46, 330, 332 etc. AEGCL/APDCL shall implement the said constitutional provision in true sprit to fulfill its environmental and social obligations and responsibilities.

3.2.2 MANDATORY REQUIREMENTS (NATIONAL/STATE)

• The Right to Fair Compensation and Transparency in Land Acquisition Rehabilitation and Resettlement Act, 2013 (RFCTLARRA) :

Govt. of India replaced the old Land Acquisition Act, 1894 and notified the new RFCTLARRA, 2013 which came into force from 1st January 2014. This act ensures appropriate identification of the affected families/households, fair compensation and rehabilitation of titleholders and non-titleholders. However, the new act i.e. RFCTLARRA, 2013 authorizes State Govt. (i.e. GoA) or its authorized Government agency to complete the whole process of acquisition of private land including Social Impact Assessment (SIA), Action Plan for R&R (i.e. Rehabilitation and Resettlement) & its implementation and the AEGCL/ APDCL responsibility is limited to identification and selection of suitable land based on technical requirement and ensuring budget allocation.

• Rights of Way and Compensation under Electricity Act, 2003:

The Electricity Act, 2003 has a provision for notifying transmission company under section 164 (B) to avail benefits of eminent domain provided under the Indian Telegraph Act, 1885. Under this section AEGCL/ APDCL may seeks for GoA authorisation to exercise all the powers that the Telegraph authority possesses and can spot, construct and erect towers without acquiring the land. Moreover, all damages due to its activity shall be compensated at market rate. In case of agricultural or private land the provisions of section- 67 and or section-68 (5 & 6) of the Electricity Act, 2003 and section-10 of the Indian Telegraph Act, 1885 are followed for assessment and payment of compensation towards such damages

3.2.3 FUNDING AGENCY

For AEGCL/ APDCL, mandatory social requirements with respect to WB Operational Policies are as follows:

• World Bank OP 4.12: Involuntary Resettlement

This policy covers direct economic and social impacts both resulting from Bankassisted investment projects, and are caused by the involuntary taking of land. To avoid or minimize involuntary resettlement and, where this is not feasible, assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

• World Bank OP 4.10: Indigenous People (IP)

This policy contributes to the Bank's mission of poverty reduction and sustainable development by ensuring that the development process fully respects the dignity, human rights, economies, and cultures of Indigenous Peoples. The objective is to design and implement projects in a way that fosters full respect for indigenous peoples" so that they receive culturally compatible social and economic benefits, and do not suffer adverse effects during the development process. The project shall ascertain broad community support for the project based on social assessment and free prior and informed consultation with the affected Tribal community, if any.

SECTION IV: APPROACH FOR ROUTE/SITE SELECTION

4.0 ROUTE SELECTION - (ASSESSMENT & MANAGEMENT PROCESS)

At the system planning stage itself one of the factors that govern the evolution of system is the possible infringement with the forest. Wherever such infringements are substantial, different alternative options are considered. The route/ site selection criteria followed is detailed below:

While identifying the transmission system, preliminary route selection is done by AEGCL/APDCL based on the Survey of India Topo sheets, Forest Atlas (Govt. of India's Publication) and Google Maps etc. During route alignment all possible efforts are made to avoid the forest involvement completely or to keep it to the barest minimum, whenever it becomes unavoidable due to the geography of terrain or heavy cost involved in avoiding it. *Presence of important/protected natural habitats (IUCN category I - IV) is verified by superimposing the proposed alternative alignment on the Integrated Biodiversity Assessment Tool (IBAT¹) map*

4.1 STUDY OF ALTERNATIVES

4.1.1 ENVIRONMENTAL CRITERIA FOR ROUTE SELECTION

For selection of optimum route, the following points are taken into consideration:

- (i) The route of the proposed transmission lines does not involve any human rehabilitation
- (ii) Any monument of cultural or historical importance is not affected by the route of the transmission line.
- (iii) The proposed route of transmission line does not create any threat to the survival of any community with special reference to Tribal Community.
- (iv) The proposed route of transmission line does not affect any public utility services like playgrounds, schools, other establishments etc.
- (v) The line route does not pass through any National Parks, Sanctuaries etc.
- (vi) The line route does not infringe with area of natural resources.

In order to achieve this, AEGCL/APDCL undertakes route selection for individual transmission and distribution lines in close consultation with representatives of concerned Forest Department and the Department of Revenue. Although under the law, AEGCL/APDCL has right of eminent domain yet alternative alignments are considered keeping in mind the above-mentioned factors during site selection, with minor alterations often added to avoid environmentally sensitive areas and settlements at execution stage.

¹ IBAT is a very informative decision-making tool to address possible infringement with potential biodiversity important areas and has been developed through a partnership of global conservation leaders including Bird Life International, Conservation International (CI), the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and the International Union for Conservation of Nature (IUCN) for conservation/protection of such areas

- As a rule, alignments are generally cited away from major towns, whenever possible, to account for future urban expansion.
- Similarly, forests are avoided to the extent possible, and when it is not possible, a route is selected in consultation with the local Divisional Forest Officer, that causes minimum damage to existing forest resources.
- Alignments are selected to avoid wetlands and unstable areas for both financial and environmental reasons.

In addition, care is also taken to avoid National parks, Sanctuaries, Eco-sensitive zones, Tiger reserves, Biosphere reserves, Elephant corridors and IBA sites etc. Keeping above in mind the routes of proposed lines under the project have been so aligned that it takes care of above factors. As such different alternatives for transmission lines were studied with the help of Govt. published data like Forest atlas, Survey of India and Google Maps etc.to arrive at most optimum route which can be taken up for detailed survey and assessment of environmental & social impacts for their proper management.

4.2 TRANSMISSION LINE

4.2.1 EVALUATION OF ALTERNATIVES ROUTE ALIGNMENT FOR 220 KV D/C RANGIA - AMINGAON TRANSMISSION LINE

Three different alignments **(Map-2)** were studied with the help of Google Maps and walkover survey to arrive at most optimum route for detailed survey. The comparative details of these three alternatives in respect of the proposed line are as follows:

S.N	Description	Alternative-I	Alternative-II	Alternative-III
1.	Route particulars			
i.	Route Length (km)	30	36.26	32.89
ii.	Terrain			
	Hilly	NIL	10%	NIL
	Plain	100%	90%	100%
2.	Environmental details		-	
i.	Name of District through which the line passes	Kamrup (Rural)	Kamrup (Rural)	Kamrup (Rural)
ii.	Town in alignment	Rangia	Rangia	Rangia
iii.	House within ROW	To be assessed during detail survey	To be assessed during detail survey	To be assessed during detail survey
iv.	Forest involvement in Ha/(km)	NIL	NIL	NIL
۷.	Type of Forest (RF/PF/Mangrove/Wil dlife Area/Elephant corridor/Biodiversity Hotspots/Biosphere Reserve/Wetlands or any other environmentally sensitive area.	N/A	N/A	N/A

S.N	Description	Alternative-I	Alternative-II	Alternative-III
vi.	Density of Forests	N/A	N/A	N/A
vii.	Type of flora	Bamboo (<i>Bambusa</i> balcooa), Paddy(<i>Oryza</i> sativa) Banana (<i>Musa acuminate</i>), Pineapple (<i>Ananas</i> comosus), Betel nut (<i>Areca catechu</i>), Tea (<i>Camellia</i> sinensis) etc	comosus), Betel	Bamboo (<i>Bambusa</i> <i>vulgaris</i>), Paddy(<i>Oryza sativa</i>) Banana (<i>Musa</i> <i>acuminate</i>), Pineapple (<i>Ananas</i> <i>comosus</i>), Betel nut (<i>Areca catechu</i>), Tea (<i>Camellia sinensis</i>) etc
viii.	Type of fauna	Assamese Macaque (<i>Macaca</i> <i>assamensis</i>), Grey Peacock Pheasant (<i>Polyplectron</i> <i>bicalcaratum</i>), Asian Toad(<i>Bufo</i> <i>melanostictus</i>) and <i>common fauna like</i> some species of Monkey also found	Assamese Macaque (<i>Macaca</i> <i>assamensis</i>), Grey Peacock Pheasant (<i>Polyplectron</i> <i>bicalcaratum</i>), Asian Toad(<i>Bufo</i> <i>melanostictus</i>) and <i>common fauna like</i> some species of	Assamese Macaque (<i>Macaca</i> <i>assamensis</i>), Grey Peacock Pheasant (<i>Polyplectron</i> <i>bicalcaratum</i>), Asian Toad(<i>Bufo</i> <i>melanostictus</i>) and <i>common fauna like</i> some species of Monkey also found
ix.	Endangered species, if any	NIL	NIL	NIL
х.	Historical/cultural monuments	NIL	NIL	NIL
3	Compensation Cost (i	n Lakhs)		3
i.	Crop (Non Forest)	Estimated @ Rs. 5 lakhs per Km	Estimated @ Rs. 5 lakhs per Km	Estimated @ Rs. 5 lakhs per Km
ii.	Forest (CA+NPV)	N/A	N/A	N/A
4.	No. of Crossings (Nos	.)		
i.	Highway (National/State)	1	NIL	
ii.	Power line	1	NIL	NIL
iii.	Railway line	1	NIL	1
iv.	River crossing	4	4	4
5.	Overall remarks	Preferred Route being shortest and is easily accessible due to its proximity to existing roads	Line length is longer as compared to Alt.1 & 3 and thus involve more tree felling	Relatively more in line length than Alt1 and route is not easily approachable

From the above comparison of the three (3) different alternatives, it is evident that although there is no forest involvement in all the three routes, Alternative- I is found to be shortest route and is easily accessible due to its proximity to existing roads and paths. Also, since route is shorter in length, it will involve minimum tree felling. Hence, lesser degree of environmental impacts as well as construction and O&M problems are anticipated. Hence, Alternative - I is considered as the most optimum route and recommended for detailed survey.

4.2.2 EVALUATION OF ALTERNATIVES ROUTE ALIGNMENT FOR 132 KV D/C AMINGAON - HAZO TRANSMISSION LINE.

Three different alignments **(Map-2)** were studied with the help of Google Maps and walkover survey to arrive at most optimum route for detailed survey. The comparative details of these three alternatives in respect of the proposed line are as follows:

S.N	Description	Alternative-I	Alternative-II	Alternative-III	
1.	Route particulars				
i.	Route Length (km)	Route Length (km) 18.49		19	
ii.	Terrain				
	Hilly	5%	5%	5%	
	Plain	95%	95%	95%	
2.	Environmental details				
i.	Name of District through which the line passes	Kamrup (Rural)	Kamrup (Rural)	Kamrup (Rural)	
ii.	Town in alignment	Hazo and Amingaon	Hazo and Amingaon	Hazo and Amingaon	
iii.	House within ROW	To be assessed during detail survey	To be assessed during detail survey	To be assessed during detail survey	
iv.	Forest involvement in Ha/(km)	NIL	NIL	NIL	
V.	Type of Forest (RF/PF/Mangrove/Wil dlife Area/Elephant corridor/Biodiversity Hotspots/Biosphere Reserve/Wetlands or any other environmentally sensitive area.	NIL	NIL	NIL	
vi.	Density of Forests	N/A	N/A	N/A	
vii.	Type of flora	Bamboo (Bambusa balcooa), Paddy(Oryza sativa) Banana (Musa acuminate), Pineapple (Ananas comosus), Betel nut (Areca catechu), Tea (Camellia sinensis) etc	Bamboo (Bambusa balcooa), Paddy(Oryza sativa) Banana (Musa acuminate), Pineapple (Ananas comosus), Betel nut (Areca catechu), Tea (Camellia sinensis) etc	Bamboo (<i>Bambusa</i> <i>balcooa</i>), Paddy(<i>Oryza</i> <i>sativa</i>) Banana (<i>Musa acuminate</i>), Pineapple (<i>Ananas</i> <i>comosus</i>), Betel nut (<i>Areca</i> <i>catechu</i>), Tea (<i>Camellia sinensis</i>) etc	

S.N	Description	Alternative-I	Alternative-II	Alternative-III	
viii.	Type of fauna	Assamese	Assamese	Assamese	
		Macaque	Macaque	Macaque (Macaca	
		(Macaca	(Macaca	assamensis), Grey	
		assamensis),	assamensis),	Peacock Pheasant	
		Grey Peacock	Grey Peacock	(Polyplectron	
		Pheasant	Pheasant	bicalcaratum),	
		(Polyplectron	(Polyplectron	Asian Toad(Bufo	
		bicalcaratum),	bicalcaratum),	melanostictus) and	
		Asian Toad(Bufo	Asian Toad(Bufo	common fauna like	
		melanostictus)	melanostictus)	some species of	
		and common	and common	Monkey also found	
		fauna like some	fauna like some		
		species of	species of		
		Monkey also	Monkey also		
		found	found		
ix.	Endangered	NIL	NIL	NIL	
	species, if any				
Х.	Historical/cultural	NIL	NIL	NIL	
	monuments				
3	Compensation Cost (i				
i.	Crop (Non Forest)	Estimated @	Estimated @ Rs.	Estimated @ Rs. 5	
		Rs. 5 lakhs	5 lakhs per Km	lakhs per Km	
		per Km			
ii.	Forest (CA+NPV)	N/A	N/A	N/A	
4.	No. of Crossings (Nos				
i.	Highway (National/State)	2	2	2	
ii.	Power line	NIL	NIL	NIL	
iii.	Railway line	1	1	1	
iv.	River crossing	NIL	NIL	NIL	
5.	Overall remarks	Preferred Route	Line length is	Relatively more in	
	Overall remarks				
	Overall remarks	being shortest in	longer as	line length than	
			longer as compared to Alt.1	line length than Alt1 and route is	
		being shortest in	-		
		being shortest in line length and	compared to Alt.1	Alt1 and route is	
		being shortest in line length and mostly passing	compared to Alt.1 & 3 and thus	Alt1 and route is not easily	

From the above comparison of the three different alternatives, it is evident that there is no forest involvement in all the three routes. However, Alternative- I is found to be shortest route and is easily accessible due to its proximity to existing approach roads as compared to other two alternatives. Hence, lesser degree of construction and O&M problems are anticipated. Also, since route is shorter in length and mostly passing through paddy fields, it will involve minimum tree felling. Hence, Alternative - I is considered as the most optimum route and recommended for detailed survey.

4.2.3 EVALUATION OF ALTERNATIVES ROUTE ALIGNMENT FOR 132 KV D/C SONABIL - TEZPUR TRANSMISSION LINE.

Three different alignments **(Map-3)** were studied with the help of Google Maps and walkover survey to arrive at most optimum route for detailed survey. The comparative details of these three alternatives in respect of the proposed line are as follows:

S.N	Description	Alternative-I	Alternative-II	Alternative-III
1.	Route particulars			
i.	Route Length (km)	13.33	15	16
ii.	Terrain			
	Hilly	NIL	NIL	NIL
	Plain	100%	100%	100%
2.	Environmental details			
i.	Name of District through which the line passes	Sonitpur	Sonitpur	Sonitpur
ii.	Town in alignment	Tezpur	Tezpur	Tezpur
iii.	House within ROW	To be assessed during detail survey	To be assessed during detail survey	To be assessed during detail survey
iv.	Forest involvement in Ha/(km)	NIL	NIL	NIL
v.	Type of Forest (RF/PF/Mangrove/ Wildlife Area/ Elephant corridor/ Biodiversity Hotspots/Biosphere Reserve/Wetlands or any other environmentally sensitive area.	NIL	NIL	NIL
vi.	Density of Forests	N/A	N/A	N/A
vii.	Type of flora	Bamboo (<i>Bambusa</i> <i>balcooa</i>), Paddy(<i>Oryza</i> <i>sativa</i>) Banana (<i>Musa</i> <i>acuminate</i>), Pineapple (<i>Ananas</i> <i>comosus</i>), Betel nut (<i>Areca</i> <i>catechu</i>), Tea (<i>Camellia</i>	Bamboo (<i>Bambusa</i> <i>balcooa</i>), Paddy(<i>Oryza</i> <i>sativa</i>) Banana (<i>Musa</i> <i>acuminate</i>), Pineapple (<i>Ananas</i> <i>comosus</i>), Betel nut (<i>Areca</i> <i>catechu</i>), Tea (<i>Camellia</i>	Bamboo (<i>Bambusa</i> <i>balcooa</i>), Paddy(<i>Oryza</i> <i>sativa</i>) Banana (<i>Musa acuminate</i>), Pineapple (<i>Ananas</i> <i>comosus</i>), Betel nut (<i>Areca</i> <i>catechu</i>), Tea (<i>Camellia sinensis</i>) etc

S.N	Description	Alternative-I	Alternative-II	Alternative-III	
viii.	Type of fauna	Assamese	Assamese	Assamese Macaque	
		Macaque (<i>Macaca</i>	Macaque (Macaca	(Macaca	
		assamensis), Grey	assamensis), Grey	assamensis), Grey	
		Peacock Pheasant	Peacock Pheasant	Peacock Pheasant	
		(Polyplectron	(Polyplectron	(Polyplectron	
		bicalcaratum),	bicalcaratum),	<i>bicalcaratum</i>), Asian	
		Asian Toad(Bufo	Asian Toad(Bufo	Toad(Bufo	
		melanostictus) and	melanostictus) and	melanostictus) and	
		common fauna like	common fauna like	common fauna like	
		some species of	some species of	some species of	
· ·	Frederic and a	Monkey also found			
ix.	Endangered	NIL	NIL	NIL	
	species, if any	N III	N III	- NUL	
Х.	Historical/cultural	NIL	NIL	NIL	
	monuments				
3	Compensation Cost (i				
i.	Crop (Non Forest)	Estimated @ Rs. 5	Estimated @ Rs.	Estimated @ Rs.	
		lakhs per Km	5 lakhs per Km	5 lakhs per Km	
ii.	Forest (CA+NPV)	N/A	N/A	N/A	
4.	No. of Crossings (Nos	5.)			
i.	Highway (National/State)	NIL	NIL	NIL	
ii.	Power line	3	3	3	
iii.	Railway line	NIL	NIL	NIL	
iv.	River crossing	2	2	2	
5.	Overall remarks	Preferred Route as	Relatively more in	Line length is longer	
		the line length is	line length	and thus involve	
		shorter and better		more tree felling	
		accessibility			

It is vivid from the above comparison that none of the three Alternatives involve any forest area. However, Alternative I is the shortest route and has better accessibility. It also passes mostly through paddy fields. Hence, lesser degree of tree felling and ROW problems are anticipated. Therefore, Alternative I is found to be the most optimum route and recommended for detail survey.

4.3. DISTRIBUTION LINES

4.3.1 EVALUATION OF ALTERNATIVES ROUTE ALIGNMENT FOR 33 KV LINE FROM 132/33 KV HAZO (EXISTING) SUBSTATION TO 33/11 KV MUKALMUWA (EXISTING) SUBSTATION

Three (3) different alignments **(Map- 4)** were studied with the help of Google Maps and walkover survey to arrive at most optimum route for detailed survey. The comparative details of these three alternatives in respect of the proposed line are as follows:

S.N	Description	Alternative-I	Alternative-I Alternative-II				
1.	Route particulars (BEE LINE LENGTH :- 18.62 KM)						
i.	Route Length (km)	21.1	22	22.56			

S.N	Description	Alternative-I	Alternative-II	Alternative-III
ii.	Terrain			
	Hilly	NIL	NIL	NIL
	Plain	100%	100%	100%
2.	Environmental details			
i.	Name of District/District details through which the line passes	Kamrup (Rural)	Kamrup (Rural)	Kamrup (Rural)
ii.	Town in alignment	Hazo & Mukalmuwa	Hazo & Mukalmuwa	Hazo & Mukalmuwa
iii.	House within ROW			
iv.	Forest involvement in Ha/(km)	NIL	NIL	NIL
V.	Type of Forest (RF/PF/Mangrove/Wil dlife Area/Elephant corridor/Biodiversity Hotspots/Biosphere Reserve/Wetlands or any other environmentally sensitive area.	NIL	NIL	NIL
vi.	Density of Forests	N/A	N/A	N/A
vii.	Type of flora	Bamboo (<i>Bambusa</i> <i>balcooa</i>), Paddy(<i>Oryza</i> <i>sativa</i>) Banana (<i>Musa acuminate</i>), Pineapple (<i>Ananas</i> <i>comosus</i>), Betel nut (<i>Areca</i> <i>catechu</i>), Tea (<i>Camellia</i> <i>sinensis</i>) etc	Bamboo (<i>Bambusa</i> <i>balcooa</i>), Paddy(<i>Oryza</i> <i>sativa</i>) Banana (<i>Musa acuminate</i>), Pineapple (<i>Ananas</i> <i>comosus</i>), Betel nut (<i>Areca</i> <i>catechu</i>), Tea (<i>Camellia sinensis</i>) etc	Bamboo (<i>Bambusa</i> <i>balcooa</i>), Paddy(<i>Oryza sativa</i>) Banana (<i>Musa</i> <i>acuminate</i>), Pineapple (<i>Ananas</i> <i>comosus</i>), Betel nut (<i>Areca catechu</i>), Tea (<i>Camellia</i> <i>sinensis</i>) etc
viii.	Type of fauna	Assamese Macaque (<i>Macaca</i> <i>assamensis</i>), Grey Peacock Pheasant (<i>Polyplectron</i> <i>bicalcaratum</i>), Asian Toad(<i>Bufo</i> <i>melanostictus</i>) and <i>common fauna like</i> Fox, Monkey also found	Assamese Macaque (<i>Macaca</i> <i>assamensis</i>), Grey Peacock Pheasant (<i>Polyplectron</i> <i>bicalcaratum</i>), Asian Toad(<i>Bufo</i> <i>melanostictus</i>) and <i>common fauna like</i> Fox, Monkey also found	Assamese Macaque (Macaca assamensis), Grey Peacock Pheasant (Polyplectron bicalcaratum), Asian Toad(Bufo melanostictus) and common fauna like Fox, Monkey also found
ix.	Endangered species, if any	NIL	NIL	NIL

S.N	Description	Alternative-I	Alternative-II	Alternative-III
Х.	Historical/cultural monuments	NIL	NIL	NIL
3	Compensation Cost (i	n Lakhs)		
i.	Crop (Non Forest)	Estimated @ Rs. 0.5 Lakhs/ Km	Estimated @ Rs. 0.5 Lakhs/ Km	Estimated @ Rs. 0.5 Lakhs/ Km
ii.	Forest (CA+NPV)	N/A	N/A	N/A
4.	No. of Crossings (Nos	.)		
i.	Highway (National/State)	1	NIL	1
ii.	Power line	1	1	1
iii.	Railway line	NIL	NIL	NIL
iv.	River crossing	3	3	3
5.	Overall remarks	Preferred Route being shortest involving minimum tree felling and is easily accessible due to its proximity to existing village/state roads	accessibility	Line length is longer and thus involve more tree felling

From the above comparison of the three different alternatives, it is evident that although there is no forest involvement in all the three routes, Alternative- I is found to be shortest route involving minimum tree felling and is easily accessible due to its proximity to existing village/state roads as compared to other two alternatives. As lesser degree of environmental impacts as well as construction and O&M problems is anticipated, Alternative-I is considered as the most optimized route and recommended for detailed survey.

4.3.2 EVALUATION OF ALTERNATIVES ROUTE ALIGNMENT FOR 33 KV LINE FROM 132/33 KV TANGLA (NEW) SUBSTATION TO 33/11 KV KHAIRABARI (EXISTING) SUBSTATION

Three (3) different alignments **(Map- 5)** were studied with the help of Google Maps and walkover survey to arrive at most optimum route for detailed survey. The comparative details of these three alternatives in respect of the proposed line are as follows:

S.N	Description	Alternative-I	Alternative-II	Alternative-III					
1.	Route particulars (B	Route particulars (BEE LINE LENGTH:- 13.06 KM)							
i.	Route Length (km)	13.79	14.03	14.42					
ii.	Terrain								
	Hilly								
	Plain	100%	100%	100%					
2.	Environmental detail	S							
i.	Name of District through which the line passes	Udalguri	Udalguri	Udalguri					

S.N	Description	Alternative-I	Alternative-II	Alternative-III	
ii.	Town in alignment	Tangla and Khairabari	Tangla and Khairabari	Tangla and Khairabari	
iii.	House within ROW	To be assessed during detail survey	To be assessed during detail survey	To be assessed during detail survey	
iv.	Forest involvement in Ha/(km)		NIL	NIL	
v.	Type of Forest (RF/PF/Mangrove/W ildlife Area/Elephant corridor/Biodiversity Hotspots/Biosphere Reserve/Wetlands or any other environmentally sensitive area.	NIL	NIL	NIL	
vi.	Density of Forests	N/A	N/A	N/A	
vii.	Type of flora	Mostly paddy/crops	Mostly paddy/crops/Trees	Mostly paddy/crops/Trees	
viii.	Type of fauna				
ix.	Endangered species, if any	NIL	NIL	NIL	
Х.	Historical/cultural monuments	NIL	NIL	NIL	
3	Compensation Cost	(in Lakhs)			
i.	Crop (Non Forest)	Estimated @ Rs. 0.5 lakhs / KM	Estimated @ Rs. 0.5 lakhs / KM	Estimated @ Rs. 0.5 lakhs / KM	
ii.	Forest (CA+NPV)	N/A	N/A	N/A	
4.	No. of Crossings (No	os.)			
i.	Highway (National/State)	2	2	2	
ii.	Power line	NIL	NIL	NIL	
iii.	Railway line	NIL	NIL	NIL	
iv.	River crossing	2	2	2	
5.	Overall remarks	Preferred Route being shortest involving minimum tree felling and is easily accessible due to its proximity to existing village/state roads	Relatively more in line length and difficult in accessibility	Line length is longer and thus more tree felling is anticipated	

As it is evident from the above discussions that Alternative I is the shortest among all the three routes studied, though none of the routes involve any forest area. Additionally, Alternative I also enjoys better accessibility due to its proximity to village roads and lesser degree of ROW problems are expected in case of Alternative I. Hence, Alternative I is found to be most optimum and recommended for detail survey.

4.4 SUBSTATION:

For substation site selection also analysis of 2-3 alternatives sites is generally carried out based on environment and social aspects and technical requirement. Such analysis considers various site specific parameters that include availability of infrastructure facilities such as access roads, water, distance from railheads, type of land (Government/ revenue/private land); social impacts such as number of families getting affected; Common Property Resources (CPR) including feasibility of acquisition. The finalization of substation land is done based on above analysis and site visit/verification. The social aspects are provided due weightage after technical requirement in decision making for selection/finalization of land for substation.

It may be noted that in the instant case land for all the proposed substations are either in possession AEGCL/APDCL or identified for purchase on willing sellerwilling buyer basis and therefore, the said exercise is not of so relevant for proposed project as the consent of owner is major criterion in addition to technical feasibility. As per the provisions of ESPPF, all land donations² and direct purchases will be subject to a review/ approval by a broad based committee comprising representatives of different sections including those from the IA and GoA.

S.	Name of	Area	Location	Surrounding	Accessibility	Land
N	Substation	(acre)		j		Status
1	220/132 KV (New) substation at Amingaon (GIS)	2.89	The proposed land is located at Katamura Gaon under Sangsari Police Station under Kamrup (Rural) district. Location is Appx. 2 Km from the DC Office, Kamrup (Rural) <i>Co-ordinates:</i> 26°14'11.77"N 91°42'19.99"E	Surrounding land-use is mostly intended for Industrial purpose. Katamura village with some habitation is on the North Western side of the site.	The plot is adjacent to existing PWD road which meets the NH 31 at Sangsari Rly crossing. The road is a well maintained single lane road. However, from the proposed plot, development of the existing approach road (<i>appx.</i> 100/150 meter) will be required.	
2	132/33 KV (New) substation at Hazo	4.96	The proposed land is located at Kulhati along the Kulhati- Bongsar PWD road. The location is appx 4/5 Km from the main Hazo	The land use surrounding the proposed substation site is mostly agriculture field. However some sparse habitation is found on the southern side.	Location is just adjacent to existing Kulhati-Bongsar PWD road. However, appx. 50 meter approach road may be required.	Acquisition of land under progress through willing buyer- willing seller basis.

Table 4.1: Status of land availability for proposed Substations

² Not applicable in the instant case

			town/market			[]
			area. Co-ordinates: 26°13'31.30"N 91°34'24.39"E			
3	132/33 KV (New) substation at Tangla	2.96	The proposed land is located at Uttar Jangalpara village which is appx 3 KM from the Tangla Rly Station. <i>Co-ordinates:</i> 26°40'22.34"N 91°55'48.38"E	The land use surrounding the proposed substation site is mostly agriculture field. However some sparse habitation is found on the SW side.	Location is just adjacent to Tangla College PWD Road. However, development of appx. 50 meter approach road may be required	Acquisition of land under progress through willing buyer- willing seller basis.
4	132/33 KV (New) substation at Tezpur	2.96	The proposed land is located at Jahaj duba gaon under Tezpur Revenue Circle, Dist: Sonitpur. <i>Co-ordinates:</i> 26°41'12.78"N 92°50'39.33"E	The land use surrounding the proposed substation site is mostly agriculture field. However some sparse habitation is found on the Northern side.	Location is adjacent to existing Panchmile-Napam PWD road. However, appx. 200 meter approach road may be required as per site assessment.	Acquisition of land under progress through willing buyer- willing seller basis.
5	Augmentatio n of 220/132 KV substation (Existing) at Rangia		Existing Rangia Substation under Kamrup (Rural) district.	NA	NA	Land in possession of AEGCL
6	Augmentatio n of 132/33 KV substation (Existing) at Sonabil		Existing Sonabil Substation under Sonitpur district.	NA	NA	Land in possession of AEGCL
7	33/11kV (New) substation at Sessa	0.66 acre	The proposed land is located at Abhoypur village under Hajo Revenue Circle, Kamrup (Rural) district. <i>Co-ordinates:</i> 26°15'50.10"N 91°35'35.27"E	The land use surrounding the proposed substation site is mostly agriculture field. An electrical conductor /galvanized pole manufacturing company is	Location is just adjacent to the village gravel road which meets the Abhoypur- Damdoma PWD road at 1 KM in the western side of the plot. However, 50 meter approach road is required to be developed.	Acquisition of land under progress through willing buyer- willing seller basis.

				situated		
8		0.00	The proposed	nearby.	Leastien is just	Assuisities
0	33/11 kV (New) substation at Ramdia	0.66 acre	The proposed land is located in the Ramdia area near the Ramdia PHC. appx. 4.7 km from the Hajo main market area. <i>Co-ordinates:</i> 26°13'34.07"N 91°29'13.71"E	The land use surrounding the proposed substation site is agricultural field on the southern side and sparse habitation on the Northern and Eastern side.	Location is just adjacent to existing Rabitilar-Bamundi road which meets the Hazo-Bamundi road at about 1 KM. Approach road of 50 meter may be required	Acquisition of land under progress through willing buyer- willing seller basis.
Ø	33/11 kV (New) substation at Damdama	0.66 acre	The proposed land is located at Damdama area under Hajo Revenue Circle under Kamrup (Rural) district. <i>Co-ordinates:</i> 26°14'58.61"N 91°34'18.98"E	The land use surrounding the proposed substation site is mostly habitated area along the Hajo- Guwahati road. The Hajo Guwahati road is on the Northern side.	Location is just adjacent to the Barpeta-Hajo- Guwahati road. Appx. 50 meter additional approach road may be required	Acquisition of land under progress through willing buyer- willing seller basis.
1 0	33/11 kV (New) substation at Harisinga	0.66 acre	The proposed land is located at Niz- Harisinga village, appx 1.3 KM from Harisinga Rly Station in Udalguri district, Assam. <i>Co-ordinates:</i> 26°44'12.60"N 91°59'25.24"E	The land use surrounding the proposed substation site is mostly vacant land on the eastern side. A Government Hospital is under construction in the adjoining plot. Some sparse habitation exists on the western side of the plot.	Location is just adjacent to the Tangla-Udalguri PWD road. However, appx. 100 meter additional approach road may be required	Acquisition of land under progress through willing buyer- willing seller basis.
1	33/11 kV (New) substation at LGM Hospital	0.66 acre	The proposed land is located near the Tezpur Town appx 400 metre from the LGM Hospital, Tezpur. <i>Co-ordinates:</i> 26°37'58.45"N 92°48'44.17"E	The land use surrounding the proposed substation site is mostly medium dense habitated area.	Location is just adjacent to the Dolabari-Kalibari PWD road which meets the NH 37 -A at appx. 1.4 KM. Appx. 50 meter additional approach road may be required	Acquisition of land under progress through willing buyer- willing seller basis.

12	Augmentati on of 132/33 KV substation (Existing) at Mookalmua	NA	Existing Mookalmua substation	NA	NA	Land in possession of APDCL
1 3	Augmentati on of 132/33 KV substation (Existing) at Parowa	NA	Existing Parowa substation	NA	NA	Land in possession of APDCL
1 4	Augmentati on of 132/33 KV substation (Existing) at Dolabari	NA	Existing Dolabari substation	NA	NA	Land in possession of APDCL
1 5	Augmentati on of 132/33 KV substation (Existing) at Tangla	NA	Existing tangla substation	NA	NA	Land in possession of APDCL
1 6	Augmentati on of 132/33 KV substation (Existing) at Khairaibari	NA	Existing Khairabari substation	NA	NA	Land in possession of APDCL
1 7	Augmentati on of 132/33 KV substation (Existing) at Kalaigaon	NA	Existing Kalaigaon substation	NA	NA	Land in possession of APDCL
1 8	Augmentati on of 132/33 KV substation (Existing) at Paneri	NA	Existing Paneri substation	NA	NA	Land in possession of APDCL

Further details about proposed substation land have been provided in Section -5.0 (i).

SECTION – V: POTENTIAL ENVIRONMENTAL IMPACT, THEIR EVALUATION AND MANAGEMENT

5.0 IMPACT DUE TO PROJECT LOCATION AND DESIGN

Environmental impacts of Transmission & Distribution (T & D) projects are not far reaching and are mostly localized to RoW (refer Table- 5.1). Actual 132 KV line including tower on ground along with RoW and extent of impact on land/vegetation is placed as Fig.-1 & 1a respectively while Fig.2 depicts the base of 33 kV distribution line (Single & H pole). However, T & D projects have some effects on natural and socio-culture resources. These impacts can be minimized by careful route selection. In order to get latest information and further optimization of route, modern survey techniques/tools like GIS, GPS are also applied. Introduction of GIS and GPS in route selection result in access to updated/latest information, through satellite images and further optimization of route having minimal environmental impact. Moreover, availability of various details, constraints like topographical and geotechnical details, forest and environmental details etc. help in planning the effective mitigative measures including engineering variations depending upon the site situation/location. In the instant scheme also these techniques are used and detail survey using GIS/GPS is under progress. Although, all possible measures have been taken during the finalization of route alignment for the proposed transmission lines but due to peculiarity of terrain and demography of the area where subprojects are being implemented, some environmental impacts may be there. The explanations in brief with regard to specific environment review criteria based on preliminary survey are as follows:

Transmission Voltage	Max. RoW (In Meters)	Min. Clearance (in Meters) between conductor & Trees	
220 kV	35	4.6	
132 kV	27	4.0	
33 KV	15	2.8	

Table- 5.1: Ro	Width &	Clearance	between	Conductors and	Trees
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As per IS:5613 and MoEF guidelines finalized in consultation with CEA

(i) Resettlement

Land is required for a) construction of substations and b) erection of transmission lines. In general requirement of land area for substation varies from 0.3 acres (for 33 kV) to 10 acres (132 kV) depending upon voltage levels and no. of bays.

In the instant scheme, land for augmentation of 220/132 kV substation at Rangia & augmentation of 132/33 kV substations located at Sonabil, Mukalmuwa, Parowa, Dolabari, Tangla, Khairabari, Kalaigaon and Paneri are already in possession with the AEGCL. However, fresh land will be required for establishment of new 220/132 kV GIS substation at Amingaon, 132/33 kV substations at Hazo, Tangla & Tezpur and 33/11 kV substations at Sessa, Ramdia, Damdama, Harisinga & LGM Hospital for which required land has already been identified by AEGCL/APDCL and negotiation process is presently underway with land owners for procurement of land on *"willing buyer willing seller"* basis on market/negotiated rate. Hence, R & R will not be an issue in the instant subprojects. Location details showing approach to site of proposed substations are enclosed as **Plate-1**.

In respect of (b), no permanent acquisition is envisaged. Land for tower and right of way is not acquired as agricultural activities can continue. A Typical plan of transmission line tower footing indicating the above position along with extent of damage and area of influence are depicted in **Fig.-3 & 3a** respectively. As described earlier all measures are undertaken by AEGCL at the line routing stage itself to avoid settlements such as cities, villages etc. It may be seen from the above description of proposed route alignments and also keeping in mind that no permanent acquisition of land is involved for tower foundation as per existing law, these subprojects don't require any resettlement of villagers. However, some temporary damages/ disturbances can happen. Same will be compensated by the project under Compensation Plan for Temporary Damage (CPTD) to minimize the damages and provide compensation plan for temporary damages in consultation with the state government and affected persons and/ or community.

The project is being implemented in Kamrup rural, Udalguri and Sonitpur districts. Udalguri is a part of BTAD (Bodoland Territorial Autonomous District) covered under sixth schedule (refer para-20 of ESPPF). *It may be noted that all social issues shall be dealt separately in accordance with the provisions of* **Social Management** *Framework*³ (*SMF, A-C*), placed in the ESPPF of AEGCL/APDCL.

(ii) Land value depreciation

Based on past experience land prices are generally expected to rise in the areas receiving power. Generally transmission lines pass through uninhabited area, agriculture fields and forests, where the land use is not going to change in foreseeable future. Therefore, the value of land will not be adversely affected to a significant degree. However, distribution lines are primarily intended to provide power supply to populated area which will boost the economic status as well as land price of the area, thus, outweighing possible negative impacts, if any.

(iii) Historical/cultural monuments/value

As per the policy of route selection, only that route alignment is finalized which avoids all the historical and cultural monuments. As per the preliminary assessment carried out during finalization of route alignment in consultation with State revenue authorities and Archaeological Survey of India (ASI), no such monuments are coming in the proposed route alignments. Moreover, utmost care shall be taken during detailed survey to avoid such areas. However, during excavation, if any treasure, archaeological artifacts are found the same shall be intimated in writing to Collector/Archaeology department as per the provisions of Section-4 of "Indian Treasure Trove Act, 1878 as amended in 1949". The Collector shall initiate further action for its safe custody or its shifting to Treasury/ Secure place. The construction activity may be suspended temporarily during this process.

_(iv) Lines into precious ecological areas

As already explained all precautions have been taken to avoid routing of line through forest and protected areas like national park/sanctuaries. In the instant scheme the route of the lines have been selected in such a way that there is no forest area

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³ SMF has 3 main elements: One, RAP for involuntary land acquisitions; Two, CPTD for poles/ towers; and Three, Tribal People Development Framework

involvement along the corridors. Moreover, suitable management measures as specified in EMP⁴ (refer clause- 9) like minimizing RoW requirement, use of existing tower, use of tall or extended tower etc, wherever feasible, will be undertaken to minimize the loss of vegetation. Further, protected area like wildlife sanctuary, national parks, biosphere reserves etc. have also been avoided completely. However, reference in EMP is maintained to address the issues in case of any eventuality and shall be appropriately addressed during Final Environment Assessment Report (FEAR).

(v) Lines into other valuable lands

Impacts on agricultural land will be restricted to the construction phase and when large-scale maintenance measures are required. The proposed transmission line will pass mostly through agricultural fields. As per existing law, land for tower/pole and right of way is not acquired and agricultural activities are allowed to continue after construction activity and AEGCL/APDCL pays compensation for all damages including cost of land below tower to its owner.

In areas where transmission lines will traverse through agricultural land, compensation will be paid to owners for any crop damage incurred as a result of construction activities. AEGCL/APDCL field staff will consult affected villagers and local revenue dept. and apprise them about the project and tower location, which shall be erected in the agricultural land, for compensation. Revenue dept. after evaluating the land loss due to construction activity and crop damages based on productivity of land arrives at the compensation cost which is paid to farmer. Agricultural activities will be allowed to continue following the construction period. If bunds or other on-farm works are disturbed during construction or maintenance, they will be restored to the owner's satisfaction following cessation of construction or maintenance activities. In the event that private trees are felled during construction or maintenance operations, compensation will be paid to the owner in an amount determined by the estimated loss of products from the tree over an eight year period (for fruit bearing trees). Agricultural lands under private ownership will be identified, and compensation will be paid to the affected villagers as per the entitlement matrix of CPTD as described in Annexure -3 (Part-B) of the ESPPF. The procedure for providing compensation is described in Annexure-3. Budgetary provision of Rs. 435.26 lakhs is made in the cost estimate to meet these expenses.

(vi) Interference with other utilities and traffic

As per regulations enacted by Government of India, it is mandatory for AEGCL/ APDCL to seek clearance prior to construction from department of Railways, Telecommunications and wherever necessary from aviation authorities that are likely to be affected by the construction of transmission & distribution lines. The transmission & distribution lines affect nearby telecommunication circuits by causing electrical interference. A standing committee -- Power Telecom Co-ordination Committee (P.T.C.C.) has been constituted by Government of India to plan and implement the mitigating measures for the induced voltage which may occur to nearby telecom circuit and suggest necessary protection measures to be adopted. The committee suggests measures like rerouting of the telecom circuits, conversion of overhead telecom circuits into cables etc. to minimize the interference.

⁴ Environment Management Plan (EMP) is placed at Table -6.1

The cost of such measures is determined by the Committee on the basis of prevailing norms and guidelines. Though the exact cost to mitigate the impacts of induction in neighboring telecom circuits would vary from case to case, the cost on an average works out to be Rs.50000/- per km. Provision to meet these expenses has been made in the cost estimate for the same for transmission line proposed under the instant scheme.

NH-31 and NH-37 A are the main roads, which connect the subproject locations through various state, district and village roads. NH-31 is an important National Highway, which provides a gateway to the states of North East. NH-37 A starts from Kuwarital in Assam and ends at junction of NH-52 near Tezpur in Assam. The volume of traffic on these roads found to be medium. Therefore, we don't foresee any steep rise in volume of traffic due to mobilization for said projects.

Wherever transmission & distribution line crosses the railways, clearance is taken from that department. In general, the system is planned and executed in such a way that adequate clearance is maintained between transmission lines on the one hand, and railways, civil aviation and defense installations on the other. Wherever the transmission lines pass by the airports the towers beyond specified height are painted in alternate orange and white stripes for easy visibility and warning lights are placed atop these towers.

(vii) Interference with drainage pattern

As the transmission lines are constructed aerially and the blockage of ground surface is limited to area of tower footings, which is very small, there is little possibility of affecting drainage pattern. However, management measures as specified in EMP (refer clause - 5 & 12) like appropriate siting of towers shall be undertaken during detailed alignment survey and design to avoid any incidence of flooding hazards of loss of agricultural production due to interference with drainage patterns or irrigation channels. In the infrequent instances where the natural flow/drainage is affected, flow will be trained and guided to safe zones. In the instant scheme, 11 numbers of river crossings are involved on various rivers. All possible efforts shall be made to avoid placing of tower in the river bed while crossing the river. In case complete avoidance is not possible, due precaution to minimize impact on river ecology shall be undertaken. We don't foresee any major impact on river ecology and on aquatic flora & flora as the construction phase of such activity shall be limited to some days. Apart from these measures like construction during lean period, dredging by using anti-turbidity technology, driven precast pile technique etc. shall be used to reduce all possible impact on aquatic flora and fauna. Since all proposed substations are located in plane terrain, no affect on drainage of the area is envisaged particularly with adequate arrangement of drainage built in all substation design.

5.1 ENVIRONMENTAL PROBLEMS DUE TO DESIGN

(i) Escape of polluting materials

The equipments installed on lines and substations are static in nature and do not generate any fumes or waste materials. However, detailed specification with respect to equipment design and substation sewage design has been included in tender document to avoid any incidence of land and water contamination. Apart from this, solid waste like packing materials, cables, aluminium conductor, sand, aggregate material, cements and steel generated during construction is carefully handled and removed from site.

(ii) Explosion/fire hazards

During the survey and site selection for transmission lines, and substations, it has been ensured that these are kept away from oil/gas pipelines and other sites with potential for creating explosions or fires. Fires due to flashover from lines can be a more serious problem in forest. However, adequate safety measures shall be taken to avoid such incidence and has been included in EMP (refer clause - 15, 23 & 52). Besides this forest authorities also incorporate measures like making fire lines to prevent spreading of fire in the affected forest area. Apart from this, states of art safety instruments are installed in the substations on both the ends so that line gets tripped within milliseconds in case of any fault.

(iii) Erosion hazards due to inadequate provision for resurfacing of exposed area

Construction of 220 kV/132kV line involves only small scale excavation of area i.e. 3m L x 3m W x 3m H for tower footing that may result in generation of 108 m3 of excavated material from each tower. In case of 220/132 kV & 132/33 kV substation foundation, excavation of soil to the tune of 7500 m3 is required depending on site condition. Similarly, in case of 33 KV line, soil excavation is limited to 0.72 m3 for each pole, and for 33/11 KV substation, excavation of around 2000 m3 is required. It is estimated that a total of approx. 61982 m3 (234x108 + 7500 X4 + 987 x 0.72 + 5X 2000) of excavated materials will be generated for construction of 234 nos of tower, 1 no of 220/132 KV substation, 3 nos of 132/33 KV substation, 987 nos of poles and 5 nos of 33/11 KV substations proposed under present scheme. However, most of these excavated materials (about 80-90%) will be used for re-filling after construction work is over and remaining materials will be disposed properly as detailed out in EMP(refer clause - 25, 26 & 28). Moreover, the topsoil disturbed during the development of sites will be stored properly and used to restore the top surface of the platform. Left over infertile and rocky material will be dumped at carefully selected dumping areas and used as fill for foundations and leveling. Further, excavation in the hilly areas is avoided in rainy days. In hill slopes and erosion prone soils, internationally accepted engineering practices including bio-engineering techniques, wherever, feasible shall be undertaken to prevent soil erosion thereby reducing the possibility of any erosion of exposed area due to construction activity.

(iv) Environmental aesthetics

Since spacing between the towers/poles in case of 220/132 kV transmission & 33 kV distribution lines is approx. 300 meters and 100 meters respectively, these will not affect the visual aesthetics of the localities particularly when it is ensured to route the lines as far away from the localities as possible. AEGCL/APDCL takes up plantation of trees to buffer the visual effect around its substations and to provide better living conditions. Wherever AEGCL/APDCL feels it appropriate, discussions will be held with local Forest Department officials to determine feasibility of planting trees along roads running parallel to transmission lines to buffer visual effect in these areas. In addition, towers may be painted grey or green to merge with the background.

(v) Noise/vibration nuisances

The equipment installed at substation are mostly static and are so designed that the noise level always remains within permissible limits i.e. 85 dB as per Indian

standards. The noise levels reported during normal operating conditions are about 60 to 70 dB at 2 m. distance from the equipment. To contain the noise level within the permissible limits whenever noise level increases beyond permissible limits, measures like providing sound and vibration dampers and rectification of equipment are undertaken. In addition, plantations of sound absorbing species like Casuarinas, Tamarind, and Neem are raised at the substations that reduce the sound level appreciably.

(vi) Blockage of Wildlife passage

The proposed transmission & distribution lines are passing mostly through agricultural land, wasteland etc. Since there are no protected areas, migration path of wildlife like elephant corridors exist near the subproject locations, possibility of any disturbance to wild life is not anticipated. Another phenomenon reported in some places viz. Bird hit/electrocution by electric lines during landing and takeoff near the water bodies, fly path of birds is also not envisaged in the instant case due to routing of line away from such areas.

5.2 ENVIRONMENTAL PROBLEMS DURING CONSTRUCTION PHASE

(i) Uncontrolled silt runoff

As already explained, during construction limited quantity of excavated material will be generated from tower/pole foundations and substation foundation. However, adequate measures shall be taken to store excavated materials properly for refilling after construction is over. In hill slopes and erosion prone soils, internationally accepted engineering practices including bio-engineering techniques, wherever, feasible shall be undertaken to prevent soil erosion. Moreover, excavation in the hilly areas is avoided in rainy days. Hence, uncontrolled silt run off is not anticipated.

(ii) Nuisance to nearby properties

As already described in preceding paras, during site selection due care is taken to keep the lines and substations away from settlements. Further, all the construction activities will be undertaken through the use of small mechanical devices e.g. tractors and manual labour, therefore nuisance to the nearby properties if any, is not expected. Since all construction related activities for new substations shall be confined to existing substations which are already inaccessible for general public due to its separation/demarcation by the boundary wall. Moreover, such areas are declared as prohibited for general public as per the provisions of Electricity Act. Hence, any adverse impact arising during the construction of these substations will be temporary and limited to the boundaries of existing substations only and will neither impact nearby habitat/property nor health & safety of neighboring community

(iii) Interference with utilities and traffic and blockage of access way

Since all the locations of subprojects are not well connected through rail link, transportation of construction materials will be mostly through road network. Access to the site will be along existing roads or village paths; minor improvements to paths may be made where necessary, but no major construction of roads will be necessary either during construction or as a part of maintenance procedures. In case, access road is not available at some places, existing field/path may be utilized and compensation for any damage to crop or field is paid to the owner.

As and when a transmission line crosses any road/ railways line, adequate care/caution is taken so as not to cause any hindrance to the movement of traffic. Stringing at the construction stage is carried out during lean traffic period in consultation with the concerned authorities and angle towers are planted to facilitate execution of work in different stages. Apart from this, safety precaution like barricading of work area and placement of visible signage shall be undertaken to avoid any unforeseen incident.

(iv) Inadequate resurfacing for erosion control

Since, the towers/poles for the proposed transmission/distribution lines are to be constructed in plain areas; soil erosion will not be a major issue. If due to terrain at some points towers may be placed on slopes and erosion prone soils, internationally accepted engineering practices including bio-engineering techniques wherever feasible shall be undertaken to prevent soil erosion. This will include cutting and filling slopes wherever necessary. The back cut slopes and downhill slopes will be treated with revetments. As explained above adequate steps shall be taken to resurface the area after construction. Wherever sites are affected by active erosion or landslides, both biological and engineering treatment will be carried out, e.g. provision of breast walls and retaining walls, and sowing soil binding grasses around the site. Further, construction is generally undertaken in dry/non-monsoon period.

(v) Inadequate disposition of borrow area

As mentioned earlier the tower/pole foundations involve excavations on small scale basis and the excavated soil is utilized for back filling. In case of substations generally the sites are selected in such a manner that the volume of cutting is equal to volume of filling avoiding borrowing of the area. As such acquisition/opening of borrow area is not needed.

(vi) Protection of Worker's health/safety

All health and safety issues and its management aspects are integral part of project/contract specific safety plan (**Annexure- 4**) which is also part of contract condition. Various aspects such as work and safety regulations, workmen's compensation, insurance are adequately covered under the General Conditions of Contract (GCC), a part of bidding documents. Project is executed as per the approved plan and is regularly monitored by dedicated Safety personnel. Moreover, for strict compliance of safety standard/plan a special provision as a deterrent has been added in the contract which provides for a heavy penalty of Rs.10 lakhs for each accidental death and Rs1.0 lakh/each for any injury and is deducted from the contractor's payment and paid to the deceased/affected family (**Annexure - 5**).

AEGCL/APDCL maintains safety as а top priority and has framed guidelines/checklist for workers' safety as its personnel are exposed to live EHV apparatus and transmission/distribution lines. This guidelines/checklists include work permits and safety precautions for work on the transmission/distribution lines both during construction and operation (Annexure - 6) and is regularly monitored by site in-charge. In addition training is imparted to the workers in fire fighting and safety measures. Standard safety tools like helmet, safety belt, gloves etc. are provided to them in accordance to the provisions of Safety Rules. First aid facilities will be made available with the labour gangs, and doctors called in from nearby towns when necessary. The number of outside (skilled) labourers will be quite small, of the order of 25-30 people per group and remaining workforce of unskilled labourers will be comprised of mostly local people. As per policy/norms preference shall be given to the eligible local labor having required skills a specific clause has been incorporated in contract conditions (refer clause- 22.2.1 of GCC) for compliance of same by Contractor. Workers are also covered by the statutory Workmen (Compensation) Act. Regular health checkups are conducted for construction workers. The construction sites and construction workers' houses will be disinfected regularly if required. In order to minimize/checking of spread of socially transmitted diseases e.g. HIV/AIDS etc. AEGCL will conduct awareness building programs on such issues for the construction workers.

5.3 ENVIRONMENTAL PROBLEMS RESULTING FROM OPERATION

(i) **O&M Staff/Skills less than acceptable resulting in variety of adverse effects**

The O& M program is normally implemented by substation personnel for both the lines as well as substations. Monitoring measures employed include patrolling and thermo-vision scanning.

The supervisors and managers entrusted with O&M responsibilities are intensively trained for necessary skills and expertise for handling these aspects. A monthly preventive maintenance program will be carried out to disclose problems related to cooling oil, gaskets, circuit breakers, vibration measurements, contact resistance, condensers, air handling units, electrical panels and compressors. Any sign of soil erosion is also reported and rectified. Monitoring results are published monthly, including a report of corrective action taken and a schedule for future action.

AEGCL/APDCL follows the best international practices while designing its system to maintain acceptable prescribed EMF level. The approved international standards and design, which The ICNIRP guideline for the general public (up to 24 hours a day) is a maximum exposure level of 1,000 mG or 100 μ T. Further, because of issues relating to need to ensure health and safety relating to the line such as fire safety, safe voltages on metallic parts of buildings, and safety clearances to avoid flashover, the transmission lines will not pass directly over any residential properties and as such the potential for EMF effects to occur will be further diminished.

As regard control of SF6 leak it may be noted that present standard of SF6 gas leakage from GIS substation is 0.5% per year. This aspect has been adequately addressed in tender document under Clause 4.9 of Technical Specification Part-I:

"The maximum SF6 gas leakage shall not exceed 0.5% (half percent) per year for the whole equipment and for any individual gas compartment separately. The SF6 gas leakage should not exceed 0.5% per year and the leakage rate shall be guaranteed for at least 10 years".

Apart from this, SF6 management is also incorporated in EMP (refer clause - 45)

Poly Chlorinated Biphenyls (PCBs) due to their high heat capacity, low flammability and low electrical conductivity were extensively used as insulating material in capacitors and transformers. But after the finding that these PCBs are non-biodegradable and have carcinogenic tendency, its use in electrical equipments as insulating medium has been banned all over the world long back. However, it has

been reported in some studies that chances of contamination of oil with PCB is possible. Keeping that in mind, AEGCL/APDCL has discontinued procurement electrical equipments containing PCB more than 2 mg/kg and specification (as per IEC 61619 or ASTM D4059) is being stated in the tender document. Moreover, the subject scheme doesn't involve replacement of any PCB containing equipment, hence no disposal of such equipment is anticipated.

5.4 CRITICAL ENVIRONMENTAL REVIEW CRITERIA

(i) Loss of irreplaceable resources

The T & D projects do not involve any large scale excavation. In transmission line land is affected to the extent 144 sq. m below the tower base for which compensation is paid to land owner. However, loss of land is insignificant due to erection of pole for distribution line. Moreover, the subject transmission and distribution lines are not passing through any forest area; hence the problem of losing natural resources is not envisaged.

(ii) Accelerated use of resources for short-term gains

The subprojects will not be making use of any natural resources occurring in the area during construction as well as maintenance phases. The construction material such as tower members, cement etc. shall come from factories while the excavated soil shall be used for backfilling to restore the surface. During construction of line, very small quantity of water is required which is met from nearby existing source or through takers. However, for substation water requirement is met mostly by ground water derived by digging a borewell during construction as well as for operational stage. Moreover, provision of rain water harvesting in all proposed new substations under the present scheme has been made to conserve precious water resources and enhance the ground water level. Hence, it may be seen that the activities associated with implementation of subject project shall not cause any accelerated use of resources for short term gain.

(iii) Endangering of species

As described earlier, no endangered species of flora and fauna exist in the subprojects area is getting affected thus there is no possibility of endangering/ causing extinction of any species.

(iv) Promoting undesirable rural-to urban migration

The subprojects will not cause any submergence or loss of land holdings that normally trigger migration. It also does not involve acquisition of any private land holdings. Hence, there is no possibility of any migration.

5.6 PUBLIC CONSULTATION:

Public consultation/information is an integral part of the project implementation. Public is informed about the project at every stage of execution. During survey also AEGCL/ APDCL site officials meet people and inform them about the routing of transmission and distribution lines. During the construction, every individual, on whose land tower is erected and people affected by RoW, are consulted. Apart from this, Public consultation using different technique like Public Meeting, Small Group Meeting, informal Meeting shall also be carried out during different activities of project cycle. During such consultation the public are informed about the project in general and in particular about the following:

- Complete project plan (i.e. its route and terminating point and substations, if any, in between);
- Design standards in relation to approved international standards;
- Health impacts in relation to EMF;
- Measures taken to avoid public utilities such as school, hospitals, etc.;
- Other impacts associated with transmission & distribution lines and AEGCL/ APDCL approach to minimizing and solving them;
- Trees and crop compensation process.

In the instant project many group meetings were organized (informally and formally) in different villages where the interventions are likely to happen. Village women folk have actively participated in these meetings. Of the total participants, women constitute around 30%. Such consultation culminated in Public meeting organized at Rangia & village Katamura on 10th February, 2014 and 1st February'14 respectively for proposed transmission & distribution lines in the first phase. During the Public consultation the details of line and its importance were explained to the villagers by the officials of AEGCL/APDCL and POWERGRID. The consultation was arranged in interactive way and queries like tree/crop compensation, engagement of local people in construction activity, etc. were replied. The initiative was appreciated by the villagers and they assured to extend their cooperation for construction of the said subprojects. The process of such consultation shall continue during project implementation and even during O&M stage. Details of above public consultation including photographs of the meeting and minutes of meeting are enclosed as **Annexure -7**.

5.7 CONCLUSIONS:

It is clear from the above discussion that though the region is rich in natural resources, by careful route selection following the principle of avoidance, forests as well as ecologically sensitive areas like National Park / Wildlife Sanctuaries have been avoided completely. Since, the subject project area experiences acute shortage of power, the project will directly benefit the locals in meeting their energy needs. The infrastructural constraints are very real and pose a limiting factor on the development of the area. The availability of power will also strengthen the basic infrastructure in the area, which is essential for development of the area. Thus the project in long run will bring much needed development in the area and significantly improve living standard of the locals. The above facts while on the one hand underline the need for implementation of the subject scheme for overall development of the area and on other hand suggests that a detailed EIA may not be necessary as per the provisions of existing regulations.

Further, a detailed Final Environmental Assessment Report (FEAR) listing action/measures adopted for mitigation of possible environmental impact, details of environment/forest clearance(if applicable), EMP implementation, monitoring details etc. shall be compiled and submitted to Bank (refer **Annexure- 8** for content of FEAR).

SECTION – VI: PROJECT IMPLEMENTATION ARRANGEMENT & MONITORING

6.0 ADMINISTRATIVE ARRANGEMENT FOR PROJECT IMPLEMENTATION

Ministry of Power (MoP), Gol has appointed POWERGRID as Design cum Implementation Supervision Consultant (i.e. Project Management Consultant-PMC) and now redesignated as Implementing Agency (IA). However, the ownership of the assets shall be with respective State government or State Utilities, which upon progressive commissioning shall be handed over to them for taking care of Operation and Maintenance of assets. The arrangement for monitoring and reviewing of project from the perspective of environment and social management will form part of overall arrangements for project management and implementation environment. Following implementation arrangement has been proposed at different levels for smooth implementation of this project;

Central Project Implementation Unit (CPIU) - A body responsible for coordinating the preparation and implementation of the project and shall be housed within the IA's offices at Guwahati. The "Project-In-Charge" of IA & Head of each of the SPCU shall be a member of CPIU.

State Project Coordination Unit (SPCU) – A body formed by the Utility and responsible for coordinating with IA in preparing and implementing the project at the State level. It consist of experts across different areas from the Utility and shall be headed by an officer of the rank not below Chief Engineer, from the Utility.

Project Implementation Unit (PIU) – A body formed by the IA, including members of Utility on deputation, and responsible for implementing the Project across the State, with its personnel being distributed over work site & working in close association with the SPCU/ CPIU. PIU report to State level "Project Manager" nominated by the Project-in-Charge of IA. The IA will have a Core team stationed at the CPIU on permanent basis and other IA officers (with required skills) will visit as and when required by this core team. This team shall represent IA and shall be responsible for all coordination with SPCU, PIU, within IA and MoP, GoI. CPIU shall also assist MoP, GoI in monitoring project progress and in its coordination with The Bank.

6.1 REVIEW OF PROJECT IMPLEMENTATION PROGRESS:

To enable timely implementation of the project/subprojects, following committee has been setup to review the progress;

A. Joint Co-ordination Committee (JCC): IA and SPCU nominate their representatives in a body called JCC to review the project. IA shall specify quarterly milestones or targets, which shall be reviewed by JCC through a formal monthly review meeting. This meeting forum shall be called as Joint Co-ordination Committee Meeting (JCCM). The IA shall convene & keep a record of every meeting. MoP, GoI and The Bank may join as and when needed. Minutes of the meeting will be shared with all concerned and if required, with GoI and The Bank.

- **B. High Power Committee (HPC):** The Utility in consultation with its State Government shall arrange to constitute a High Power Committee (HPC) consisting of high level officials from the Utility, State/ District Administration, Law enforcement agencies, Forest Department. etc. so that various permission/ approvals/ consents/ clearances etc. are processed expeditiously so as to reach the benefits of the Project to the end consumers. HPC shall meet on bimonthly basis or earlier, as per requirement. This forum shall be called as High Power Committee Meeting (HPCM) and the SPCU shall keep a record of every meeting. Minutes of the meeting will be shared with all concerned and if required, with Gol and The Bank.
- C. Contractor's Review Meeting (CRM): Periodic Review Meeting will be held by officials of PIU with Contractors at field offices, State Head Quarters (PIU location) and if required with core team of IA at Guwahati. These shall be called "Contractor's Review Meeting" (CRM). PIU shall keep a record of all CRMs, which shall be shared with all concerned and if required, with Gol and The Bank.
- D. A review will be held among MoP, Gol, The Bank, State Government., Utility and IA, at four (4) months interval or earlier if needed, primarily to maintain oversight at the top level and also to debottleneck issues that require intervention at Gol/ State Government level. Minutes of the meeting shall be prepared by IA and shared with all concerned.

6.2 ENVIRONMENTAL MONITORING IN UTILITY:

Monitoring is a continuous process for AEGCL/APDCL projects at all the stages, be it the site selection, construction or maintenance.

The success of AEGCL/APDCL lies in its strong monitoring systems. Apart from the Field In-Charge reviewing the progress on daily basis regular project review meetings are held at least on monthly basis at corporate level wherein apart from construction issues the environmental aspects of the projects are discussed and remedial measures taken wherever required. The exceptions of these meetings are submitted to the Directors and Managing Director of the Corporation. The progress of various on-going projects is also informed to the Board of Directors.

AEGCL/APDCL has formed a separate cell at the corporate office level namely Environment and Social Management Cell (ESMC) headed by Director PMU for proper implementation and monitoring of environmental & social management measures. AEGCL/APDCL organization support structure with arrangement for ESPPF implementation is depicted in **Exhibit-3**. Key responsibilities of the ESMC are follows:

- Coordinating environmental and social commitments and initiatives with various multilateral agencies, GoA and MoEF.
- Coordination of all environmental activities related to a project from conceptualization to operation and maintenance stage.
- Advising and coordinating /Site office to carry out environmental and social surveys and route alignment for new projects.

- Advising site offices to follow-up with the state forest offices and other state departments for expediting forest clearances and other E&S issues of various projects.
- Providing a focal point for interaction with the MoEF for expediting forest clearances
- Training of Circle and Site officials on E&S issues arising out of Transmission/ Distribution projects and their management plan.
- Training of other departments to familiarize them with the ESPP document.

As regards monitoring of impacts on ecological resources particularly in Forest, Sanctuary or National Park, it is generally done by the concerned Divisional Forest Officer, Chief Wildlife Warden and their staff as a part of their normal duties. As no forest area is involved in the instant project such monitoring/provision shall not be applicable to proposed project. A detailed Environment Management Plan (EMP) including monitoring plan for all possible environmental and social impact and its proper management has been drawn (**Table- 6.1**) and will be implemented during various stage of project execution. Since many provisions of EMP are to be implemented by contractor hence for proper monitoring EMP has included in the contract document. A budget estimate towards tree/crop/tower base compensation and EMP implementation is prepared and is placed at **Annexure-9**. A summary of the same is presented below:

Sr. No.	Budgetary Head	Amount (Rs. Lakhs)
1	Forest compensation	Nil
2	Tree & Crop Compensation	411.86
3	Land Compensation for Tower Footing	23.40
4	Implementation Monitoring & Audit	29.00
	Total	464.26

Any other measures like provision of bird guards, spike guards, barbed wire fencing or any other arrangement for addressing the issues like bird hit/animal/elephant scratching etc. shall be finalized only after detailed/ check survey and finalization of route alignment. Since the detailed/ check survey is part of main package requirement of such measures, its extent and estimated cost shall be incorporated in the revised cost estimate proposal which is normally prepared for all projects as there is a considerable time gap between planning and actual implementation. However, as per the preliminary assessment such additional measures may not be required in the instant scheme as no such impact are envisaged due to routing of lines far away from such sensitive areas.

6.3 GRIEVANCE REDRESSAL MECHANISM (GRM)

Grievance Redress Mechanism (GRM) is an integral and important mechanism for addressing/resolving the concern and grievances in a transparent and swift manner. Many minor concerns of peoples are addressed during public consultation process initiated at the beginning of the project and broadly outlined in Annexure-23. For handling grievance, AEGCL/APDCL has already a framework in place. To ensure its implementation, Grievance Redress Committee (GRC) will be established at two places, one at the project/scheme level and another at Corporate/HQ level. The GRCs shall include members from AEGCL/APDCL, Local Administration, Village Council/Panchayat Members, Affected Persons representative and reputed persons from the society and representative from the autonomous districts council in case of tribal districts selected/decided on nomination basis under the chairmanship of project head. The composition of GRC shall be disclosed in Panchayat/Village council offices and concerned district headquarter for wider coverage.

The complainant will also be allowed to submit its complaint to local project official who will pass it to GRC immediately but not more than 5 days of receiving such complaint. The first meeting of GRC will be organized within 15 days of its constitution/disclosure to formulate procedure and frequency of meeting. However, GRC meeting shall be convened within 15 days of receiving a grievance for its solution. GRC endeavor will be to pronounce its decision/ may also refer it to corporate GRC for solution within 30-45 days of receiving grievances. In case complainant/appellant is not satisfied with the decision of GRC they can approach AEGCL/APDCL Corporate level Committee /District Collector or Court of law for solution.

The corporate level GRC shall function under the chairmanship of Director (PMU) who will nominate other members of GRC including one representative from corporate ESMC who is conversant with the environment & social issues. The meeting of Corporate GRC shall be convened within 7-10 days of receiving the reference from project GRC or complainant directly and pronounce its decision within next 15 days.

6.4 ENVIRONMENTAL REVIEW :

Periodic review by higher management including review by Heads of SPCU and CPIU for all environmental and social issues will be undertaken to ensure that EMP and other measures are implemented at site for compliance of agreed policy and management plan.

Table- 6.1: ENVIRONMENT MANAGEMENT PLAN⁵

Clause No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
Pre-coi	nstruction						
1	Location of overhead line towers/ poles/ underground distribution lines and alignment & design	Exposure to safety related risks	Setback of dwellings to overhead line route designed in accordance with permitted level of power frequency and the regulation of supervision at sites.	Tower location and overhead/ underground alignment selection with respect to nearest dwellings	Setback distances to nearest houses – once	Implementing Agency (IA)	Part of overhead lines tower/ poles/ laying of underground cable sitting survey and detailed alignment survey and design
2	Equipment specifications and design parameters	Release of chemicals and gases in receptors	PCBs not used in substation transformers or other project facilities or equipment.	Transformer design	Exclusion of PCBs in transformers stated in tender specification – once	IA	Part of tender specifications for the equipment
		(air, water, land)	Processes, equipment and systems not to use chlorofluorocarbons (CFCs), including halon, and their use, if any, in existing processes and systems should be phased out and to be disposed of in a manner consistent with the requirements of the Government	Process, equipment and system design	Exclusion of CFCs stated in tender specification – once Phase out schedule to be prepared in case still in use – once	IA	Part of tender specifications for the equipment Part of equipment and process design

⁵ Compliance of these measures with quantity etc. shall be provided in the Final Environment Assessment Report (FEAR) to be prepared after obtaining all statutory clearances and execution of project"

Clause No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
3	Transmission/ Distribution line design	Exposure to electromagne tic interference	Line design to comply with the limits of electromagnetic interference from overhead power lines	Electromagnetic field strength for proposed line design	Line design compliance with relevant standards – once	IA	Part of design parameters
4	Substation location and design	Exposure to noise	Design of plant enclosures to comply with noise regulations.	Expected noise emissions based on substation design	Compliance with regulations - once	IA	Part of detailed siting survey and design
		Social inequities	Careful selection of site to avoid encroachment of socially, culturally and archaeological sensitive areas (i.e. sacred groves, graveyard, religious worship place, monuments etc.)	Selection of substation location (distance to sensitive area).	Consultation with local authorities/ autonomous councils - once		Part of detailed siting survey and design
5	Location of overhead line towers/poles/ laying of underground distribution line & alignment and	Impact on water bodies	Avoidance of such water bodies to the extent possible. Avoidance of placement of tower inside water bodies to the extent of possible	Tower/pole location and overhead/ underground line alignment selection (distance to water bodies)	Consultation with local authorities- once	IA	Part of tower/pole sitting survey and detailed underground /overhead line alignment survey and design
	design	Social inequities	Careful route selection to avoid existing settlements and sensitive locations	Tower/pole location and overhead/ underground line alignment selection (distance to nearest dwellings or social institutions)	Consultation with local authorities/ autonomous councils and land owners – once	IA	Part of detailed tower/pole sitting and overhead/underg round alignment survey and
			Minimise impact on agricultural land	Tower location and overhead/ underground line alignment selection (distance to agricultural land)	Consultation with local authorities/ autonomous councils and land owners – once		design

Clause		Potential	Proposed mitigation	Parameter to be	Measurement &	Institutional	Implementation
No.	stage	impact	measures	monitored	frequency	responsibility	schedule
			Careful selection of site and	Tower/pole location and	Consultation with local		
			route alignment to avoid	overhead/ underground	authorities/		
			encroachment of socially, culturally and	line alignment selection (distance to sensitive	autonomous councils -		
			archaeological sensitive	area)	once		
			areas (i. g. sacred groves,	alea)			
			graveyard, religious worship				
			place, monuments etc.)				
6	Securing lands	Loss of land/	In the case of Involuntary	Compensation and	As per provisions laid	State Govt.	Prior to
	for substations.	income	Acquisitions, Compensation	monetary R&R amounts/	out in the act		award/start of
		change in	and R&R measures are	facilities extended before			substation
		social status	extended as per provision	possession of land.			construction.
		etc.	of RFCTLARRA, 2013 ⁶				
7	Line through	Loss of	Avoid siting of lines through	Tower/pole location and	Consultation with local	IA	Part of detailed
	protected area/	precious	such areas by careful site	overhead/ underground	forest authorities -		siting and
	precious	ecological	and alignment selection	line alignment selection	once		alignment
	ecological area	values/ damage to	(National Parks, Wildlife Sanctuary, Biosphere	(distance to nearest designated ecological			survey /design
		precious	Reserves/ Biodiversity	protected/ sensitive areas)			
		species	Hotspots)	protected, sensitive areas)			
		000000	Minimize the need by using	Tower/pole location and	Consultation with local	IA	Part of detailed
			RoW wherever possible	overhead/ underground	authorities and design		sitting and
			The second s	line alignment selection	engineers - once		alignment
							survey /design
8	Line through	Damage to	Study of earmarked	Tower/pole location and	Consultation with local	IA	Part of detailed
	identified	the Wildlife/	elephant corridors to avoid	overhead/ underground	forest authorities –		sitting and
	Elephant	Birds and	such corridors, Adequate	line alignment selection.	once.		alignment
	corridor /	also to line	ground clearance, Fault				survey /design
	Migratory bird		clearing by Circuit Breaker,				and Operation
			Barbed wire wrapping on towers, reduced spans etc.,	Minimum/maximum	Monitoring – quarterly		
			if applicable	ground clearance	basis		
				ground dicarantic	00010		

⁶ In the instant case no Involuntary acquisition of land (permanent) is involved, hence this clause shall not be applicable.

Clause No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
			Avoidance of established/ identified migration path (Birds & Bats). Provision of flight diverter/ reflectors, bird guard, elevated perches, insulating jumper loops, obstructive perch deterrents, raptor hoods etc ⁷ ., if applicable	Tower/pole location and overhead/ underground line alignment selection	Consultation with local forest authorities - once	IA	Part of detailed sitting and alignment survey /design and Operation
9	Line through forestland	Deforestation and loss of biodiversity edge effect	Avoid locating lines in forest land by careful site and alignment selection Minimise the need by using	Tower/pole location and overhead/ underground line alignment selection (distance to nearest	Consultation with local authorities – once	IA	Part of detailed sitting and alignment survey/design
			existing towers, tall towers and RoW, wherever possible	protected or reserved forest)	Consultation with local authorities and design engineers – once		
			Measures to avoid invasion of alien species	Intrusion of invasive species	Consultation with local forest authorities - once		
			Obtain statutory clearances from the Government	Statutory approvals from Government	Compliance with regulations – once for each subproject		
			Consultation with autonomous councils wherever required	Permission/ NOC from autonomous councils	Consultation with autonomous councils – once during tower placement		
10	farmland		Use existing tower or footings wherever possible.	Tower/pole location and overhead/ underground line alignment selection.	Consultation with local authorities and design engineers – once	IA	Part of detailed alignment survey and design
			Avoid sitting new towers on farmland wherever feasible	Tower/pole location and overhead/ underground line alignment selection	Consultation with local authorities and design engineers – once		Part of detailed sitting and alignment survey /design

⁷ As per International/National best practices and in consultation with concerned forest/wildlife Authority.

Clause No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
11	Noise related	Nuisance to neighbouring properties	Substations sited and designed to ensure noise will not be a nuisance	Noise levels	Noise levels to be specified in tender documents – once	IA	Part of detailed equipment design
12	Interference with drainage patterns/ irrigation channels	Flooding hazards/ loss of agricultural production	Appropriate sitting of towers to avoid channel interference	Tower/pole location and overhead/ underground line alignment selection (distance to nearest flood zone)	Consultation with local authorities and design engineers – once	IA	Part of detailed alignment survey and design
13	Escape of polluting materials	Environment al pollution	Transformers designed with oil spill containment systems, and purpose-built oil, lubricant and fuel storage system, complete	Equipment specifications with respect to potential pollutants	Tender document to mention specifications – once	IA	Part of detailed equipment design /drawings
			Substations to include drainage and sewage disposal systems to avoid offsite land and water pollution.	Substation sewage design	Tender document to mention detailed specifications – once	IA	Part of detailed substation layout and design /drawings
14	Equipments submerged under flood	Contamination of receptors	Substations constructed above the high flood level(HFL) by raising the foundation pad	Substation design to account for HFL (elevation with respect to HFL elevation)	Base height as per flood design- once	IA	Part of detailed substation layout and design/drawings
15	Explosions /Fire	Hazards to life	Design of substations to include modern fire fighting equipment Provision of fire fighting equipment to be located close to transformers	Substation design compliance with fire prevention and control codes	Tender document to mention detailed specifications – once	IA	Part of detailed substation layout and design /drawings
Constru		11			1		7
16	Equipment layout and installation	Noise and vibrations	Construction techniques and machinery selection seeking to minimize ground disturbance.	Construction techniques and machinery	Construction techniques and machinery creating minimal ground disturbance- once at the start of each	IA (Contractor through contract provisions)	Construction period

Clause No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
	<u> </u>				construction phase		
17	Physical construction	Disturbed farming activity	Construction activities on cropping land timed to avoid disturbance of field crops (within one month of harvest wherever possible).	Timing of start of construction	Crop disturbance – Post harvest as soon as possible but before next crop – once per site	IA (Contractor through contract provisions)	Construction period
18	Mechanized construction	Noise, vibration and operator safety, efficient operation	Construction equipment to be well maintained.	Construction equipment – estimated noise emissions	Complaints received by local authorities – every 2 weeks	IA (Contractor through contract provisions)	Construction period
		Noise, vibration, equipment wear and tear	Turning off plant not in use.	Construction equipment – estimated noise emissions and operating schedules	Complaints received by local authorities – every 2 weeks	IA (Contractor through contract provisions)	Construction period
19	Construction of roads for accessibility	Increase in airborne dust particles	Existing roads and tracks used for construction and maintenance access to the line wherever possible.	Access roads, routes (length and width of new access roads to be constructed)	Use of established roads wherever possible – every 2 weeks	IA (Contractor through contract	Construction period
		Increased land requirement for temporary accessibility	New access ways restricted to a single carriageway width within the RoW.	Access width (meters)	Access restricted to single carriage –way width within RoW – every 2 weeks	IA (Contractor through contract provisions)	Construction period
20	Construction activities	Safety of local villagers	Coordination with local communities for construction schedules, Barricading the construction area and spreading awareness among locals	Periodic and regular reporting /supervision of safety arrangement	No. of incidents- once every week	IA (Contractor through contract provisions)	Construction period

Clause No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
		Local traffic obstruction	Coordination with local authority/ requisite permission for smooth flow of traffic	Traffic flow (Interruption of traffic)	Frequency (time span)- on daily basis	IA (Contractor through contract provisions)	Construction period
21	Temporary blockage of utilities	Overflows, reduced discharge	Measure in place to avoid dumping of fill materials in sensitive drainage area	Temporary fill placement (m ³)	Absence of fill in sensitive drainage areas – every 4 weeks	IA (Contractor through contract provisions)	Construction period
22	Site clearance	Vegetation	Marking of vegetation to be removed prior to clearance, and strict control on clearing activities to ensure minimal clearance. No use of herbicides and pesticides	Vegetation marking and clearance control (area in m ²)	Clearance strictly limited to target vegetation – every 2 weeks	IA (Contractor through contract provisions)	Construction period
23	Trimming /cutting of trees within RoW	Fire hazards	Trees allowed growing up to a height within the RoW by maintaining adequate clearance between the top of tree and the conductor as per the regulations.	Species-specific tree retention as approved by statutory authorities (average and max. tree height at maturity, in meters)	Presence of target species in RoW following vegetation clearance – once per site	IA (Contractor through contract provisions)	Construction period
		Loss of vegetation and deforestation	Trees that can survive pruning to comply should be pruned instead of cleared.	Species-specific tree retention as approved by statutory authorities	Presence of target species in RoW following vegetation clearance - once per site	IA (Contractor through contract provisions)	Construction period
			Felled trees and other cleared or pruned vegetation to be disposed of as authorized by the statutory bodies.	Disposal of cleared vegetation as approved by the statutory authorities (area cleared in m ²)	Use or intended use of vegetation as approved by the statutory authorities – once per site	IA (Contractor through contract provisions)	Construction period
24	Wood/ vegetation harvesting	Loss of vegetation and	Construction workers prohibited from harvesting wood in the project area	Illegal wood /vegetation harvesting (area in m ² , number of incidents	Complaints by local people or other evidence of illegal	IA (Contractor through	Construction period

Clause No.		Potential	Proposed mitigation	Parameter to be	Measurement &	Institutional	Implementation
NO.	stage	impact deforestation	measures	monitored	frequency	responsibility	schedule
		delorestation	during their employment, (apart from locally	reported)	harvesting – every 2 weeks	contract provisions)	
			(apart from locally employed staff continuing		Weeks	provisions)	
			current legal activities)				
25	Surplus	Runoff to	Soil excavated from tower	Soil disposal locations	Acceptable soil	IA	Construction
25	earthwork/soil	cause water	footings/ substation	and volume (m^3)	disposal sites – every	(Contractor	period
	cartinion 501	pollution,	foundation disposed of by		2 weeks	through	period
		solid waste	placement along roadsides,		2 WOORD	contract	
		disposal	or at nearby house blocks if			provisions)	
		alopoour	requested by landowners				
26	Substation	Loss of soil	Loss of soil is not a major	Borrow area sitting (area	Acceptable soil borrow	IA	Construction
	construction		issue as excavated soil will	of site in m ² and	areas that provide a	(Contractor	period
			be mostly reused for filling.	estimated volume in m ³)	benefit - every 2	through	
			However, in case of	,	weeks	contract	
			requirement of excess soil			provisions)	
			the same will be met from				
			existing quarry or through				
			deep excavation of existing				
			pond or other nearby barren				
			land with agreement of local				
			communities				
		Water	Construction activities	Seasonal start and finish	Timing of major	IA	Construction
		pollution	involving significant ground	of major earthworks(P ^H ,	disturbance activities –	(Contractor	period
			disturbance (i.e. substation	BOD /COD, Suspended	prior to start of	through	
			land forming) not	solids, others)	construction activities	contract	
			undertaken during the			provisions)	
			monsoon season				
27	Site clearance	Vegetation	Tree clearances for	Ground disturbance	Amount of ground	IA	Construction
			easement establishment to	during vegetation	disturbance – every 2	(Contractor	period
			only involve cutting trees off		weeks	through	
			at ground level or pruning	Statutory approvals	Statutory approvals	contract	
			as appropriate, with tree		for tree clearances –	provisions)	
			stumps and roots left in		once for each site		
			place and ground cover left undisturbed				
28	Substation	Waste	Excess fill from	Location and amount	Appropriate fill	IA	Construction
20	Substation	VVASIE				IA	CONSTRUCTION

Clause No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
	foundation/Towe r erection disposal of surplus earthwork/fill	disposal	substation/tower foundation excavation disposed of next to roads or around houses, in agreement with the local community or landowner.	(m ³)of fill disposal	disposal locations – every 2 weeks	(Contractor through contract provisions)	period
29	Storage of chemicals and materials	Contamination of receptors (land, water, air)	Fuel and other hazardous materials securely stored above high flood level.	Location of hazardous material storage; spill reports (type of material spilled, amount (kg or m ³) and action taken to control and clean up spill)	Fuel storage in appropriate locations and receptacles – every 2 weeks	IA (Contractor through contract provisions)	Construction period
30	Construction schedules	Noise nuisance to neighbouring properties	Construction activities only undertaken during the day and local communities informed of the construction schedule.	Timing of construction (noise emissions, [dB(A)]	Daytime construction only – every 2 weeks	IA (Contractor through contract provisions)	Construction period
31	Provision of facilities for construction workers	Contamination of receptors (land, water, air)	Construction workforce facilities to include proper sanitation, water supply and waste disposal facilities.	Amenities for Workforce facilities	Presence of proper sanitation, water supply and waste disposal facilities – once each new facility	IA (Contractor through contract provisions)	Construction period
32	Influx of migratory workers	Conflict with local population to share local resources	Using local workers for appropriate asks	Avoidance/reduction of conflict through enhancement/ augmentation of resource requirements	Observation & supervision–on weekly basis	IA (Contractor through contract provisions)	Construction period
33	Lines through farmland	Loss of agricultural	Use existing access roads wherever possible	Usage of existing utilities	Complaints received by local people	IA (Contractor	Construction period
	k	productivity	Ensure existing irrigation facilities are maintained in working condition	Status of existing facilities	/authorities - every 4 weeks	through contract provisions)	
			Protect /preserve topsoil and reinstate after construction completed	Status of facilities (earthwork in m ³)			

Clause No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
	-		Repair /reinstate damaged bunds etc after construction	Status of facilities (earthwork in m ³)			
		Loss of income.	Land owners/ farmers compensated for any temporary loss of productive land as per existing regulation.	Process of Crop/tree compensation in consultation with forest dept.(for timber yielding tree) and Horticulture deptt.(for fruit bearing tree)	Consultation with affected land owner prior to implementation and during execution.	IA	During construction
34	Uncontrolled erosion/silt runoff	Soil loss, downstream siltation	Need for access tracks minimised, use of existing roads. Limit site clearing to work areas Regeneration of vegetation to stabilise works areas on completion (where applicable) Avoidance of excavation in wet season Water courses protected from siltation through use of bunds and sediment ponds	Design basis and construction procedures (suspended solids in receiving waters; area re-vegetated in m ² ; amount of bunds constructed [length in meter, area in m ² , or volume in m ³])	Incorporating good design and construction management practices – once for each site	IA (Contractor through contract provisions)	Construction period
35	Nuisance to nearby properties	Losses to neighbouring land uses/	Contract clauses specifying careful construction	Contract clauses	Incorporating good construction	IA (Contractor through	Construction period
	properties	values	As much as possible existing access ways will be	Design basis and layout	Incorporating good design engineering	contract	
			Productive land will be reinstated following completion of construction	Reinstatement of land status (area affected, m ²)	Consultation with affected parties – twice – immediately	provisions)	
		Social inequities	Compensation will be paid for loss of production, if any.	Implementation of Tree/Crop compensation (amount paid)	Consultation with affected parties – once in a quarter	IA	Prior to construction

Clause No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
36	Flooding hazards due to construction impediments of natural drainage	Flooding and loss of soils, contamination of receptors (land, water)	Avoid natural drainage pattern/ facilities being disturbed/blocked/ diverted by on-going construction activities	Contract clauses (e.g. suspended solids and BOD/COD in receiving water)	Incorporating good construction management practices-once for each site	IA (Contractor through contract provisions)	Construction period
37	Equipment submerged under flood	Contamination of receptors (land, water)	Equipment stored at secure place above the high flood level(HFL)	Store room level to be above HFL (elevation difference in meters)	Store room level as per flood design-once	IA	Construction period
38	Inadequate siting of borrow areas (quarry areas)	Loss of land values	Existing borrow sites will be used to source aggregates, therefore, no need to develop new sources of aggregates	Contract clauses	Incorporating good construction management practices – once for each site	IA (Contractor through contract provisions)	Construction period
39	Health and safety	Injury and sickness of workers and members of the public	Safety equipment's (PPEs) for construction workers Contract provisions specifying minimum requirements for construction camps Contractor to prepare and implement a health and safety plan. Contractor to arrange for health and safety training sessions	Contract clauses (number of incidents and total lost-work days caused by injuries and sickness)	Contract clauses compliance – once every quarter	IA (Contractor through contract provisions)	Construction period
40	Inadequate construction stage monitoring	Likely to maximise damages	Training of environmental monitoring personnel Implementation of effective	Training schedules Respective contract	No. of programs attended by each person – once a year Submission of duly	IA	Routinely throughout construction period
			environmental monitoring and reporting system using checklist of all contractual environmental requirements	checklists and remedial actions taken thereof.	completed checklists of all contracts for each site - once		

Clause No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
			Appropriate contact clauses to ensure satisfactory implementation of contractual environmental mitigation measures.	Compliance report related to environmental aspects for the contract	Submission of duly completed compliance report for each contract – once		
	on and Maintena			1			
41	Location of line towers/poles and overhead/ underground line alignment & design	Exposure to safety related risks	Setback of dwellings to overhead line route designed in accordance with permitted level of power frequency and the regulation of supervision at sites.	Compliance with setback distances ("as-built" diagrams)	Setback distances to nearest houses – once in quarter	AEGCL/ APDCL	During operations
42	Line through identified bird flyways, migratory path	Injury/ mortality to birds, bats etc due to collision and electrocution	Avoidance of established/ identified migration path (Birds & Bats). Provision of flight diverter/reflectors, elevated perches, insulating jumper loops, obstructive perch deterrents, raptor hoods etc., if applicable	any incident of	No. of incidents- once every month	AEGCL/ APDCL	Part of detailed siting and alignment survey /design and Operation
43	Equipment submerged under flood	Contamination of receptors (land, water)	Equipment installed above the high flood level (HFL) by raising the foundation pad.	Substation design to account for HFL ("as- built" diagrams)	Base height as per flood design – once	AEGCL/ APDCL	During operations
44	Oil spillage	Contamination of land/nearby water bodies	Substation transformers located within secure and impervious sump areas with a storage capacity of at least 100% of the capacity of oil in transformers and associated reserve tanks.	Substation bunding (Oil sump) ("as-built" diagrams)	Bunding (Oil sump) capacity and permeability - once	AEGCL/ APDCL	During operations
45	SF ₆ management	Emission of most potent GHG causing climate change	Reduction of SF6 emission through awareness, replacement of old seals, proper handling & storage by controlled inventory and	Leakage and gas density/level	Continuous monitoring	AEGCL/ APDCL	During Operations

Clause No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
			use, enhance recovery and applying new technologies to reduce leakage				
46	Inadequate provision of staff/workers health and safety during operations	Injury and sickness of staff /workers	Careful design using appropriate technologies to minimise hazards Safety awareness raising for staff. Preparation of fire emergency action plan and training given to staff on implementing emergency action plan	Usage of appropriate technologies (lost work days due to illness and injuries) Training/awareness programs and mock drills	Preparedness level for using these technologies in crisis – once each year Number of programs and percent of staff /workers covered – once each year	AEGCL/ APDCL	Design and operation
			Provide adequate sanitation and water supply facilities	Provision of facilities	Complaints received from staff /workers every 2 weeks		
47	Electric Shock Hazards	ock Injury/ mortality to staff and public	Careful design using appropriate technologies to minimise hazards	Usage of appropriate technologies (no. of injury incidents, lost work days)	Preparedness level for using these technology in crisis- once a month	AEGCL/ APDCL	Design and Operation
			Security fences around substations	Maintenance of fences	Report on maintenance – every 2 weeks		
			Barriers to prevent climbing on/ dismantling of towers	Maintenance of barriers			
			Appropriate warning signs on facilities	Maintenance of warning signs			
			Electricity safety awareness raising in project areas	Training /awareness programs and mock drills for all concerned parties	Number of programs and percent of total persons covered – once each year		
48	Operations and maintenance staff skills less than acceptable	Unnecessary environmenta I losses of various types	Adequate training in O&M to all relevant staff of substations & T & D line maintenance crews.	Training/awareness programs and mock drills for all relevant staff	Number of programs and percent of staff covered – once each year	AEGCL/ APDCL	Operation

Clause No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Parameter to be monitored	Measurement & frequency	Institutional responsibility	Implementation schedule
			Preparation and training in the use of O&M manuals and standard operating practices				
49	Inadequate periodic environmental monitoring.	Diminished ecological and social values.	Staff to receive training in environmental monitoring of project operations and maintenance activities.	Training/awareness programs and mock drills for all relevant staff	Number of programs and percent of staff covered – once each year	AEGCL/ APDCL	Operation
50	Equipment specifications and design parameters	Release of chemicals and gases in receptors (air, water, land)	Processes, equipment and systems using chlorofluorocarbons (CFCs), including halon, should be phased out and to be disposed of in a manner consistent with the requirements of the Govt.	Process, equipment and system design	Phase out schedule to be prepared in case still in use – once in a quarter	AEGCL/ APDCL	Operations
51	Transmission/ distribution line maintenance	Exposure to electromagne tic interference	Transmission/ distribution line design to comply with the limits of electromagnetic interference from overhead power lines	Required ground clearance (meters)	Ground clearance - once	AEGCL/ APDCL	Operations
52	Uncontrolled growth of vegetation	Fire hazard due to growth of tree/shrub /bamboo along RoW	Periodic pruning of vegetation to maintain requisite electrical clearance. No use of herbicides/ pesticides	Requisite clearance (meters)	Assessment in consultation with forest authorities - once a year(pre- monsoon/post- monsoon	AEGCL/ APDCL	Operations
53	Noise related	Nuisance to neighbouring properties	Substations sited and designed to ensure noise will not be a nuisance.	Noise levels {dB(A)}	Noise levels at boundary nearest to properties and consultation with affected parties if any - once	AEGCL/ APDCL	Operations

EXHIBIT – 1

POWER MAP OF ASSAM

EXHIBIT -1

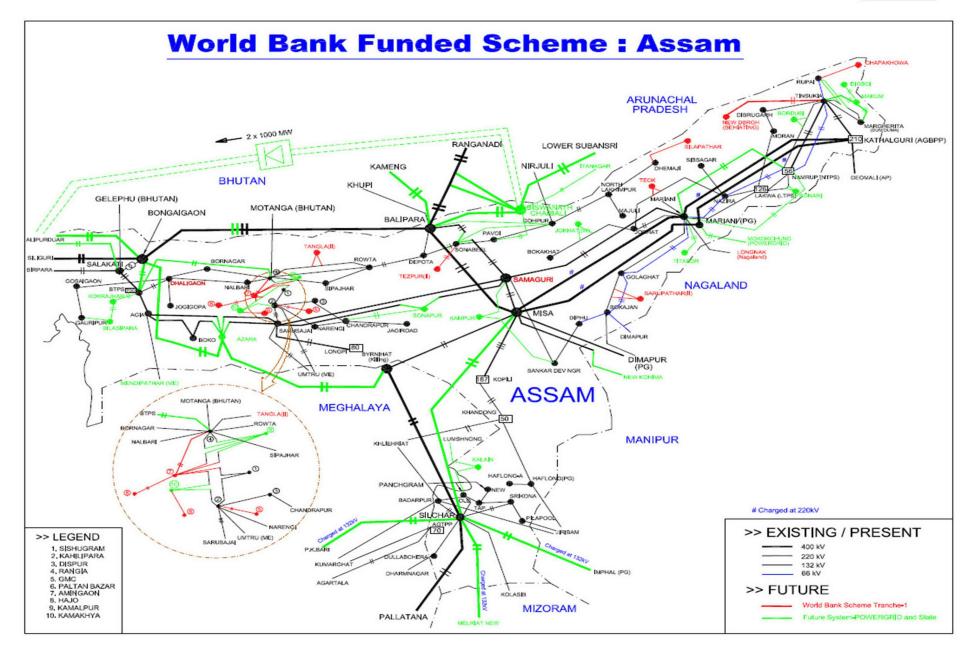


EXHIBIT – 2

SCHEMATIC MAP SHOWING PROPOSED TRANSMISSION NETWORK

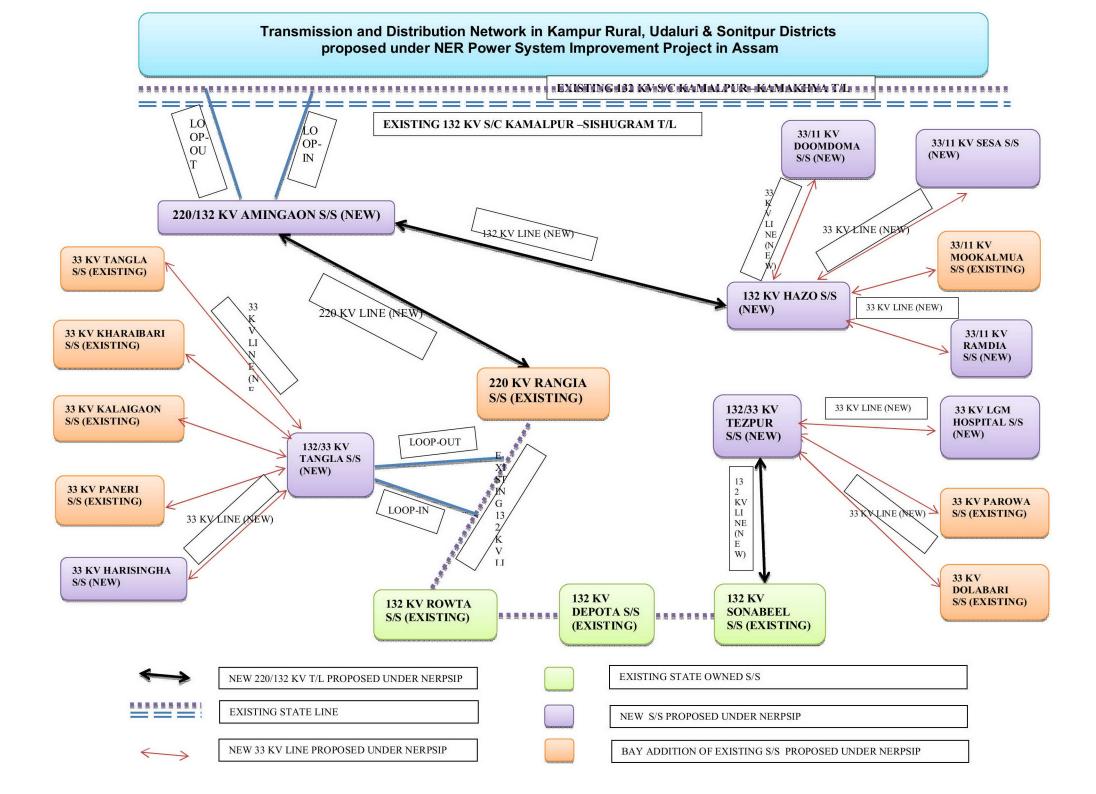
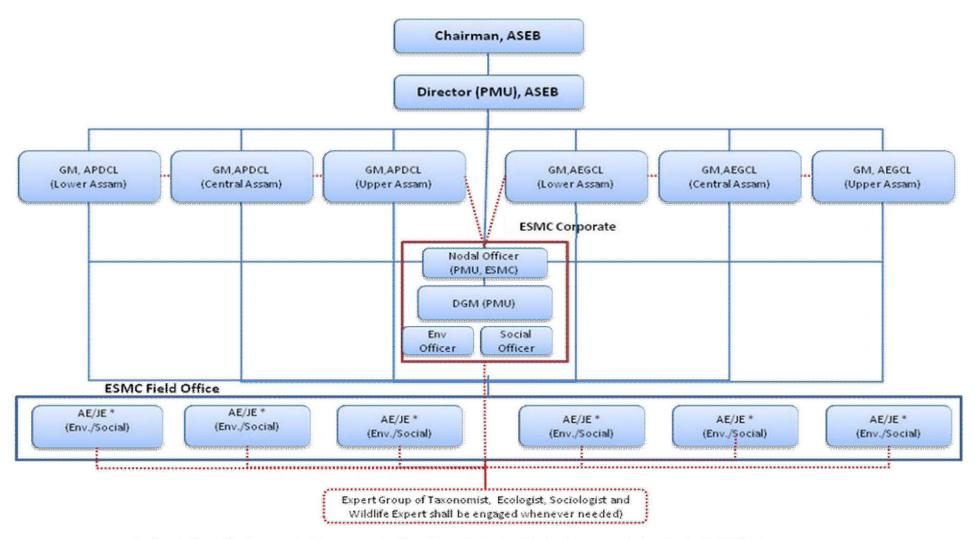


EXHIBIT – 3

AEGCL/APDCL's ORGANIZATION SUPPORT STRUCTURE

Exhibit-3

AEGCL/APDCL'S ORGANIZATION CHART WITH ARRANGEMENT FOR ESPP IMPLEMENTATION



* Through redeployment of personnel after due training with dual responsibility in the initial stage

FIGURE – 1

132 KV LINE DEPICTING ACTUAL POSITION ALONG WITH ROW AND EXTENT OF DAMAGE

<u>Fig. -1</u> 132 kV line depicting actual position along with RoW and extent of damage

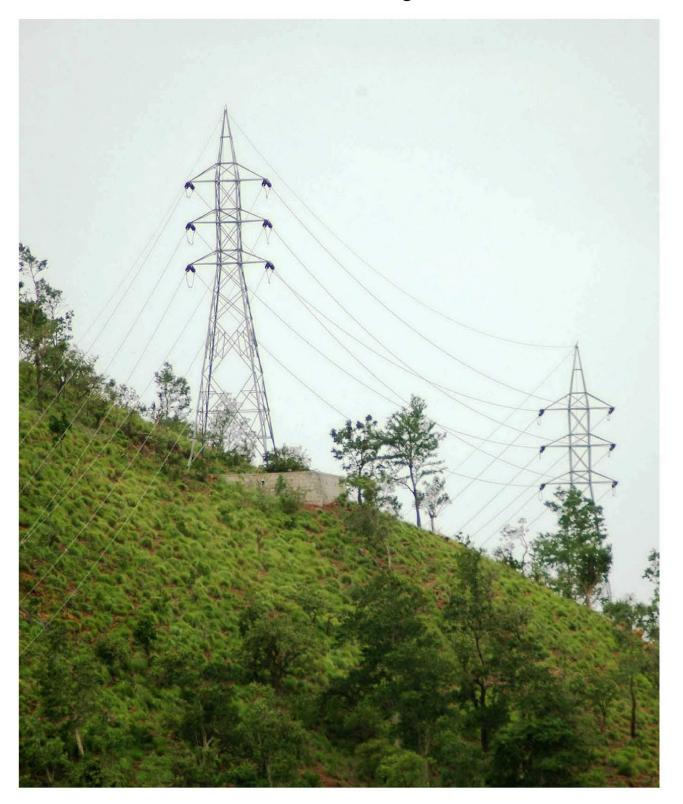


FIGURE – 1 a

132 KV TOWER BASE SHOWING IMPACT ON AGRICULTURAL LAND AND CROP

Fig-1(a)



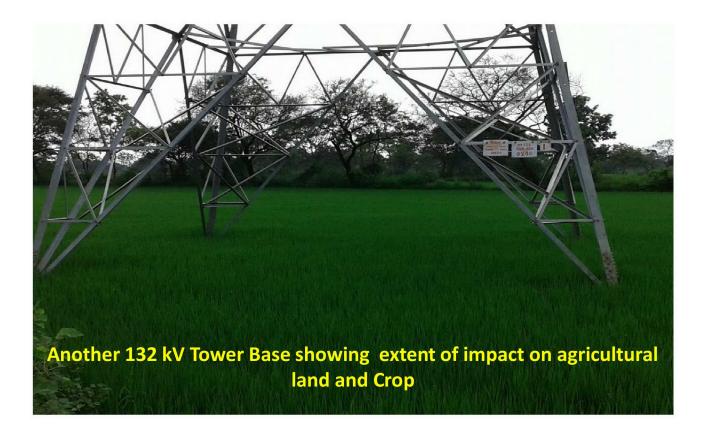


FIGURE - 2

33 KV lines (Single & H pole) depicting base area impact

Fig. -2: 33 KV lines (Single & H pole) depicting base area impact

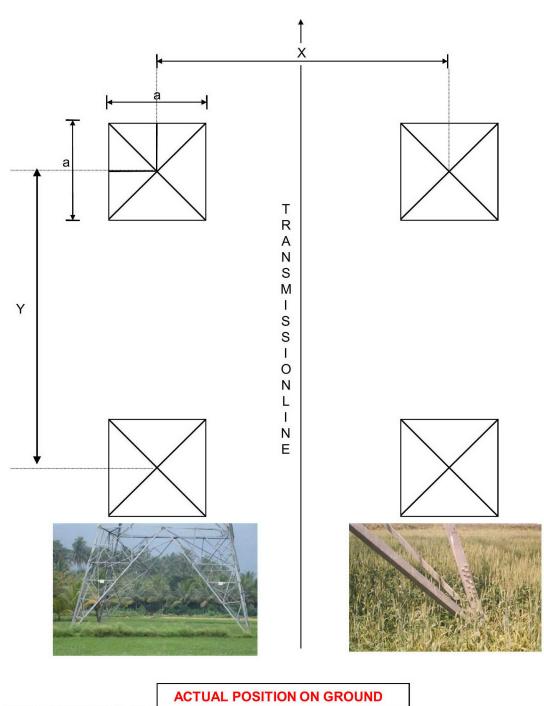


33 kV line inside city area of Assam

33 kV (H Pole) line inside substation

FIGURE – 3

TYPICAL PLAN OF TRANSMISSION LINE TOWER FOOTINGS SHOWING ACTUAL GOUND POSITION AND EXTENT OF IMPACT



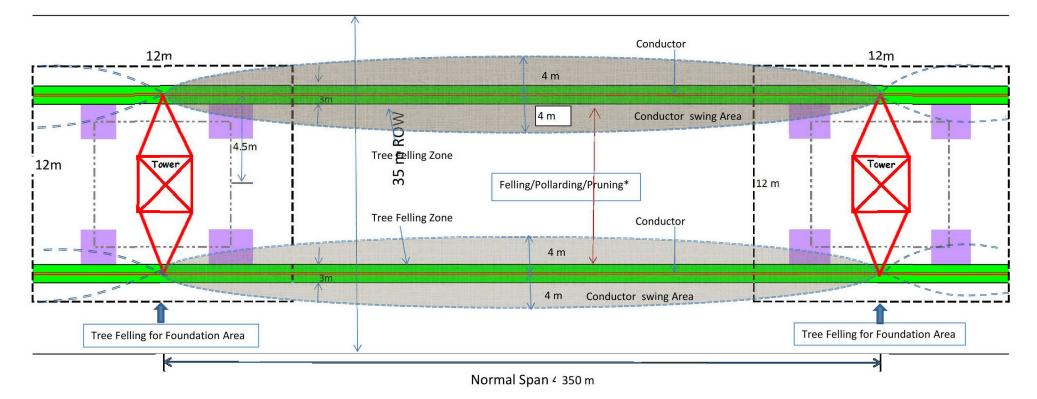
TYPICAL PLAN OF TRANSMISSION LINE TOWER FOOTINGS SHOWING ACTUAL GOUND POSITION AND EXTENT OF IMPACT

INDICATIVE MEASURES X & Y = 10-15 METERS a = 300- 450 mm Fig.-3

FIGURE – 3 a

SCHEMATIC DIAGRAM INDICATING AREA OF INFLUENCE/IMPACT FOR 132 KV D/C TRANSMISSION LINE

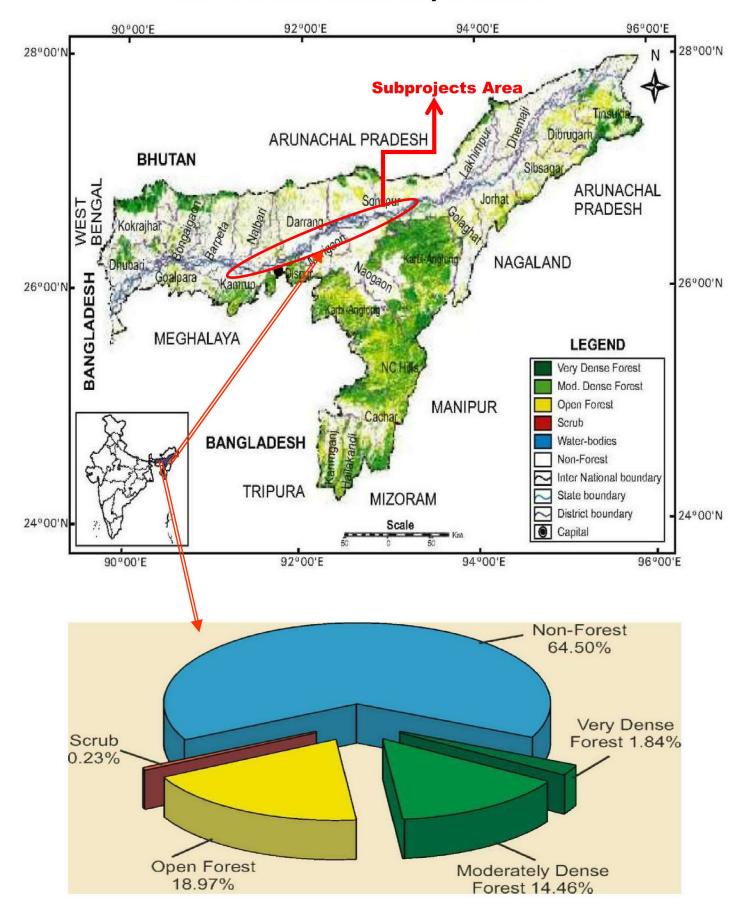
POWER GRID CORPORATION OF INDIA LIMITED (A Government Of India Enterprise) SCHEMATIC DIAGRAM FOR INDICATING AREA OF INFLUENCE/IMPACT for 220 KV D/C Transmission Line



Note : Tree felling of 3m below conductor is only applicable in forest area

MAP - 1

FOREST COVER MAP OF ASSAM



MAP-1 : Forest Cover Map of Assam

MAP – 1a & 1b

DISTANCE FROM MAJOR WETLANDS

280 KV RANGIA 88 (EXISTINO)

ALT-1 (Proposed Route)

MINIMUM DISTANCE (13 KM)

MINIMUM DISTANCE (16.2 KM) 🔶

14/20 8/8 (NDM)

ALT-10 2

DEEPOR BEEL (RAMSAR SITE)

ALT-I(Proposed Roule)

TH.

Image © 2015 DigitalGlobe Image © 2015 CNES / Astrium Image Landsat



ALT-S

PROPOSED 132 SUBSTATION (TEZPUR)

Brahmaputra River

ALT.-1(Proposed Route)

MINIMUM DISTANCE= 163 KM

Image Landsat

NBAM-BILMUKH WETLAND (PROPOSED B/S)

Googleearth

MAP - 2

ALTERNATIVES ROUTE ALIGNMENT FOR 220 KV D/C RANGIA-AMINGAON LINE & 132 KV D/C AMINGAON-HAZO LINE



Belshor o बेल्शोर

वगुरिहती Bagurihati ●









220 KV RANGIA SS (EXISTING)



3/3 (NEW

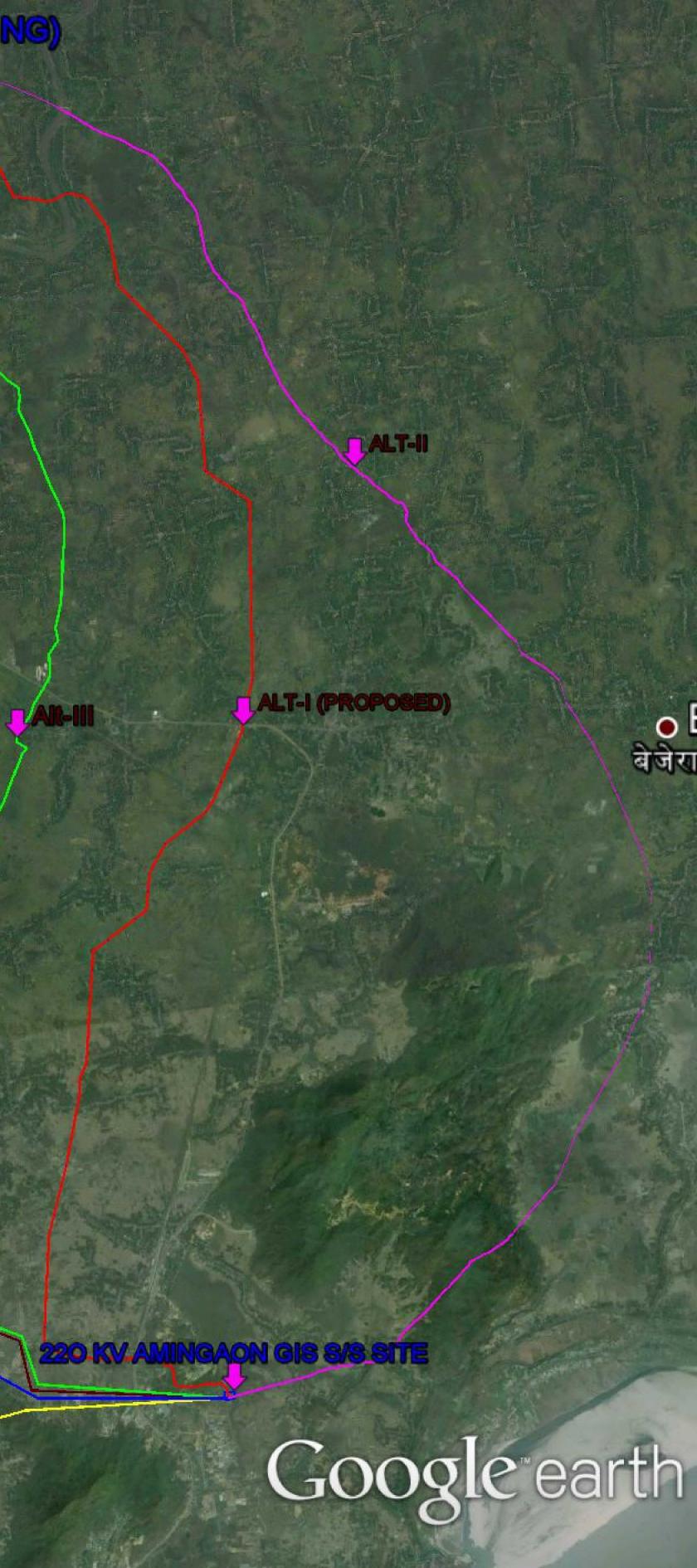
ALTH (PROPOSED)

ALT-II

3 KV LINE

Image © 2015 DigitalGlobe Image © 2015 CNES / Astrium © 2015 Google

RAMDIA S/S NEW



MAP – 3

ALTERNATIVES ROUTE ALIGNMENT FOR132 KV D/C SONABIL -TEZPUR LINE

33 KV PAROWA S/S

-

KV LINE

33 KV DOLABARI S/S Dolabari, Tezpur, Assam, India

33 KV S/S (LGBMH)

T.NO.-11/1 **XVUNE** GANTRY T.NO.-18/9 NO.-14/0 INTGANTRYI.NO.-14/1

 \bigcirc

T.NO.-7/1T.NO.-6/1 T.NO.-9/1 T.NO.-8/0 T.NO.-10/1

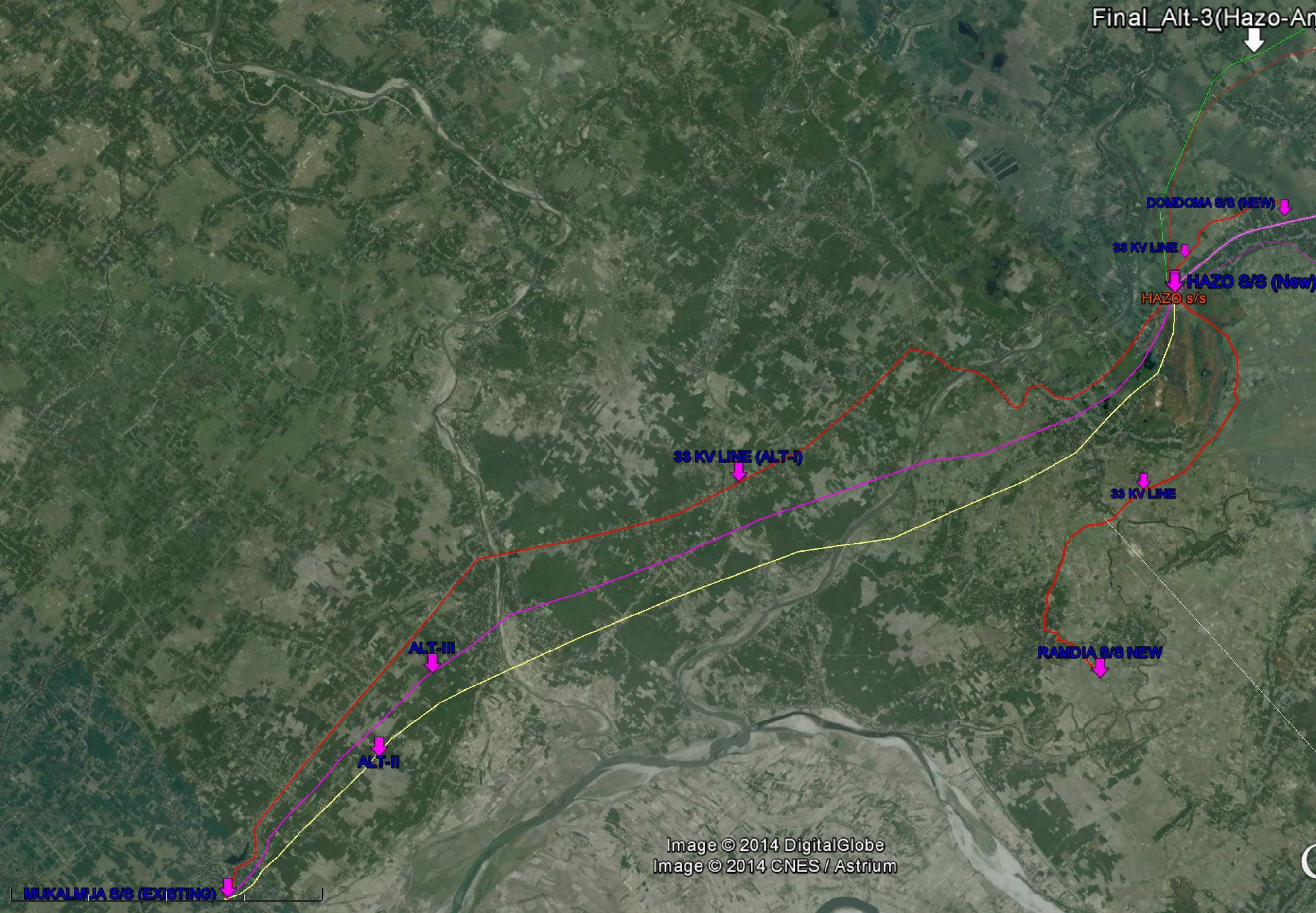
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132 KV SOBANIL S/S (EXISTING) GANTRY T.NO.-D/E ROUTE ALT-2 ROUTE ALT-3 / T.NO.-2/0 T.NO.-3/0 T.NO.-3/2 T.NO.-3/6 T.NO.-3/7 T.NO.-4/3T.NO.-4/1 T.NO.-4/4T.NO.-4/2 T.NO.-5/0T.NO.-4/5 T.NO.-6/0 T.NO.-5/1

Googleearth

MAP - 4

ALTERNATIVE ROUTE ALIGNMENT OF 33 KV LINE FROM 132/33KV HAZO (EXISTING) TO 33/11KV MUKALMUWA (EXISTING) SUBSTATION



Final_Alt-3(Hazo-Amingaon) Final_Alignment(H

Final_Alt-2(Hazo-/

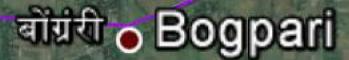
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Google earth

MAP – 5

ALTERNATIVE ROUTE ALIGNMENT OF 33 KV LINE FROM 132/33KV TANGLA (NEW) TO 33/11KV KHAIRABARI (EXISTING) SUBSTATION

भेर्खेओं चरिअली Bhergaon Chariali •



NLT-II

KV KHAIRABARI S/S (EXISTING)





EXISTING TOWER LOCATIONS

EXISTING TOWER

132 KV TANGLA SS (NEW)

बोर-तोंगला Tangla उ टांगला ● Bor-Tongla ांगला

> 33 KV TANGLA S/S (EXISTING) नेम जलाः

> > 133 KV LINE

BS/KV LIN

LOOP-IN/LOOP-OUT LINE

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Nabarbari - ननावीरी

e अम्वराओं 88 KV HARISINGHA 88 (NEW)

Harisinga • हरिशिंगा

33 KV LINE

132 KV RANGLA-ROWTA T/L



Ch)

33 KV KALAIGAON S/S (EXISTING)

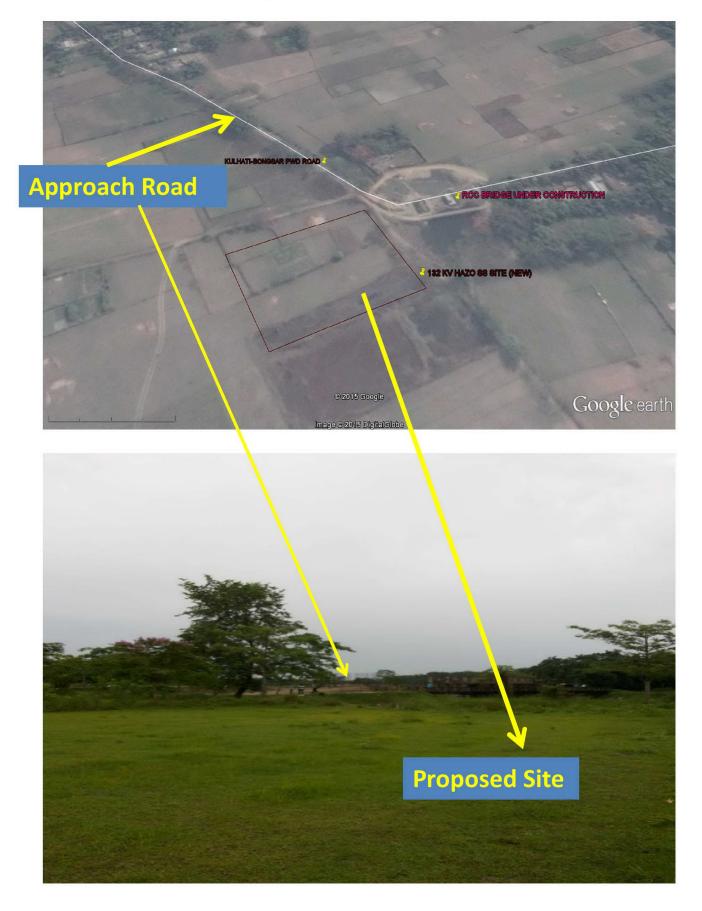
PLATE – 1

PROPOSED SUBSTATION LOCATION

220/132 KV Amingaon GIS



132/33 KV Hazo Substation



132/33 KV Tezpur Substation

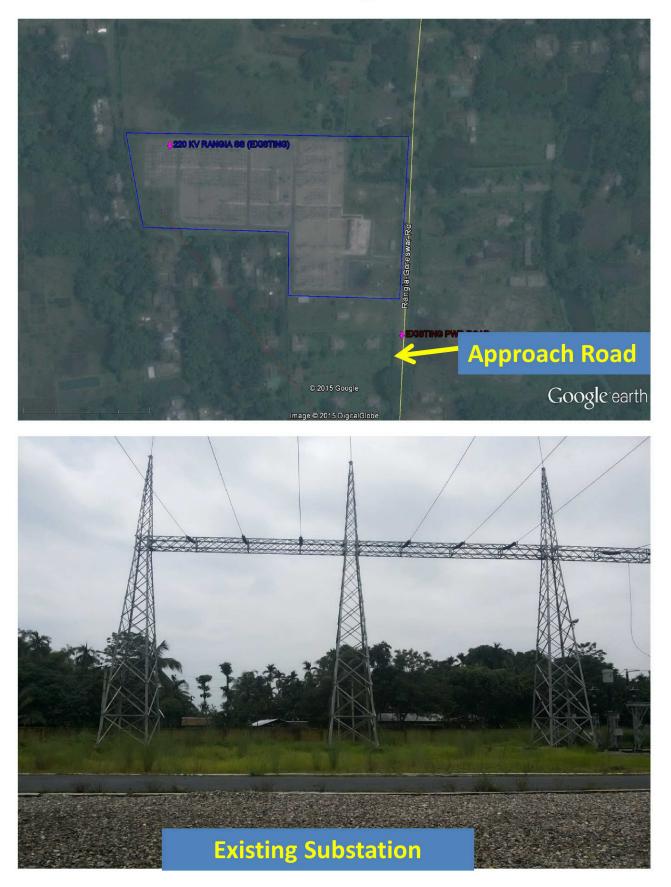




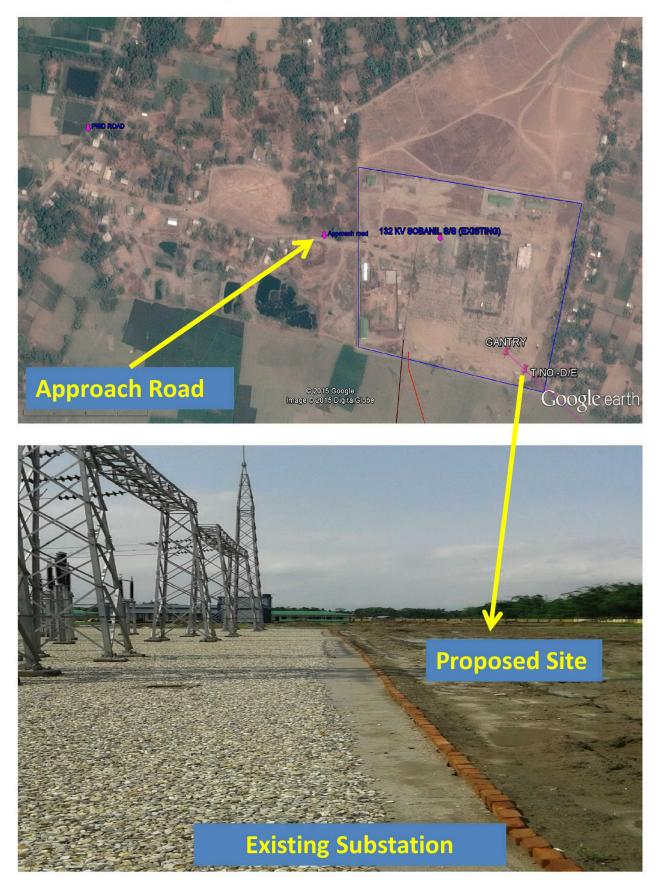
132/33 KV Tangla Substation



220/132 KV Rangia Extension



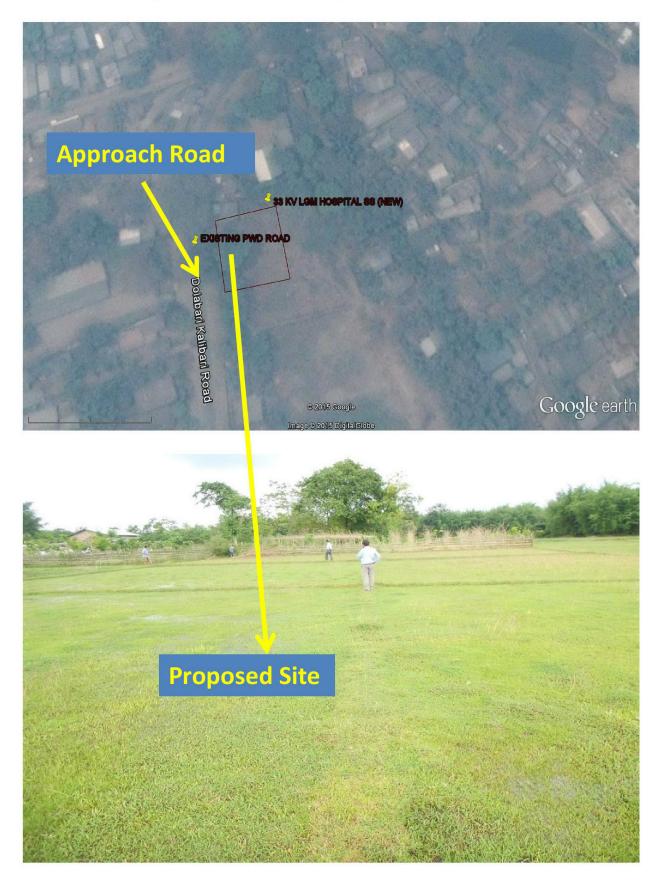
132/33 KV Sonabil Extension



33/11 KV Ramdiya Substation



33/11 KV LGM Hospital Substation



33/11 KV Sesa Substation



33/11 KV Domdoma Substation



33/11 KV Harsingha Substation



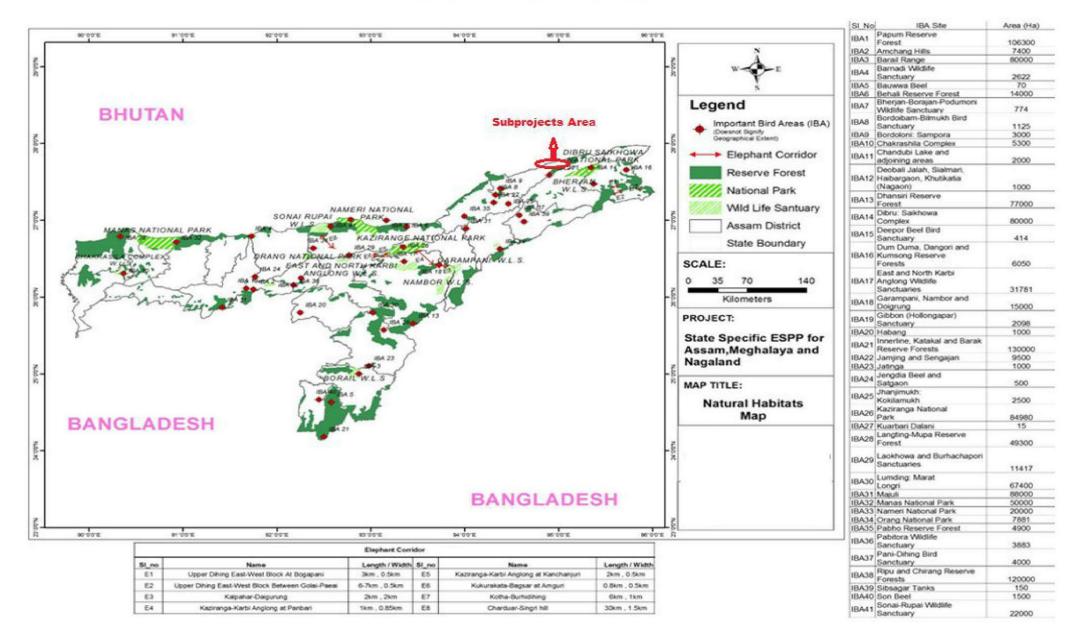
ANNEXURE – 1

NATIONAL PARK AND WILDLIFE SANCTUARIES IN ASSAM

ANNEXURE 1: NATIONAL PARK AND WILDLIFE SANCTUARIES IN ASSAM

SI. No.	National Park and Wildlife Sanctuaries	Location (District)	Main Habitat
1.	Kaziranga National Park	Golaghat, Nagaon & Sonitpur	One horned Rhino, Swamp Deer, Wild Buffalo, Tiger, Elephant, Hoolock Gibbon, Capped Langur, Home to 25 globally threatened and 21 near threatened species of birds
2.	Manas National Park	Chirang and Baksa	Rhino, Elephant, Tiger, Pygmy Hog, Hispid hare, Golden Langur, Assamese Macaque, Rhesus Macaque, Leopard, Golden Cat, Fishing Cat, Leopard Cat, Jungle Cat, Large Indian civet, Small Indian civet, Toddy Cat
3.	Orang National Park	Udalguri and Sonitpur	Rhino, Tiger, Maljuria Elephants (male elephants in group), Hog Deer, Wild Pig 222 species of Birds (Greater Adjutant Stork, Lesser Adjutant Stork, Brahminy Duck, Pintail Duck etc.)
4.	Nameri National Park	Sonitpur	Tiger, Leopard, Elephant, Gaur, Wild Pigs, Sambar, Barking Deer, Hispid hare, Slow Loris, Capped Langur, White Winged Wood duck, Palla's fish- eagle, Lesser Adjutant Stork, Greater spotted Eagle, White ramped vulture, Longo billed vulture, Black bellied Term, Rufous–necked Hornbill, Wreathed Hornbill, Great Pied Hornbill etc.
5.	Dibru-Saikhowa National Park	Dibrugarh and Tinsukia	Tiger, Elephant, Leopard, Jungle Cat, Bears, Small Indian Civet, Squirrels, Gangetic Dolphin, Slow Loris, Assamese Macaque, Rhesus Macaque, Capped Langur, Hoolock Gibbon. It is an identifies Important Bird Area (IBA)
6.	Bherjan-Borajan- Padumoni WLS	Tinsukia	Hoolock Gibbon, Capped Langur, Pig- tailed, Macaque, Macaque, Slow Loris and Rhesus Macaque
7.	Panidehing WLS	Sivasagar	Elephants, Lesser Adjutant Stork, Greater Adjutant, Swamp Francolin, Spot-billed Pelican, White-rumped Vulture, Greater Spotted Eagle,

SI. No.	National Park and Wildlife Sanctuaries	Location (District)	Main Habitat
			Slender-billed Vulture, Pallas's Fish- eagle
8.	Hollongpara Gibbon WLS	Jorhat	7 Primates (Hoolock Gibbon, Stump- tailed Macaque, Capped Langur, Pig- tailed Macaque, Assamese Macaque, Slow Loris and Rhesus Macaque)
9.	Nambor- Doigurung WLS	Golaghat	Gaur, Elephants, Hoolock Gibbon
10.	Garampani WLS	Karbi Anglong	Elephants, White-winged Duck, Lesser Adjutant Stork
11.	Nambor WLS	Karbi Anglong	Gaur , Elephants, Hoolock Gibbon
12.	East Karbi Anlong WLS	Karbi Anglong	Gaur, Elephants, Tiger, Hoolock Gibbon
13.	Marat Longri WLS	Karbi Anglong	Tigers, Leopards, Gaur , Elephants, Hoolock Gibbon
14.	Burhachapori WLS	Sonitpur	Elephants, Aquatic Birds, Tiger, Bengal Florican
15.	Laokhowa WLS	Nagaon	Elephant, Tiger, Asiatic Wild Buffalo, Bengal Florican
16.	Pabitora WLS	Morigaon	Rhino, Leopards, Barking Deer, Lesser Adjutant, Greater Adjutant, White- bellied Heron, Greater Spotted Eagle
17.	Sonai-Rupai WLS	Sonitpur	White Winged wood duck, Elephant, Tiger, Gaur
18.	Barnadi WLS	Udalguri	Hispid Hare, Pygmy Hog, Elephants, Tiger
19.	Chakrasila WLS	Kokrajhar	Golden Langur, Gaur
20.	Dihing-Patkai WLS	Dibrugarh and Tinsukia	Hoolock Gibbon, Elephants, White Winged wood duck, Tiger
21.	Borail WLS	Cachar	Serow, Himalayan Black bear, Hoolock Gibbon
22.	Amchang WLS	Kamrup (Metro)	Elephant, Gaur, Leopard
23.	Deepor Beel Wildlife Sanctuary	Kamrup (Metro)	Greater Adjutant Stork, Whistling Teal, Open Billed Stork, Shoveler, Pintail, Garganey, Pheasant tail jacanas



PROTECTED AREAS MAP OF ASSAM

ANNEXURE – 2

ELEPHANT RESERVES & ELEPHANT CORRIDORS IN ASSAM

ANNEXURE 2: ELEPHANT RESERVES AND ELEPHANT CORRIDORS IN ASSAM

Elephant Reserves

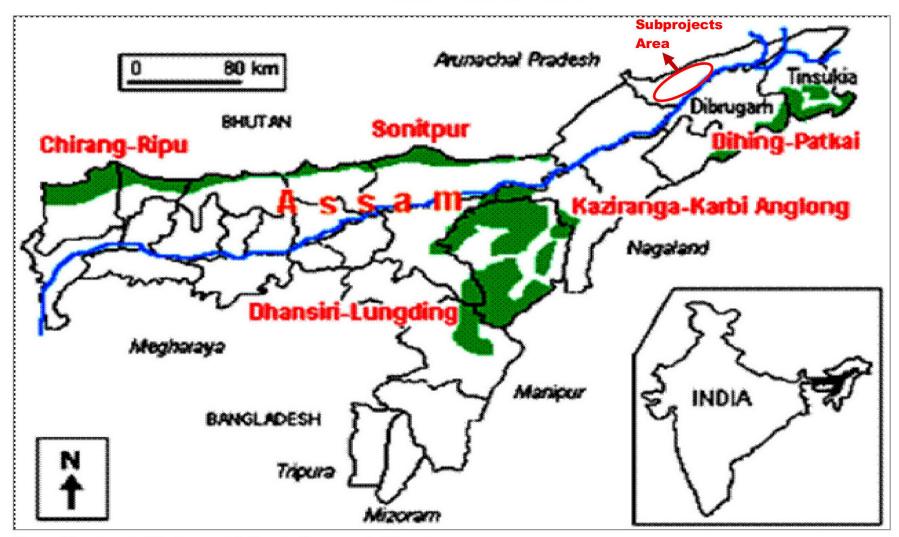
SI. No	Name of Elephant Reserves	Area In sq. km
1	Sonitpur	1,420
2	Dehing-Patkai	937
3	Kaziranga-Karbi Anglong	3,270
4	Dhansiri-Lungding	2,740
5	Chirang-Ripu	2,600

Elephant Corridors

- 1. Kotha-Burhidihing: This corridor connects the Kotha Reserve Forest (Digboi Forest Division) and adjacent elephant populations of Changlang district of Arunachal Pradesh with the Burhidihing Reserve Forest (Doom Dooma Forest Division) thereby maintaining the linkage with Tarai Reserve Forest, Kakojan Reserve Forest and Nalani Reserve Forest. Length of the corridor is 6 km. and width is 1 km. Major Settlements in the corridor are Monogaon and Takeli pathar.
- 2. Upper Dihing East-Upper Dihing West Block at Bogapani: The corridor lies between the Upper Dihing East and West blocks of forestland and passes through Bogapani tea estate and a few settlements (viz. Bogapani and Panbari). This 3 km. long and 0.5 km. wide elephant corridor constitutes of Reserve Forest and some forest land which are leased to tea gardens and patta land.
- 3. Upper Dihing East-Upper Dihing West Block between Golai-Pawai: This corridor is primarily of Reserve Forest and patta land, connecting Upper Dihing East and West blocks for elephant movement. This corridor has witnessed crop depredation by elephant resulting discontinuation of cultivation by the adjacent villagers in 2000-2001. Again new settlements have started coming in the 6-7 km. long and 0.5 km. wide corridor.
- 4. Kalapahar-Daigurung: This corridor, located about 22 km. from Silonijan (Karbi Anglong) on the Silonijan-Chokikhola road is a small patch forest located between Sotiona and Parolijan village (Parolijan River). It is encircled by two hills, namely Kalapahar and Risak on either side connecting Kaziranga National Park via Kalioni Reserve Forest. Length of the corridor is 2 km. and width is 2 km.

- Kaziranga-Karbi Anglong at Panbari: This 1 km. long and 0.85 km. wide corridor consisted of Reserve forest and Kaziranga National Park and connects elephant habitats of Kaziranga National Park with the Karbi Anglong forest.
- 6. Kaziranga-Karbi Anglong at Kanchanjuri: This corridor connects the elephant habitats of Kaziranga National Park with Brahapahar and Karbi Anglong forests. Under Eastern Assam Wildlife Division this corridor area passes through tea gardens and is close to NH 37. Length of the corridor is 2km.and width is 0.5 km. consisting of Reserve forest and proposed addition (4rd addition) to Kaziranga National Park.
- 7. Kukurakata-Bagser at Amguri: This corridor falls under Eastern Assam Wildlife Division, connecting the elephant habitats of Kaziranga National Park and Kukurakata Reserve Forest with Bagser Reserve Forest and the forest of Karbi Anglong. Length of the corridor is 0.8 km.and width 0.5 km. Amguri is the major settlement in the corridor.
- 8. Charduar-Singri hill: This corridor (Sonitpur West Forest Division) passes through tea gardens and settlements of Sonitpur district and is known to have very man-animal conflict. Several major settlements (viz. Posabasi, Panchnoi, Dipabasti, Rowmari basti etc.) lay in this 30 km. long and 1.5 km wide elephant corridor.

ELEPHANT RESERVE IN ASSAM



(Source: Department of Environment & Forests, Government of Assam)

ANNEXURE – 3

TREE, CROP AND TOWER BASE COMPENSATION PROCEDURE

ANNEXURE 3 : TREE / CROP/ TOWER FOOTING COMPENSATION PROCESS (OTHER THAN FOREST LAND COMPENSATION)

As per the provisions of Electricity Act, 2003 and Indian Telegraph Act,1885, land for tower and right of way is not acquired and agricultural activities are allowed to continue. However, the acts also stipulate that licensee shall pay full compensation to all interested for any damages sustained during the execution of said work. Accordingly, AEGCL/APDCL pays compensation to land owners towards damages if any during implementation of transmission project as well as during operation and maintenance phase.

AEGCL/APDCL follows the principle of avoidance, minimization and mitigation in the construction of line in agricultural field having crop due to inherent flexibility in phasing the construction activity and tries to defer construction in cropped area to facilitate crop harvesting. However, if it is unavoidable and is likely to affect project schedule, compensation is given at market rate for standing crops. All efforts are also taken to minimize the crop damage to the extent possible in such cases.

As regards trees coming in the Right of Way (RoW) following procedure is adopted for enumeration: All the trees which are coming within the clearance belt of ROW on either side of the center line are identified and marked/numbered from one AP (Affected Person) to the other and documented. Type, Girth (Measured 1 m. above ground level), approximate height o the tree is also noted for each tree. Trees belonging to Govt., Forest, Highways and other local bodies may be separately noted down or timely follow up with the concerned authorities for inspection and removal. Cashew, Guava, Lemon and other hybrid trees which are not of tall growing nature are not marked for cutting since these trees can be crossed using standard tower extensions if required.

AEGCL/ APDCL also pay compensation to affected land owners for utilization of their land for tower footing. To arrive compensation rate mechanism of negotiated settlement is followed. The association of local authorities like Dy. Commissioner/Addl. Dy Commissioner (Revenue) of concerned district and concerned Circle officers is also ensured during such negotiation. The circle value for the land price fixation as per the Department of Registration for different categories of land for the villages along the transmission line corridor will be obtained from the district registrars. This guidance value will be referred to by the negotiation committee. Once the negotiated rate is finalised & consent is received from land owners, the same is approved by Dy. Commissioner of concerned district for payment of compensation to land owners by AEGCL/ APDCL. All efforts are made to release such payment before construction activities.

A notice under Electricity Act, 2003/ Indian Telegraph Act, 1885 is served to the landowners informing that the proposed transmission line is being routed through the property of the individual concerned. The notice shall contain the particulars of the land, ownership details and the details of the trees/crops/land inevitability likely to be damaged during the course of the construction of the proposed transmission line and acknowledgement received from land owners. A copy of said

notice is further issued to the Revenue Officer/SDM, who has been authorized by the Assam Govt. for the purpose of assessment/valuation and disbursement of compensation to the affected parties.

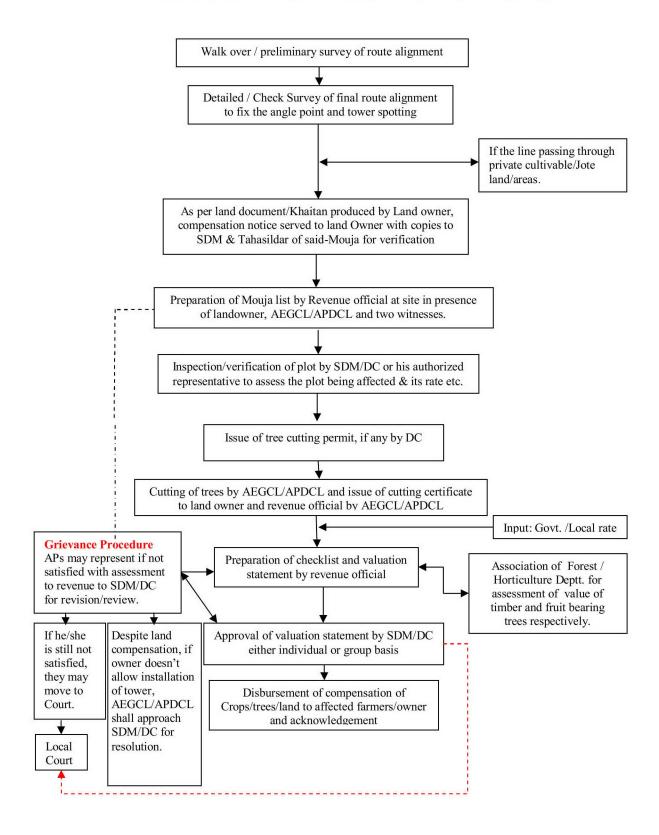
The revenue officer shall further issue a notice of intimation to the concerned land owner and inspect the site to verify the documents related to the proof of ownership and a detailed Mouja list is prepared for the identified trees/ crops/ land for tower footing inevitability damaged during the course of the construction. For assessing the true value of timber yielding trees help of forest officials is taken and for fruit bearing trees help of Horticulture department is taken.

The Mouja list shall contain the land owner details including extent land area utilization for tower footing, type of tree/crop, its present age, variety, yielding pattern etc. and the same is prepared at site in the presence of the land owner. These Mouja lists are further compiled and a random verification is conducted by the concerned DC or his authorized representative in order to ascertain the assessment carried out by the revenue office is genuine and correct. After this process the District Collector issue a tree cutting permit to AEGCL/ APDCL to enable removal / damage to the standing tree/crop identified in the line corridor. Similarly on the basis of enqiry report received from concerned Tehsildar, SDM issue land valuation certificate to AEGCL/ APDCL for payment of compensation to land owner.

Once the tree/crop is removed / damaged, AEGCL/ APDCL shall issue a tree cutting/crop damaged notice to the land owner with a copy to the Revenue Officer to process the compensation payment. Based on the above the compensation payment is generated by means of a computerized programme developed by the National Informatics Center exclusively for this purpose. The detailed Valuation statement thus generated using this programme is verified at various levels and approval of payment of compensation is accorded by the concerned District Collectors.

On approval of compensation, the revenue officer shall further intimate the amount payable to the different landowners and AEGCL/ APDCL arranges the payment by way of Demand Draft/Cheque to the affected parties. The payment is further disbursed at the local village office after due verification of the documents in presence of other witnesses.

TREE / CROP/TOWER FOOTING COMPENSATION PROCESS



ANNEXURE - 4 SAFETY PLAN

ANNEXURE- 4 : SAFETY PLAN

13. FORM OF SAFETY PLAN TO BE SUBMITTED BY THE CONTRACTOR WITHIN SIXTY DAYS OF AWARD OF CONTRACT

[TO BE EXECUTED ON A NON JUDICIAL STAMP PAPER WORTH RS. TWENTY ONLY]

SAFETY PLAN

NOW THEREFORE, the Contractor undertakes to execute the Contract as per the safety plan as follows:

- 1. THAT the Contractor shall execute the works as per provisions of Bidding Documents including those in regard to Safety Precautions / provisions as per statutory requirements.
- 2. THAT the Contractor shall execute the works in a well planned manner from the commencement of Contract as per agreed mile stones of work completion schedule so that planning and execution of construction works goes smoothly and consistently through out the contract duration without handling pressure in last quarter of the financial year/last months of the Contract and the shall be finalized in association with EMPLOYER Engineer In-charge/Project Manager from time to time as required.
- 3. THAT the Contractor has prepared the safe work procedure for each activity i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. to be executed at site, which is enclosed at Annexure 1A (SP) for acceptance and approval of Engineer In-charge/Project Manager. The Contractor shall ensure that on approval of the same from Engineer In-charge/Project Manager, the approved copies will be circulated to Employer's personnel at site [Supervisor(s)/Executive(s)] and Contractor's personnel at site [Gang leader, supervisor(s) etc.] in their local language / language understood by gang.

THAT the Contractor has prepared minimum manpower deployment plan, activity wise as stated above, which is enclosed at **Annexure – 1B (SP)** for approval of Engineer Incharge/Project Manager.

- 4. THAT the Contractor shall ensure while executing works that they will deploy minimum 25% of their own experienced work force who are on the permanent roll of the company and balance 75% can be a suitable mixed with the hired gangs / local workers / casual workers if required. The above balance 75% work force should be provided with at least 10 days training by the construction agencies at sites and shall be issued with a certificate. No worker shall be engaged without a valid certificate. Hired gang workers shall also follow safe working procedures and safety norms as is being followed by company's workmen. It should also be ensured by the contractor that certified fitters who are climbing towers / doing stringing operations can be easily identifiable with a system like issue of Badge / Identification cards (ID cards) etc. Colour identification batches should be worn by the workers. Contractor has to ensure that inexperience workers / unskilled workers should not be deployed for skilled job.
- 5. THAT the Contractor's Gang leader / Supervisor / Senior most member available at every construction site shall brief to each worker daily before start of work about safety requirement and warn about imminent dangers and precautions to be taken against the imminent dangers (Daily Safety Drill). This is to be ensured without fail by Contractor and maintain record of each gang about daily safety instructions issued to workers and put up to EMPLOYER site In-charge for his review and record.
- 6. THAT the Contractor shall ensure that working Gangs at site should not be left at the discretion of their Gang Leaders who are generally hired and having little knowledge about safety. Gang leader should be experienced and well versed with the safe working procedures applicable for transmission line/ Sub Station works. In case gang is having Gang leader not on permanent roll of the company then additional Supervisor from company's own roll having thorough knowledge about the works would be deployed so as to percolate safety instructions up to the grass root level in healthy spirits. Contractor has to ensure close supervision while executing critical locations of transmission lines / sub stations and ensures that all safety instructions are in place and are being followed.
- 7. THAT the Contractor shall maintain in healthy and working condition all kind of Equipments / Machineries / Lifting tools / Lifting tackles / Lifting gears / All kind of Ropes including wire ropes / Polypropylene ropes etc. used for Lifting purpose during execution of the project and get them periodically examined and load tested for safe working load in accordance with relevant provisions and requirement of Building & other construction workers Regulation of Employment and Conditions of Services Act and Central Rule 1998, Factories Act 1948, Indian Electricity Act 2003 before start of the project. A register of such examinations and tests shall be properly maintained by the contractor and will be promptly produced as and when desired by the Engineer In-charge/Project Manager or by the person authorised by him. The Contractor has to ensure to give special attention on the formation / condition of eye splices of wire rope slings as per requirement of IS 2762 Specification for wire rope slings and sling legs.

THAT the Contractor has prepared a list of all Lifting machines, lifting Tools / Lifting Tackles / Lifting Gears etc. / All types of ropes and Slings which are subject to safe working load is enclosed at **Annexure – 2 (SP)** for review and approval of Engineer Incharge/Project Manager.

8. THAT the Contractor has to procure sufficient quantity of Personal Protective Equipment (PPE)conforming to Indian / International standards and provide these equipment to every workman at site as per need and to the satisfaction of Engineer-in-charge/Project Manager of EMPLOYER. The Contractor's Site Supervisor/ Project Manager has to ensure that all workmen must use Personal Protective Equipment at site. The Contractor shall also ensure that Industrial Safety helmets are being used by all workmen at site irrespective of their working (at height or on ground). The Contractor shall further ensure use of safety shoes by all ground level workers and canvas shoes for all workers working at height, Rubber Gum Boots for workers working in rainy season and concreting job, Use of Twin Lanvard Full body Safety Harness with attachment of light weight such as aluminium alloy etc. and having features of automatic locking arrangement of snap hook, by all workers working at height for more than three meters and also for horizontal movement on tower shall be ensured by contractor. The Contractor shall not use ordinary half body safety harness at site. The Contractor has to ensure use of Retractable type fall arrestors by workers for ascending / descending on suspension insulator string and other similar works etc., Use of Mobile fall arrestor for ascending / descending from tower by all workers. The contractor has to provide cotton / leather hand gloves as per requirement, Electrical Resistance Hand gloves for operating electrical installations / switches, Face shield for protecting eyes while doing welding works and Dust masks to workers as per The Contractor will have to take action against the workers not using reauirement. Personal Protective Equipment at site and those workers shall be asked to rest for that day and also their Salary be deducted for that day. EMPLOYER may issue warning letter to Project Manager of contractor in violation of above norms.

THAT the Contractor shall prepare a detailed list of PPEs, activity wise, to commensurate with manpower deployed, which is enclosed at **Annexure – 3 (SP)** for review and approval of Engineer In-charge/Project Manager. It shall also be ensured that the sample of these equipment shall be got approved from EMPLOYER supervisory staff before being distributed to workers. The contractor shall submit relevant test certificates as per IS / International Standard as applicable to PPEs used during execution of work. All the PPE's to be distributed to the workers shall be checked by EMPLOYER supervisory staff before its usage.

The Contractor also agrees for addition / modification to the list of PPE, if any, as advised by Engineer In-Charge/Project Manager.

9. THAT the Contractor shall procure, if required sufficient quantity of Earthing Equipment / Earthing Devices complying with requirements of relevant IEC standards (Generally IECs standards for Earthing Equipments / Earthing Devices are – 855, 1230, 1235 etc.) and to the satisfaction of Engineer In-Charge/ Project Manager and contractor to ensures to maintained them in healthy condition.

THAT the Contractor has prepared / worked out minimum number of healthy Earthing Equipments with Earthing lead confirming to relevant IS / European standards per gang wise during stringing activity/as per requirement, which is enclosed herewith at **Annexure** – **4 (SP)** for review and acceptance of Engineer In-Charge/ Project Manager prior to execution of work.

- 10. THAT the Contractor shall provide communication facilities i.e. Walky Talkie / Mobile Phone, Display of Flags / whistles for easy communication among workers during Tower erection / stringing activity, as per requirement.
- 11. THAT the Contractor undertakes to deploy qualified safety personnel responsible for safety as per requirements of Employer/Statutory Authorities.

THAT the Contractor employing more than 250 workmen whether temporary, casual, probationer, regular or permanent or on contract, shall employ at least one full time officer exclusively as qualified safety officer having diploma in safety to supervise safety aspects of the equipment and workmen who will coordinate with Engineer In-charge /Project Manager/Safety Coordinator of the Employer. In case of work being carried out through sub contractors the sub – contractor's workmen / employees will also be considered as the contractor's employees / workmen for the above purpose. If the number of workers are less than 250 then one qualified safety officer is to be deployed for each contract. He will report directly to his head of organization and not the Project Manager of contractor He shall also not be assigned any other work except assigning the work of safety. The curriculum vitae of such person shall be got cleared from EMPLOYER Project Manager / Construction staff.

The name and address of such safety officers of contractor will be promptly informed in writing to Engineer In-charge with a copy to safety officer - In-charge before start of work or immediately after any change of the incumbent is made during the currency of the contract. The list is enclosed at **Annexure – 5A (SP)**.

THAT the Contractor has also prepared a list including details of Explosive Operator (if required), Safety officer / Safety supervisor / nominated person for safety for each erection / stringing gang, list of personnel trained in First Aid Techniques as well as copy of organisation structure of the Contractor in regard to safety. The list is enclosed at **Annexure – 5B (SP)**.

- 12. The Project Manager shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/or property, and/or equipment. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury/accident and he shall comply to remove shortcomings promptly. The Contractor after stopping the specific work can, if felt necessary, appeal against the order of stoppage of work to the Project Manager within 3 days of such stoppage of work and decision of the Project Manager in this respect shall be conclusive and binding on the Contractor.
- 13. THAT, if, any Employer's Engineer/ supervisor at site observes that the Contractor is failing to provide safe working environment at site as per agreed Safety Plan / EMPLOYER Safety Rule/ Safety Instructions / Statutory safety requirement and creates hazardous conditions at site and there is possibility of an accident to workmen or workmen of the other contractor or public or the work is being carried out in an un safe manner or he continues to work even after being instructed to stop the work by Engineer / Supervisor at site / RHQ / Corp. Centre, the Contractor shall be bound to pay a penalty of Rs. 10,000/ per incident per day till the instructions are complied and as certified by Engineer / Supervisor of Employer at site. The work will remain suspended and no activity will take place without compliance and obtaining clearance / certification of the Site Engineer / Supervisor of the Employer to start the work.

14. THAT, if the investigation committee of Employer observes any accident or the Engineer In-charge/Project Manager of the Employer based on the report of the Engineer/Supervisor of the Employer at site observes any failure on the Contractor's part to comply with safety requirement / safety rules/ safety standards/ safety instruction as prescribed by the Employer or as prescribed under the applicable law for the safety of the equipment, plant and personnel and the Contractor does not take adequate steps to prevent hazardous conditions which may cause injury to its own Contractor's employees or employee of any other Contractors or Employer or any other person at site or adjacent thereto, or public involvement because of the Contractor's negligence of safety norms, the Contractor shall be liable to pay a compensation of Rs. 10.00.000/- (Rupees Ten Lakh only) per person affected causing death and Rs. 1.00,000/- (Rupees One Lakh only) per person for serious injuries / 25% or more permanent disability to the Employer for further disbursement to the deceased family/ Injured persons. The permanent disability has the same meaning as indicated in Workmen's Compensation Act 1923. The above stipulations is in addition to all other compensation pavable to sufferer as per workmen compensation Act / Rules

THAT as per the Employer's instructions, the Contractor agrees that this amount shall be deducted from their running bill(s) immediately after the accident, That the Contractor understands that this amount shall be over and above the compensation amount liable to be paid as per the Workmen's Compensation Act /other statutory requirement/ provisions of the Bidding Documents.

- 15. THAT the Contractor shall submit Near-Miss-Accident report along with action plan for avoidance such incidence /accidents to Engineer In-charge/ Project Manager. Contractor shall also submit Monthly Safety Activities report to Engineer In-charge/ Project Manager and copy of the Monthly Safety Activities report also to be sent to Safety In-charge at RHQ of the Employer for his review record and instructions.
- THAT the Contractor is submitting a copy of Safety Policy/ Safety Documents of its Company which is enclosed at **Annexure – 6 (SP)** and ensure that the safety Policy and safety documents are implemented in healthy spirit.
- 17. THAT the Contractor shall make available of First Aid Box [Contents of which shall be as per Building & other construction workers (Regulation of Employment and Conditions of Services Act and Central Rule 1998 / EMPLOYER Guidelines)] to the satisfaction of Engineer In-Charge/ Project Manager with each gang at site and not at camp and ensures that trained persons in First Aid Techniques with each gang before execution of work.
- 18. THAT the Contractor shall submit an 'Emergency Preparedness Plan' for different incidences i.e. Fall from height, Electrocution, Sun Stroke, Collapse of pit, Collapse of Tower, Snake bite, Fire in camp / Store, Flood, Storm, Earthquake, Militancy etc. while carrying out different activities under execution i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. which is enclosed at Annexure 7 (SP) for approval of the Engineer In-Charge/ Project Manager before start of work.
- 19. THAT the Contractor shall organise Safety Training Programs on Safety, Health and Environment and for safe execution of different activities of works i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal

of materials at site / store etc. for their own employees including sub contractor workers on regular basis.

The Contractor, therefore, submits copy of the module of training program, enclosed at **Annexure – 9 (SP)**, to Engineer In-charge/Project Manager for its acceptance and approval and records maintained.

- 20. THAT the Contractor shall conduct safety audit, as per Safety Audit Check Lists enclosed at Annexure - 8 (SP), by his Safety Officer(s) every month during construction of Transmission Lines / Sub Stations / any other work and copy of the safety audit report will be forwarded to the Employer's Engineer In-charge / Site In-charge/Project Manager for his comments and feedback. During safety audit, healthiness of all Personal Protective Equipments (PPEs) shall be checked individually by safety officer of contractor and issue a certificate of its healthiness or rejection of faulty PPEs and contractor has to ensure that all faulty PPEs and all faulty lifting tools and tackles should be destroyed in the presence of EMPLOYER construction staff. Contractor has to ensure that each gang be safety audited at least once in two months. During safety audit by the contractor, Safety officer's feedback from EMPLOYER concerned shall be taken and recorded. The Employer's site officials shall also conduct safety audit at their own from time to time when construction activities are under progress. Apart from above, the Employer may also conduct surveillance safety audits. The Employer may take action against the person / persons as deemed fit under various statutory acts/provisions under the Contract for any violation of safety norms / safety standards.
- 21. THAT the Contractor shall develop and display Safety Posters of construction activity at site and also at camp where workers are generally residing.
- 22. THAT the Contractor shall ensure to provide potable and safe drinking water for workers at site / at camp.
- 23. THAT the Contractor shall do health check up of all workers from competent agencies and reports will be submitted to Engineer In-Charge within fifteen (15) days of health check up of workers as per statutory requirement.
- 24. THAT the Contractor shall submit information along with documentary evidences in regard to compliance to various statutory requirements as applicable which are enclosed at **Annexure 10A (SP)**.

The Contractor shall also submit details of Insurance Policies taken by the Contractor for insurance coverage against accident for all employees are enclosed at **Annexure – 10B (SP)**.

25. THAT a check-list in respect of aforesaid enclosures along with the Contractor's remarks, wherever required, is attached as **Annexure – Check List** herewith.

THE CONTRACTOR shall incorporate modifications/changes in this 'Safety Plan' necessitated on the basis of review/comments of the Engineer In-Charge/Project Manager within fourteen (14) days of receipt of review/comments and on final approval of the Engineer In-Charge/Project Manager of this 'Safety Plan', the Contractor shall execute the works under the Contract as per approved 'Safety Plan'. Further, the Contractor has also noted that the first progressive payment towards Services Contract shall be made on submission of 'Safety Plan' along with all requisite documents and approval of the same by the Engineer In-Charge/Project Manager.

IN WITNESS WHEREOF, the Contractor has hereunto set its hand through its authorised representative under the common seal of the Company, the day, month and year first above mentioned.

For and on behalf of

M/s.....

WIT	NESS	
	Signature	Signature
	Name	Name
2.	Signature	Authorised representative
	Name	(Common Seal)
	Address	(In case of Company)

Note:

All the annexure referred to in this "Safety Plan" are required to be enclosed by the contractor as per the attached "Check List "

- 1. Safety Plan is to be executed by the authorised person and (i) in case of contracting Company under common seal of the Company or (ii) having the power of attorney issued under common seal of the company with authority to execute such contract documents etc., (iii) In case of (ii), the original Power of Attorney if it is specifically for this Contract or a Photostat copy of the Power of Attorney if it is General Power of Attorney and such documents should be attached to this Safety Plan.
- 2. For all safety monitoring/ documentation, Engineer In-charge / Regional In-charge of safety at RHQ will be the nodal Officers for communication.

CHECK LIST FOR SEFETY PLAN

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
1.	Annexure – 1A (SP) Safe work procedure for each activity i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. to be executed at site.	Yes/No	
2.	Annexure – 1B (SP) Manpower deployment plan, activity wise foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc.	Yes/No	
3.	Annexure – 2 (SP) List of Lifting Machines i.e. Crane, Hoist, Triffor, Chain Pulley Blocks etc. and Lifting Tools and Tackles i.e. D shackle, Pulleys, come along clamps, wire rope slings etc. and all types of ropes i.e. Wire ropes, Poly propylene Rope etc. used for lifting purposes along with test certificates.	Yes/No	
4.	 Annexure – 3 (SP) List of Personal Protective Equipment (PPE), activity wise including the following along with test certificate of each as applicable: 1. Industrial Safety Helmet to all workmen at site. (EN 397 / IS 2925) with chin strap and back stay arrangement. 2. Safety shoes without steel toe to all ground level workers and canvas shoes for workers working on tower. 3. Rubber Gum Boot to workers working in rainy season / concreting job. 4. Twin lanyard Full Body Safety harness with shock absorber and leg strap arrangement for all workers working at height for more than three meters. Safety Harness should be with attachments of light weight such as of aluminium alloy etc. and having a feature of automatic locking arrangement of snap hook 	Yes/No	

C 11	Details of Englacing	C1-1	Domoris
S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	 and comply with EN 361 / IS 3521 standards. 5. Mobile fall arrestors for safety of workers during their ascending / descending from tower / on tower. EN 353 -2 (Guided type fall arresters on a flexible anchorage line.) 		
	 Retractable type fall arrestor (EN360: 2002) for ascending / descending on suspension insulator string etc. 		
	 Providing of good quality cotton hand gloves / leather hand gloves for workers engaged in handling of tower parts or as per requirement at site. 		
	 8. Electrical Resistance hand gloves to workers for handling electrical equipment / Electrical connections. IS : 4770 		
	 Dust masks to workers handling cement as per requirement. Face shield for welder and Grinders. 		
_	: 1179 / IS : 2553 11. Other PPEs, if any, as per requirement etc.		
5.	Annexure – 4 (SP) List of Earthing Equipment / Earthing devices with Earthing lead conforming to IECs for earthing equipments are – (855, 1230, 1235 etc.) gang	Yes/No	
6.	wise for stringing activity/as per requirement. Annexure – 5A (SP) List of Qualified Safety Officer(s) along with their	Yes/No	
7.	contact details. Annexure – 5B (SP) Details of Explosive Operator (if required), Safety	Yes/No	
	officer / Safety supervisor for every erection / stinging gang, any other person nominated for safety, list of personnel trained in First Aid as well as brief information about safety set up by the Contractor alongwith copy of organisation of the Contractor in regard to safety		
8.	Annexure – 6 (SP) Copy of Safety Policy/ Safety Document of the Contractor's company	Yes/No	
9.	Annexure – 7 (SP) 'Emergency Preparedness Plan' for different incidences i.e. Fall from height, Electrocution, Sun	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	Stroke, Collapse of pit, Collapse of Tower, Snake bite, Fire in camp / Store, Flood, Storm, Earthquake, Militancy etc. while carrying out different activities under execution i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc.		
10.	Annexure – 8 (SP) Safety Audit Check Lists (Formats to be	Yes/No	
11.	enclosed) Annexure – 9 (SP) Copy of the module of Safety Training Programs on Safety, Health and Environment, safe execution of different activities of works for Contractor's own employees on regular basis and sub contractor employees.	Yes/No	
12.	Annexure – 10A (SP) Information along with documentary evidences in regard to the Contractor's compliance to various statutory requirements including the following:		
(i)	Electricity Act 2003 [Name of Documentary evidence in support of compliance]	Yes/No	
(ii)	Factories Act 1948 [Name of Documentary evidence in support of compliance]	Yes/No	
(iii)	Building & other construction workers (Regulation of Employment and Conditions of Services Act and Central Act 1996) and Welfare Cess Act 1996 with Rules. [Name of Documentary evidence in support of	Yes/No	
(iv)	<i>compliance</i>] Workmen Compensation Act 1923 and Rules. [Name of Documentary evidence in support of	Yes/No	
(v)	<i>compliance</i>] Public Insurance Liabilities Act 1991 and Rules. [Name of Documentary evidence in support of compliance]	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
(vi)	Indian Explosive Act 1948 and Rules.	Yes/No	
	[Name of Documentary evidence in support of compliance]		
(vii)	Indian Petroleum Act 1934 and Rules.	Yes/No	
	[Name of Documentary evidence in support of compliance]		
(viii)	License under the contract Labour (Regulation & Abolition) Act 1970 and Rules.	Yes/No	
	[Name of Documentary evidence in support of compliance]		
(ix)	Indian Electricity Rule 1956 and amendments if any, from time to time.	Yes/No	
	[Name of Documentary evidence in support of compliance]		
(x)	The Environment (Protection) Act 1986 and Rules.	Yes/No	
	[Name of Documentary evidence in support of compliance]		
(xi)	Child Labour (Prohibition & Regulation) Act 1986.	Yes/No	
	[Name of Documentary evidence in support of compliance]		
(xii)	National Building Code of India 2005 (NBC 2005).	Yes/No	
	[Name of Documentary evidence in support of compliance]		
(xiii)	Indian standards for construction of Low/ Medium/ High/ Extra High Voltage Transmission Line	Yes/No	
	[Name of Documentary evidence in support of compliance]		
(iv)	 Any other statutory requirement(s) Yes [please specify] 	Yes/No	
	[Name of Documentary evidence in support of compliance]		
13.	Annexure – 10B (SP)		
	Details of Insurance Policies alongwith		

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	documentary evidences taken by the Contractor for the insurance coverage against accident for all employees as below:		
(i)	Under Workmen Compensation Act 1923 and Rules.	Yes/No	
	[Name of Documentary evidence in support of insurance taken]		
(ii)	Public Insurance Liabilities Act 1991	Yes/No	
	[Name of Documentary evidence in support of insurance taken]		
(iii)	Any Other Insurance Policies	Yes/No	
	[Name of Documentary evidence in support of insurance taken]		

EMPLOYER

ANNEXURE – 5

SAFETY CONDITIONS IN CONTRACT DOCUMENT

ordered by the Employer consistent with the requirements of the Contract.

PC 21.4 Replace the word 'materials' in line no. 2 with 'Plant and Equipment'.

Add the word '**including liabilities for port charges if any**' after the word '**clearance**' in line no. 3.

Addition of Sub-Clauses (PC22.2.3.1, PC22.2.3.2, PC22.2.3.3, PC 22.2.3.4) of GC 22.2.3

PC 22.2.3.1 Compliance with Labour Regulations

During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all applicable existing labour enactments and rules made thereunder, regulations notifications and byelaws of the State or Central Government or local authority and any other labour law (including rules), regulations bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The employees of the Contractor and the Sub-contractor in no case shall be treated as the employees of the Employer at any point of time.

- PC 22.2.3.2 The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments.
- PC 22.2.3.3 If the Employer is caused to pay under any law as principal employer such amounts as may be necessary to cause or observe, or for non observance of the provisions stipulated in the notifications/ byelaws/Acts/ Rules/regulations including amendments, if any, on the part of the Contractor, the Employer shall have the right to deduct any money due to the Contractor under this contract or any other contract with the employer including his amount of performance security for adjusting the aforesaid payment. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.
- PC 22.2.3.4 Salient features of some major laws applicable to establishments engaged in building and other construction works are indicated at Appendix-I to PC.

Addition of New Sub-Clauses (PC22.4.1 to 22.4.3 including its subclauses) of GC 22.4

PC 22.4.1 Protection of Environment

The Contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other

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causes arising as consequence of his methods of operation.

During continuance of the Contract, the Contractor and his Subcontractors shall abide at all times by all existing enactments on environmental protection and rules made there under, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

Salient features of some of the major laws that are applicable are given below:

The Water (Prevention and Control of Pollution) Act, 1974, This provides for the prevention and control of water pollution and the maintaining and restoring of wholesomeness of water. 'Pollution' means such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.

The Air (Prevention and Control of Pollution) Act, 1981, This provides for prevention, control and abatement of air pollution. 'Air Pollution' means the presence in the atmosphere of any 'air pollutant', which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

The Environment (Protection) Act, 1986, This provides for the protection and improvement of environment and for matters connected therewith, and the prevention of hazards to human beings, other living creatures, plants and property. 'Environment' includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.

The Public Liability Insurance Act, 1991, This provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as hazardous substance under Environment (Protection) Act, 1986, and exceeding such quantity as may be specified by notification by the Central Government.

PC 22.4.2

(i)

The Contractor shall (a) establish an operational system of managing environmental impacts, (b) carry out all the monitoring and mitigation measures set forth in the environment management plan attached to the Particular Conditions as Appendix-I, and (c) allocate the budget required

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to ensure that such measures are carried out. The Contractor shall submit to the Employer (quarterly) semi-annual) reports on the carrying out of such measures.

- (ii) The Contractor shall adequately record the conditions of roads, agricultural land and other infrastructure prior to transport of material and construction commencement, and shall fully reinstate pathways, other local infrastructure and agricultural land to atleast their pre-project condition upon construction completion.
- (iii) The Contractor shall undertake detailed survey of the affected persons during transmission line alignment finalization under the Project, where applicable. and
- (iv) The Contractor shall conduct health and safety programme for workers employed under the Contract and shall include information on the risk of sexually transmitted diseases, including HIV/AIDS in such programs.

PC 22.4.3 Safety Precautions

PC 22.4.3.1 The Contractor shall observe all applicable regulations regarding safety on the Site.

Unless otherwise agreed, the Contractor shall, from the commencement of work on Site until taking over; provide:

- a) fencing, lighting, guarding and watching of the Works wherever required, and
- b) temporary roadways, footways, guards and fences which may be necessary for the accommodation and protection of Employer / his representatives and occupiers of adjacent property, the public and others.
- PC 22.4.3.2 The Contractor shall ensure proper safety of all the workmen, materials, plant and equipment belonging to him or to THE EMPLOYER or to others, working at the Site. The Contractor shall also be responsible for provision of all safety notices and safety equipment required both by the relevant legislations and the Engineer, as he may deem necessary.
- PC 22.4.3.3 The Contractor will notify well in advance to the Engineer of his intention to bring to the Site any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals which may involve hazards. The Engineer shall have the right to prescribe the conditions, under which such container is to be stored, handled and used during the performance of the works and the Contractor shall strictly adhere to and comply with such

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instructions. The Engineer shall have the right at his sole discretion to inspect any such container or such construction plant/equipment for which material in the container is required to be used and if in his opinion, its use is not safe, he may forbid its use. No claim due to such prohibition shall be entertained by the Owner and the Owner shall not entertain any claim of the Contractor towards additional safety provisions/conditions to be provided for/constructed as per the Engineer's instructions.

Further, any such decision of the Engineer shall not, in any way, absolve the Contractor of his responsibilities and in case, use of such a container or entry thereof into the Site area is forbidden by the Engineer, the Contractor shall use alternative methods with the approval of the Engineer without any cost implication to THE EMPLOYER or extension of work schedule.

PC 22.4.3.4

Where it is necessary to provide and/or store petroleum products or petroleum mixtures and explosives, the Contractor shall be responsible for carrying-out such provision and/or storage in accordance with the rules and regulations laid down in Petroleum Act 1934. Explosives Act, 1948 and Petroleum and Carbide of Calcium Manual published by the Chief Inspector of Explosives of India. All such storage shall have prior approval of the Engineer. In case, any approvals are necessary from the Chief Inspector (Explosives) or any statutory authorities, the Contractor shall be responsible for obtaining the same.

PC 22.4.3:5

All equipment used in construction and erection by Contractor shall meet Indian/International Standards and where such standards do not exist, the Contractor shall ensure these to be absolutely safe. All equipment shall be strictly operated and maintained by the Contractor in accordance with manufacturer's Operation Manual and safety instructions and as per Guidelines/rules of THE EMPLOYER in this regard.

PC 22.4.3.6

Periodical examinations and all tests for all lifting/hoisting equipment & tackles shall be carried-out in accordance with the relevant provisions of Factories Act 1948, Indian Electricity Act 1910 and associated Laws/Rules in force from time to time. A register of such examinations and tests shall be properly maintained by the Contractor and will be promptly produced as and when desired by the Engineer or by the person authorised by him.

PC 22.4.3.7

The Contractor shall be fully responsible for the safe storage of his and his Sub-Contractor's radioactive sources in accordance with BARC/DAE Rules and other applicable provisions. All precautionary measures stipulated by

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BARC/DAE in connection with use, storage and handling of such material will be taken by the Contractor.

PC 22.4.3.8 The Contractor shall provide suitable safety equipment of prescribed standard to all employees and workmen according to the need, as may be directed by the Engineer who will also have right to examine these safety equipment to determine their suitability, reliability, acceptability and adaptability.

PC 22.4.3.9 Where explosives are to be used, the same shall be used under the direct control and supervision of an expert, experienced, qualified and competent person strictly in accordance with the Code of Practice/Rules framed under Indian Explosives Act pertaining to handling, storage and use of explosives.

PC 22.4.3.10 The Contractor shall provide safe working conditions to all workmen and employees at the Site including safe means of access, railings, stairs, ladders, scaffoldings etc. The scaffoldings shall be erected under the control and supervision of an experienced and competent person. For erection, good and standard quality of material only shall be used by the Contractor.

PC 22.4.3.11 The Contractor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to the • Owner or other Contractors under any circumstances, whatsoever, unless expressly permitted in writing by THE EMPLOYER to handle such fuses, wiring or electrical equipment

PC 22.4.3.12 Before the Contractor connects any electrical appliances to any plug or socket belonging to the other Contractor or Owner, he shall:

- a. Satisfy the Engineer that the appliance is in good working condition:
- b. Inform the Engineer of the maximum current rating, voltage and phases of the appliances;
- Obtain permission of the Engineer detailing the sockets to which the appliances may be connected.

PC 22.4.3.13

- 13 The Engineer will not grant permission to connect until he is satisfied that:
 - a. The appliance is in good condition and is fitted with suitable plug;
 - b. The appliance is fitted with a suitable cable having two earth conductors, one of which shall be an

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earthed metal sheath surrounding the cores.

PC 22.4.3.14 No electric cable in use by the Contractor/Owner will be disturbed without prior permission. No weight of any description will be imposed on any cable and no ladder or similar equipment will rest against or attached to it.

PC 22.4.3.15 No repair work shall be carried out on any live equipment. The equipment must be declared safe by the Engineer and a permit to work shall be issued by the Engineer before any repair work is carried out by the Contractor. While working on electric lines/equipment, whether live or dead, suitable type and sufficient quantity of tools will have to he provided by the Contractor to electricians/workmen/officers.

PC 22.4.3.16

The Contractors shall employ necessary number of qualified, full time electricians/electrical supervisors to maintain his temporary electrical installation.

PC 22.4.3.17

The Contractor employing more than 250 workmen whether temporary, casual, probationer, regular or permanent or on contract, shall employ at least one full time officer exclusively as safety officer to supervise safety aspects of the equipment and workmen, who will coordinate with the Project Safety Officer. In case of work being carried out through Sub-Contractors, the Sub-Contractor's workmen/employees will also be considered as the Contractor's employees/workmen for the above purpose.

The name and address of such Safety Officers of the Contractor will be promptly informed in writing to Engineer with a copy to Safety Officer-In charge before he starts work or immediately after any change of the incumbent is made during currency of the Contract.

PC 22.4.3.18

In case any accident occurs during the construction/ erection or other associated activities undertaken by the Contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the Contractor to promptly inform the same to the Engineer in prescribed form and also to all the authorities envisaged under the applicable laws.

PC 22.4.3.19

The Engineer shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/or property, and/or equipment. In such cases, the Contractor shall be informed in writing about the nature of hazards and

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possible injury/accident and he shall comply to remove shortcomings promptly. The Contractor after stopping the specific work can, if felt necessary, appeal against the order of stoppage of work to the Engineer within 3 days of such stoppage of work and decision of the Engineer in this respect shall be conclusive and binding on the Contractor.

PC 22.4.3.20

The Contractor shall not be entitled for any damages/compensation for stoppage of work due to safety reasons as provided in para GCC 22.4.3.19 above and the period of such stoppage of work will not be taken as an extension of time for completion of work and will not be the ground for waiver of levy of liquidated damages.

PC 22.4.3.21

It is mandatory for the Contractor to observe during the execution of the works: requirements of Safety Rules which would generally include but not limited to following:

Safety Rules

- a) Each employee shall be provided with initial indoctrination regarding safety by the Contractor, so as to enable him to conduct his work in a safe manner.
- b) No employee shall be given a new assignment of work unfamiliar to him without proper introduction as to the hazards incident thereto, both to himself and his fellow employees.
- Under no circumstances shall an employee hurry or take unnecessary chance when working under hazardous conditions.
- d) Employees must not leave naked fires unattended.
 Smoking shall not be permitted around fire prone areas and adequate fire fighting equipment shall be provided at crucial location.
- Employees under the influence of any intoxicating beverage, even to the slightest degree shall not be permitted to remain at work.
- There shall be a suitable arrangement at every work site for rendering prompt and sufficient first aid to the injured.
- g) The staircases and passageways shall be adequately lighted.
- h) The employees when working around moving machinery, must not be permitted to wear loose

EMPLOYER employees or any other person who are at Site or adjacent thereto, then the Contractor shall be responsible for payment of a sum as indicated below to be deposited with THE EMPLOYER, which will be passed on by THE EMPLOYER to such person or next to kith and kin of the deceased:

a. Fatal injury or accident causing death	Rs. 1.000,000/- per person
b. Major injuries or accident causing 25% or more permanent disablement	Rs. 100,000/- per person

Permanent disablement shall have same meaning as indicated in Workmen's Compensation Act. The amount to be deposited with THE EMPLOYER and passed on to the person mentioned above shall be in addition to the compensation payable under the relevant provisions of the Workmen's Compensation Act and rules framed there under or any other applicable laws as applicable from time to time. In case the Contractor does not deposit the above mentioned amount with THE EMPLOYER, such amount shall be recovered by THE EMPLOYER from any monies due or becoming due to the Contractor under the contract or any other on-going contract.

PC22.4.3.25

If the Contractor observes all the Safety Rules and Codes, Statutory Laws and Rules during the currency of Contract awarded by the Owner and no accident ocours then THE EMPLOYER may consider the performance of the Contractor and award suitable 'ACCIDENT FREE. SAFETY MERITORIOUS AWARD' as per scheme as may be announced separately from time to time.

PC22.4.3.26

The Contractor shall also submit 'Safety Plan' as per proforma specified in Section IX: Contract Forms, Part-3 of Bidding Documents alongwith all the requisite documents mentioned therein and as per check-list contained therein to the Engineer In-Charge for its approval within 60 days of award of Contract.

Further, one of the conditions for release of first progressive payment / subsequent payment towards Services Contract shall be submission of 'Safety Plan' alongwith all requisite documents and approval of the same by the Engineer In-Charge.

8.16

Section VIII. Particular Conditions

Emergency Work (GC Clause 22.6) PC 22.6 Replace the words "Otherwise" with "In case such work is not in the scope of the Contractor", in the second last line of second paragraph of GC clause 22.6. Supplementing sub-clause GC 23.3 PC 23.3 For notification of testing, four weeks shall be deemed as reasonable advance notice. Test and Inspection (GC Clause 23.7). PC 23.7 Replace the words "GC Sub-Clause 6.1" with "GC Sub-Clause 46.1", in the last line of GC clause 23.7. Replace the marginal words/headings `Completion of the Facilities' PC 24 with 'Pre Commissioning' Replace sub clause GC 24.5 with the following: PC 24.5 The Project Manager shall, within fourteen (14) days after receipt of the Contractor's notice under sub clause GC 24.4; notify the Contractor in writing of any defects and/or deficiencies. If the Project Manager notifies the Contractor of any defects and/or deficiencies, the Contractor shall then correct such defects and/or deficiencies, and shall repeat the procedure described in sub clause GC 40 40 40 40 24.4. If the Project Manager is satisfied that the Facilities or that part thereof have passed Pre-commissioning, the Project Manager shall, within fourteen (14) days after receipt of the Contractor's notice/ seven (7) days after receipt of the Contractor's repeated notice, advise the Contractor to proceed with the Commissioning of the Facilities or that part thereof. If the Project Manager is not so satisfied, then it shall notify the Contractor in writing of any defects and/or deficiencies within seven (7) days after receipt of the Contractor's repeated notice, and the above procedure shall be repeated. Replacing Sub-Clause GC 24.6 PC 24.6 If the Project Manager fails to advise the Contractor to proceed with the Commissioning of the Facilities or the relevant part thereof or inform the Contractor of any defects and/or deficiencies within fourteen (14) days after receipt of the Contractor's notice under GC Sub-Clause 24.4 or within seven (7) days after receipt of the Contractor's repeated notice under GC Sub-Clause 24.5, then the Facilities or that part thereof shall be deemed to have passed Precommissioning, as of the date of the Contractor's notice or repeated notice, as the case may be. Replace the word ` Completion' with ` Pre-commissioning' in the 1st line PC 24.7 of sub clause GC 24.7 Tower Packages ASM-TW01 & ASM-TW02 for Assam associated with NER Power System Improvement Project

ANNEXURE – 6

HEALTH AND SAFETY CHECKLISTS

ANNEXURE 6: HEALTH AND SAFETY CHECKLIST

Safety Related Check List during Construction of Transmission Lines/Distribution Lines

Region: Date	e of Safety Audit:
Name of Transmission/Distributio	n Line:
Loc. No:	Voltage Level:
Name of Contractor:	
Contractor License / Registration	No.:Validity
Name of Sub Contractor :	
Sub-Contractor License / Registra	tion No.:Validity

I. DURING TOWER FOUNDATION :

SN	Description of Activity	Feed back	Remarks
i)	Excavation :		
1.	Dumping of Excavated soil. (Minimum 1.5 Mts. or half the depth of the pit which ever is more)	Yes / No.	
2.	Whether angle of repose of soil as per design in the foundation is maintained or not.	Yes / No.	
3.	De watering arrangement is available (If necessary)	Yes / No.	
4.	Working area has been protected properly to avoid against fall of passerby or animal in the excavated pit.	Yes / No.	
5	Shoring & Shuttering to protect the loose rock / soil against fall exists.	Yes / No.	
6	Arrangement of illumination at construction site is available. (if required)	Yes / No.	
7	Check proper/adequate arrangement is made for extension of electric supply. (Proper size of cable, Use of fuse, No loose connection for De-watering Pumps/ Illumination / Electric compressors etc. if applicable).	Yes / No.	
8	Check for damage / Uneven settlement of foundation.	Yes / No.	
9	Ensure Life saver arrangements have been made during construction of well foundation in river bed. (Where necessary)	Yes / No.	
10	Check that the adequate arrangement is made for the storage of blasting material at safe place. (if required)	Yes / No.	
11	Check that the blasting materials is handled with due care at site. (If required)	Yes / No.	
12	Check that during blasting operation, Labour / Workmen / Passerby are at safe places and arrangement is made to inform public by caution markings (Red Flag) / Public Notices.	Yes / No.	

SN	Description of Activity	Feed back	Remarks
13	Check that the Blaster is holding the proper license issued by	Yes / No.	
1 4	the appropriate authority. as per the Indian Explosive Act.		
14	Check that the length of the fuse wire used during blasting	Yes / No.	
1 -	operation is adequate.		
15	Ensure Laying of temporary cable used for operation of	Vac / Na	
	Machines used during construction should not cause any	Yes / No.	
16	danger for electrocution of workmen.		
10	Check that PPEs i.e. Safety helmets, Safety Shoes, is used by blaster and their gang members during blasting.	Yes / No.	
17	Ensure that Shuttering and timbering has been made as		
	detailed in I:S: 3764.	Yes / No.	
18	Ensure that before undertaking excavation, the soil has been		
	tested and in case of availability of any explosive / dangerous	Yes / No.	
	gas, necessary arrangement must be made to remove / dilute	res / NO.	
	such gases.		
19	The positions of underground installations such as sewers,		
	water pipes and electrical cables have been verified and in case	Yes / No.	
	of their existence, they must be isolated.		
20	Arrangement shall be made to prevent external vibrations due	Yes / No.	
	to rail / road traffic (If required).	103 / 110.	
21	Safety is ensured during the construction of Tr. Lines for		
	buildings, structures etc. which are coming in the vicinity of the	Yes / No.	
	excavated area from collapse. (If required)		
22	Check that sufficient strong ladder of suitable length is	Yes / No.	
	available for ingress / outgress of persons in the pit		
23	Lone worker should not be allowed to work in the excavated	Yes / No.	
24	area beyond shoulder level.		
24	Check for any possibility of seepage of water from nearby	Yes / No.	
	pond / river should be estimated and taken care of.		
25	After excavation the work has been completed speedily and	Yes / No.	
	back filling done at the earliest.	,	
ii)	Casting of Foundation / Concreting :		
1	Check construction materials are stacked at safe place and also		
	does not cause any danger. (Away from pit by 1.5 Mtrs. Or half	Yes / No.	
	the depth of pit, which ever is more.)		
2	Check arrangement of illumination at Construction Site. (If	Yes / No.	
	required).	Tes / NO.	
3	Ensure life saver arrangements have been made during	Yes / No.	
	construction of Well foundation in River Bed.	103/110.	
4	Check that the Concreting Mixer machine is placed at a safe	Yes / No.	
	place. (Not very near to pit.)	1057110.	
5	Check proper / adequate arrangement is made for extension of		
	electric supply. (Proper size of cable, Use of fuse, No loose	Yes / No.	
	connection for De watering Pumps / Illumination / Electric	_,	
~	compressors etc. if applicable).		
6	Check that laying of temporary cables used during construction		
	activities should not cause any danger for electrocution to	Yes / No.	
	workmen.		

SN	Description of Activity	Feed back	Remarks
7	Inspection of excavations shall be made by a Competent Person every day. In case, possible cave in or slide is apparent, all working in the excavation shall be seized until the necessary precautions have been taken to safeguard the possible cave in or slide.	Yes / No.	
8	Jacks and vertical supports shall be positioned in such a manner that the vertical loads are distributed equally and do not exceed the capacity of the jacks and the jacks are placed away from pit edge etc.	Yes / No.	
9	Proper Jacking arrangement is made to take the entire load of template.	Yes / No.	
10	In case of long template in stub setting, more jacks have been provided and check that the Jacks are placed on levelled and hard surface to avoid the unbalancing and fallen.	Yes / No.	
11	Wire mesh rolls shall be secured in order to prevent dangerous recoiling action.	Yes / No.	
12	Lone worker should not be allowed to work in the excavated area.	Yes / No.	
13	Check that sufficient strong ladder of suitable length is available for ingress / outgress of persons in the pit	Yes / No.	

II. TOWER ERECTION :

SN	Description of Activity	Feed back	Remarks
1	Check proper communication facility is available at site during Tower erection. (If required)	Yes / No.	
2.	Check damages or uneven settlement of foundation.	Yes / No.	
3.	Ensure the derrick used before tower erection has been checked for adequate strength/ size. Ensure for copy of test certificate for all the lifting machines and tackles.	Yes / No.	
4.	Ensure that the pulleys used before tower erection has been checked for adequate strength / proper size (diameter). Also in case of open type pulleys proper locking arrangements like providing of Safety Pin is made. Ensure for copy of test certificate for all the lifting machines and tackles.	Yes / No.	
5.	Ensure that the ropes used before tower erection has been checked for adequate strength / physical condition (Free from break of strands and knots etc.	Yes / No.	
6.	Check that the lifting tools and tackles i.e. Winch Machine, Chain Pulley Block, Trifor, D - Shackle etc. are in healthy condition and has been tested periodically. (Attach copy of test certificate).	Yes / No.	
7.	Ensure that permission has been obtained from Aviation Authority for erection of special towers. (Where necessary).	Yes / No.	

SN	Description of Activity	Feed back	Remarks
8.	Ensure that permission has been obtained form Aviation Authority for erection of towers which comes in the vicinity of flying zone. (Where necessary)	Yes / No.	
9.	Check that the safety measures has been taken before undertaking for the Road / Rail / River Xing jobs involving like wise stretches.	Yes / No.	
10.	For rail or road crossing check whether written working plan is available at site with specific reference to safety e.g. local earthing, skilled & experience manpower, proper T&P, strength and height of scaffolding to maintain the required clearance etc.	Yes / No.	
11.	Ensure that all the members and proper size of Nuts and Bolts of lower section are fitted properly before erection of the upper section of tower is taken up.	Yes / No.	
12.	Check that the anti climbing devices are provided in the tower after erection job.	Yes / No.	
13.	Check that the danger plates have been provided.	Yes / No.	
14.	Check that only erection team members are allowed to stand near the tower while erection is in process and should wear the safety helmet / Safety Shoes.	Yes / No.	
15.	Working area of the tower has been demarcated during erection.	Yes / No.	
16	Check that proper guying arrangement has been made. And also to see that proper size of the crow bars has been used which has been fixed at hard surface in case of sandy soil or loose soil.	Yes / No.	
17	Check that proper arrangement is made while lifting the tower members and fixing them at height i.e. Proper size and strength of the hook used for lifting the tower members.	Yes / No.	
18	Check sufficient numbers of guys are made while lifting the assembled cross arm and also avoiding use of single sheeve pulleys while lifting the assembled cross arm / heavy load.	Yes / No.	

III. CONDUCTOR STRINGING:

SN	Description of Activity	Feed back	Remarks
1.	All drivers and plant operators are holding the valid driving license.	Yes / No.	
2.	Check that the permit has been obtained from the Competent Authority for stringing of conductor while crossing through Road / Rail / River / Venerable areas etc. (Where necessary)	Yes / No.	
3.	Check that required painting has been made on tower falling in the vicinity of aviation zones. (Where necessary.)	Yes / No.	
4.	Check that all safety measures have been taken during	Yes / No.	

SN	Description of Activity	Feed back	Remarks
	stringing of conductor crossing the EHV / HV / LT lines (Earthing of existing lines etc.)		
5.	Ensure that proper size of Nuts and Bolts is rigidly tightened and punching / tacking / tack welding is done in towers before undertaking stringing job.	Yes / No.	
6.	Ensure that proper scaffolding arrangements made during stringing of conductor (While Road Xing / Power Line Xing etc.	Yes / No.	
7.	Ensure that all members are fitted in tower before undertaking conductor stringing work.	Yes / No.	
8.	Check that the back filling of the foundation has been done as per specification.	Yes / No.	
9.	Ensure that the discharge rod is electrically tested before use.	Yes / No.	
10.	Stringing Machine / Tension pullor Machine are properly earthed.	Yes / No.	
11.	Check the brake arrangement of the TSE Machines is working.	Yes / No.	
12.	Ensure that the pulleys used before conductor stringing has been checked for adequate strength / proper size (diameter), also in case of open type pulleys proper locking arrangements like providing of Safety Pin is made Ensure for copy of test certificate for all the lifting machines and tackles.	Yes / No.	
13.	Ensure the ropes used before conductor stringing has been checked for adequate strength / physical condition (Free from break of strands and knots etc.	Yes / No.	
14.	Check that the lifting tools and tackles i.e. Winch Machine, Chain Pulley Block, Trifor, D - Shackle etc. are in healthy condition and has been tested periodically. (Attach copy of test certificate).	Yes / No.	
15.	Check for the brake arrangement of the Drum reel of conductor during laying / paying out of conductor.	Yes / No.	
16.	Check that proper communication facility is available at site during of stringing of conductor (If required)	Yes / No.	
17.	Whether the tower has been permanently earthed.	Yes / No.	
18.	Check that Sag Board is provided at two locations.	Yes / No.	
19.	Check that the Sag Board arrangement is made by the experienced / trained persons.	Yes / No.	
20.	Check approved Sag tension chart is available and followed at site.	Yes / No.	
21.	While clamping of conductor / EW to be done, check for earthing.	Yes / No.	

SN	Description of Activity	Feed back	Remarks
22.	Ensure sending signal to puller to stop when last layer of conductor / EW being pulled.	Yes / No.	
23.	Check tension applied on the dynamo meter dial and check values with approved data.	Yes / No.	
24.	Before stringing starts check that the villagers do not come underneath the job of the concerned section.	Yes / No.	
25.	Only nylon or polypropylene ropes should be used during conductor stringing in vicinity of live overhead lines.	Yes / No.	
26.	Ensure that PTW has been taken from the concerned authority.	Yes / No.	
27.	Ensure that Winch, Pulleys etc. are properly earthed.	Yes / No.	
28.	For LT lines, whether special persons are posted at each point of isolation till return of permit (PTW).	Yes / No.	
29.	Whether the network of LT lines has been thoroughly checked and precautions taken Against inadvertent charging.	Yes / No.	
30.	Check that proper arrangement is made / available for development and use of a Portable Earthing and Short – Circuiting Devices which can be engaged and disengaged to and from the LT lines, keeping away from the LT lines, until all operations on the same are completed and all men and materials are removed from LT lines.	Yes / No.	
31.	Check the provision and proper positioning for the guying and back staying (Where necessary).	Yes / No.	
32.	Check demarcation of feeder is done for D/c Line.	Yes / No.	
33.	Ensure that all the insulator strings are thoroughly checked for availability and proper fixing of cotter / split pins before hoisting the same.	Yes / No.	

General Points common for all activities during Excavation, Casting of Foundation

I. ERECTION OF TOWER AND STRINGING OF CONDUCTOR :

SN	Description of Activity	Feed back	Remarks
1.	Check whether the contractor had procured required quantity of PPEs considering maximum numbers of erection gangs deployed at one time.	Yes / No.	
2.	Supervisors/ Workmen have been provided with required healthy PPEs, like Safety helmet / Safety Belts / Safety Shoes / Gum Boot etc. as applicable.	Yes / No.	
3.	Availability of First Aid Box with required medicines at site.	Yes / No.	
4.	Instruction register is available at site.	Yes / No.	

5.	Ensure that Supervisor / Gang Leader always issues instruction to the Workmen before start of work.	Yes / No.
6.	Ensure that supervisory staff from Power Grid is available at site during construction.	Yes / No.
7.	All driver and plant operators are holding valid driving license.	Yes / No.
8.	Check the vehicle for rescue is available at site.	Yes / No.
9.	Ensure engaged labour are aware of the job.	Yes / No.
10.	Check that the unskilled labourers are not engaged in skilled job.	Yes / No.
11.	Ensure that supervisor / workmen engaged in the field are aware of First Aid Techniques (Such as in case of Electric Shock, Fall from the height, Snake bite and the person rescued from buried under the debris etc.	Yes / No.
12.	Check for nearby Hospital / Doctor in case of emergencies arises.	Yes / No.
13.	While transporting heavy consignment of conductor / EW drums from central store to site by the use of Cranes, Truck, and Tractor. The safety aspect for construction and failure of brake system of moving machinery is to be checked.	Yes / No.
14.	At least one dry powder type of portable fire extinguisher shall be provided especially where explosive or blasting agents are used for excavation.	Yes / No.
15.	Check the competence (Qualification / Experience) of supervisor / gang leader of contractor.	Yes / No.

Signature Signature Name : Name : **Designation** : Name : **Designation: Designation: Representative of** AEGCL & APDCL. Rep. from Contractor AEGCL & APDCL Rep. from Site. **Circle Office.**

Signature

Safety Related Check List during Construction of Substation

Region:	Date of Safety Audit:	
Name of Sub Stn. / Switching	Stn.:	
Name of Contractor:		
Contractor License / Registrat	ion No.:	Validity
Name of Sub Contractor :		
Sub-Contractor License / Reg	istration No.:	Validity

I. SUB STATION CIVIL WORKS :

SN	Description of Activity	Feed back	Remarks
i): Sa	fety during Excavation :	•	
1.	Check Substation area has been protected by constructing boundary wall all around the substation to avoid entry of passerby / unauthorized person or animal in the substation.	Yes / No.	
2.	De watering arrangement is available (If necessary)	Yes / No.	
3.	Check proper / adequate arrangement is made for extension of electric supply. (Proper size of cable, Use of fuse, No loose connection and no naked wire connection to Pumps / Illumination / Electric compressors etc. if applicable).	Yes / No.	
4.	Check arrangement of illumination at construction site is available.	Yes / No.	
5.	Check dumping of Excavated soil (Minimum 1.5 Mts. Or half the depth of the pit which ever is more from the edge of the pit.)	Yes / No.	
6.	Check Shoring & Shuttering to protect the loose rock / soil against fall. (if required).	Yes / No.	
7.	Check lone worker is not be allowed to work in the excavated area.	Yes / No.	
8.	Ensure Laying of temporary cables used for operation of Machines used during construction should not cause any danger for electrocution of persons / animals.	Yes / No.	
9.	Ensure that before undertaking excavation, the soil has been tested and in case of availability of any explosive / dangerous gas, necessary arrangement must be made to remove / dilute such gases.	Yes / No.	
10.	The positions of underground installations such as sewers, water pipes and electrical cables has been verified and in case of their existence, they must be isolated before further excavation works to ensure Human Safety.	Yes / No.	
11.	Check that the scaffolds are not overloaded in any case. Scaffolds are to be erected and supported properly.	Yes / No.	
12.	Stability of the soil of the excavated pit for safe working is	Yes / No.	

SN	Description of Activity	Feed back	Remarks
	to be checked and certified by a competent person daily		
	before start of work. A register at site is maintained where		
	competent person can certify accordingly. No manhole		
	should remain uncovered during night & off days.		
13.	Check the provision of sufficient strong ladder of suitable	Yes / No.	
-01	length is available near the working place during		
	excavation.		
14.	Check if any permission is required from local statutory	Yes / No.	
	body before excavation.		
15.	Check for No undercutting / toe cutting in soil.	Yes / No.	
16.	Check after excavation the work should be speedily	Yes / No.	
-0.	completed without delay and back filling done at the		
	earliest.		
17.	Check for any possibility of seepage of water from nearby	Yes / No	
17.	pond / river has been estimated and taken care of.		
18.	Check to avoid slide / collaps of side walls of excavated	Yes / No.	
10.	pit, the excavation is to be done in trapezoidal cross –		
	section.		
ii\• C -	section. Ifety precaution during Storage, Handling and Use of Bla	L sting Mator	ial.
1	Check that the adequate arrangement is made for the		
1	storage of blasting material at safe place. (Temporary	Yes / No.	
		res / NO.	
	Magazine is to be installed observing all norms) as per		
2.	Indian Explosive Act.		
Ζ.	Check that the blasting materials is handled by licensed	Yes / No.	
2	blaster with due care at site. (If applicable)		
3.	Check smoking is prohibited in the vehicle carrying	Yes / No.	
4	explosives.		
4.	Check that the Blaster is holding proper license issued by	Yes / No.	
_	the appropriate authority. As per Indian Explosive Act.		
5.	Check that the length of the fuse wire used during	Yes / No.	
	blasting operation is adequate.		
6.	Check while transportation, no unauthorized person is	Yes / No.	
_	allowed in vehicle carrying explosives.		
7.	Check that the loading and unloading of explosives is	Yes / No.	
	being done carefully.		
8.	Check explosives and detonators or blasting caps is not	Yes / No.	
	being transported in the same vehicle.		
9.	Check while transportation the detonators and explosives	Yes / No.	
	are not carried loose or mixed with other materials.		
10	Check surplus explosives shall not be stacked near	Yes / No.	
	working area during loading / unloading.		
11.	Check explosives shall not be held in hands when	Yes / No.	
	lightening the fuse.		
12.	Check that blasting in the open has been carried out	Yes / No.	
	during the fixed hours every day or on fixed days in the		
	week so that the public at large should know about this.		
13.	Check that arrangement has been made to display	Yes / No.	
	sufficient warnings / sign board to enable the people to		
	get out of the blasting area to get off the danger zone		

SN	Description of Activity	Feed back	Remarks
14.	Check that the danger zone has been suitably cordoned off.	Yes / No.	
15.	Check during blasting operations begin / after the firing of explosives shall follow the loud siren.	Yes / No.	
16.	Check that during blasting operation, Labour / Workmen / Passerby are at safe places and arrangement is made to inform public by caution markings (Red Flag) / Public Notices etc.	Yes / No.	
17.	Check that PPEs i.e. Safety helmets, Safety Shoes, is used by blaster and their gang members during blasting and also the persons supervising the blasting operations.	Yes / No.	
18.	For covered blasting ensure placement of cover plates of proper thickness and sufficient numbers of sand filled bags.	Yes / No.	
19.	Ensure that permission for blasting has been obtained from the appropriate authority.	Yes / No.	
iii)	Safety during casting of Foundation / Concreting :		
1.	Check construction materials are stacked at safe place and also does not cause any danger. (Away from pit) i.e. 1.5 Mtrs. or half the depth of the pit whichever is more.)	Yes / No.	
2.	Check proper arrangement of illumination at Construction Site of Substation is available.	Yes / No.	
3.	Check that the Concreting Mixer/ Vibrator machines etc are placed at a safe place (Not very near to any pit at least 1.5 Mtr. from the edge of the pit) to avoid transfer of vibrations and should be operated by skilled persons.	Yes / No.	
4.	Check proper / adequate arrangement is made for extension of electric supply. (Proper size of cable, Use of fuse, No loose connection for De watering Pumps / Illumination / Electric compressors etc. if applicable).	Yes / No.	
5.	Check for laying of temporary cables used during construction activities should not cause any danger for electrocution to persons / animals.	Yes / No.	
6.	All bracing, struts and shuttering in excavations shall be adequately secured so as to prevent their accidental displacement.	Yes / No.	
7.	Ensure Shuttering and timbering has been made as detailed in I:S: 3764 for protecting the loose rock / soil against fall.	Yes / No.	
8.	Check for proper placing of Hydraulic jacks with stability and constant watch of these instruments (which are continuously loaded) to avoid any danger of displacement causing sever accident.	Yes / No.	

II. SAFETY DURING STRUCTURE, EQUIPMENT ERECTION & CABLE LAYING ETC. :

SN	Description of Activity	Feedback	Remarks
1.	Check Back filling done prior to erection activity.	Yes / No.	

SN	Description of Activity	Feedback	Remarks
2.	Check the derrick used before structure erection has been		Test certificate is
	checked for adequate strength / size and no joints are permitted.	Yes / No.	required apart from visual inspection.
3.	Check that the pulleys used before structure erection / Equipment Erection has been checked for adequate strength / proper size (diameter), also in case of open type pulleys proper locking arrangements like providing of Safety Pin is made Safe working load should be punched.	Yes / No.	Test certificate is required apart from visual inspection.
4.	Check the ropes used before structure erection / Equipment Erection has been checked for adequate strength / physical condition (free from break of strands and knots etc.	Yes / No.	Test certificate is required apart from visual inspection.
5.	Check that the lifting tools and tackles are in healthy condition and has been tested periodically.	Yes / No.	Test certificate is required apart from visual inspection.
6.	Check permission has been obtained from Aviation Authority for erection of Lightning Mast which comes in the vicinity of flying zone. (Where necessary)	Yes / No.	
7.	Check that all Nuts and Bolts are fitted in the structure before undertaking the job of other section of the structure and are tightened.	Yes / No.	
8.	Check area has been cordoned off to prevent injuries to unauthorized persons from hitting against structural component or falling in the excavated pits.	Yes / No.	
9.	Check that danger plates are available on all the equipment & structures in the switchyard.	Yes / No.	
10.	Check demarcation of feeder is done for Double Circuit Line.	Yes / No.	
11.	Check only erection team members are allowed to stand near the structure / Equipment while erection is in process and should wear the safety helmet / Safety Shoes.	Yes / No.	
12.	Check proper guying arrangement has been made while lifting structure / Equipment, if necessary.	Yes / No.	
13.	Check that proper arrangement is made while lifting the structure members and fixing them at height i.e. Proper size and strength of the hook used for lifting the structure members.	Yes / No.	
14.	Check sufficient numbers of guys are made while lifting the assembled structure / heavy loads and also avoiding use of single sheeve pulleys while lifting the assembled structure / heavy load.	Yes / No.	
15.	Check arrangement has been made for equipment identification.	Yes / No.	
16.	Check that required painting made on tower falling in the vicinity of aviation zones. (Where necessary.)	Yes / No.	
17	Check no live wires nearby. Take shut down if necessary.	Yes / No.	
18.	Check the structure has been permanently earthed.	Yes / No.	
19.	Check crane are preferably be used for erection of pipe		

SN	Description of Activity	Feedback	Remarks
	structure in the sub station building works (if required.)	Yes / No.	
20.	Check all safety procedures for erection work like use of		
	safety helmets, Safety belts, use of guy wires, lowering /	Yes / No.	
	lifting of tools by rope etc. are strictly adhered to during		
	structure erection works is in progress in the switchyard.		
21.	Check that correct size of spanner (Box or ring type) as		
	well as DE spanners is being used.	Yes / No.	
22.	Check working area of the structure has been demarcated		
	during erection.	Yes / No.	
23.	Check heavy structures are lifted with crane with proper	Yes / No.	
	safety.		
24.	Only polypropylene ropes are to be used to tie the		
	aluminium tube / Bus bar since this is soft material and	Yes / No.	
	will not damage aluminium tube / Bus bar during		
	erection.		
25.	Ensure that R clips in insulator caps are fixed properly to		
	avoid disconnection of insulator discs.	Yes / No.	
26.	Ensure that all the necessary security pins (split pins) are	Yes / No.	
	fixed.		
27.	Check all nuts of jumper fittings are properly tightened		
	and live metal clearance have been maintained as per	Yes / No.	
	POWERGRID specification.		
28.	In case of tension fitting dead end joint dimensions		
	before & after the compression are checked and	Yes / No.	
	recorded.		
29.	No damaged component of any hardware fitting should		
	be used on works.	Yes / No.	
30.	Length of jumpers has been measured properly to give it		
	a parabolic shape. No sharp bend should exist.	Yes / No.	
31.	Check surge counter erection facilitates proper reading		
	and that earthing is done with minimum bends.	Yes / No.	
32.	Check Surge monitor has been earthed by connecting it		
	to main earth mat with (G I Flat 75 x 12 mm) and earth pit	Yes / No.	
	separately as per drawing.		
33.	Check the alignment of earth switch with isolator, earth		
	switch of isolator is put into operation and the contacts	Yes / No.	
	are cleaned. After completion of pre commissioning		
	checks and formats are dully filled and signed.		
34.	Ensure that the rubber beedings are kept in good	Yes / No.	
	condition.		
35.	Check CT has been placed on the support structure very	Yes / No.	
	carefully and all nuts have been tightened. Earthing is		
	done as per drawing.		
36.	Ensure the lattice structure of CT has been earthed at two	Yes / No.	
	points.		
37.	Check the marshalling box in the switchyard has proper	Yes / No.	
	illumination arrangement.		
38.	Check the capacitor unit is short circuited & earthed, until	Yes / No.	
	erection and commissioning works are being done on		
	CVT. (The capacitor get charged by the electrical fields in		

SN	Description of Activity	Feedback	Remarks
	the vicinity and they keep these charges for a long time,		
	which can be dangerous to human life. Hence the		
	shorting of capacitor unit is necessary). It should be		
	removed before tests / use.		
39.	Check Fuses in the marshaling box are OK.	Yes / No.	
40.	Check proper earthing of CVT tank has been done.	Yes / No.	
41.	Check all housing accessories, mounting stools including	Yes / No.	
	bolts / Nuts for fixing Line Trap and insulators are of non		
	magnetic material.		
42.	Check H.F. point of CVTs on which the coupling device is	Yes / No.	
	not mounted has been earthed.		
43.	Check the remaining CVTs have been earthed thro'	Yes / No.	
	coupling device.		
44.	Cable drums after visual inspection should be stored	Yes / No.	
	preferably in the covered area. Cable ends should be		
	clamped.		
45.	Ensure each cable and conduit run should be tagged with	Yes / No.	
	cable identity numbering as per the approved that appear		
	in the cable and conduit schedule.		
46.	The tag should be of aluminium plate with ID number	Yes / No.	
	punched on it and securely attached to the cable conduit		
	by not less than two turns. Cable tags should of		
	rectangular shape for power cables and of circular shape		
	for control cables.		
47.	Check underground cable markers should project 150	Yes / No.	
	mm above ground and spaced at an interval of 30 Mts.		
	They shall be located on both sides of road and drain		
	crossing and also at every change in direction.		
48.	Check cable tags should be provided inside the	Yes / No.	
	switchgear, motor control centres, control and relay		
	panels etc. wherever required for cable identification,		
	where a number of cables enter together through a gland		
	plate.		
49.	The cable (power and control) between LT stations,	Yes / No.	
	Control room, DG set building and fire fighting pump		
	house should be laid in the buried cable trenches. In		
	addition to the above, for lighting purpose also, buried		
	cable trench can be used in outdoor area. (as per		
	Technical specification of specific contract)		
50.	Cable route and joint markers and RCC warning covers	Yes / No.	
	should be provided wherever required. The voltage grade		
	of cables should be engraved on the marker.		
51.	Tray Identification Number on each run of trays at an	Yes / No.	
	interval of 10 Mtrs should be painted.		
52.	In case the outer sheath of a cable is damaged during	Yes / No.	
	handling / installation, the same should be repaired to		
	the satisfaction of the site. In case any other part of a		
	cable is damaged, the same should be replaced by a		
	healthy cable. Power cables should be at the top most		
	layers. The armor of control cable is to be earthed.		

SN	Description of Activity	Feedback	Remarks
53.	All cable termination should be appropriately tightened	Yes / No.	
	to ensure secure and reliable connections. All the		
	exposed parts of cable lugs should be covered with tape,		
	sleeve or paint.		
54.	Power and control cables are laid on separate cable trays	Yes / No.	
55.	Co-axial cable is laid separately from power cable.	Yes / No.	
56.	All cable trays, racks and metallic ducts have been	Yes / No.	
	grounded by connecting each to earth / mat. (As per		
	Scheme)		
57.	Check sections of cable trays have been bridged by	Yes / No.	
	copper jumpers/ G I to retain continuity of earthing. (As		
	per Scheme)		
58.	Check earthing of panel is done by the erection	Yes / No.	
	contractor for connecting it with switchyard earth mat. (
	As per Scheme)		
59.	Auxiliary bus wiring for AC and DC supplies, Voltage		
55.	Transformer circuits, annunciation circuits and other	Yes / No.	
	common services is provided near the top of the panels		
	running throughout the entire length of the panels.		
60.	All internal wiring to be connected to external equipment	Yes / No.	
00.	is terminated on terminal blocks, preferably vertically		
	mounted on the side of each panel.		
61.	Check whether Mimic Diagram is available preferably	Yes / No.	
01.	made of anodized aluminium or plastic of approved fast		
	colour material and screwed on to the panel that can be		
	easily cleaned.		
62.	Check the panels all equipment mounted on front and	Yes / No.	
02.	rear side as well as equipment mounted inside are		
	provided with individual name plates with equipment		
	designated engraved.		
63.	Check on top of each panel on front as well as rear side,	Yes / No.	
05.	large and bold name plates are provided for circuit /		
	feeder designation.		
64.	Check all front mounted equipments are provided at the	Yes / No.	
04.	rear with individual name plates engraved with tag	res / NO.	
	numbers corresponding to panel internal wiring to		
	facilitate easy tracing of the wiring.		
65.	Check the name plates mounted directly by the side of	Yes / No.	
05.	the respective equipments should not be hidden by		
66.	equipment wiring.	Yes / No.	
00.	Check availability of 240V single phase 50 HZ, AC socket with switch suitable to accord 5 Amps and 15 Amps pin		
	with switch suitable to accept 5 Amps and !5 Amps pin		
	round standard plug, is provided in the interior of each		
	cubicle with ON-OFF switch for connection of hand		
67	lamps.		
67.	Check that panels are provided with a fluorescent lighting	Yes / No.	
	fixture rated with 240 Volts single phase, 50 Hz supply for		
	the interior illumination of the panel during maintenance.		
	The fittings are complete with switch fuse unit and		
	switching of the lighting is controlled by the respective		

SN	Description of Activity	Feedback	Remarks
	panel door switch. Adequate lighting with fuse unit is also		
	provided for the corridor in control panels.		
68.	Check control panels are provided with necessary arrangements for receiving, distributing, isolating and fusing of DC and AC supplies for various control, signalling, lighting and space heater circuits. The incoming and sub circuits are separately with switch fuse units.	Yes / No.	
69.	Check panels are provided with a space heater rated for 240 V, single phase, 50 Hz, AC supply for the internal heating of the panel to prevent condensation of moisture.	Yes / No.	
70.	Check all panels are equipped with an earth bus securely fixed	Yes / No.	
71.	Check when several panels are mounted adjoining each other, the earth bus is made continuous with necessary connectors and clamps for this purpose.	Yes / No.	
72.	Check provision is made for extending the earth bus bars to adjoining panels on either side.	Yes / No.	
73.	Check provision is made on each bus bar of the end panels for connecting earthing grid.	Yes / No.	
74.	Check all metallic cases of relays, instruments and panel mounted equipment including gland plates are connected to the earth bus by copper wires of specified size.	Yes / No.	
75.	Check the colour code of the earthing wire is green.	Yes / No.	
76.	Check that earthing made with equipment is with Nuts and Bolts i.e. For such connection lugs should be pressed and tightened to the terminals through Nuts and Bolts.	Yes / No.	
77.	Check that no equipment is mounted on the panel doors.	Yes / No.	
78.	Check each switch should bear clear inscription identifying its function.	Yes / No.	
79.	Check those who have sufficient knowledge of steel structural job have been employed in steel structural works only.	Yes / No.	
80.	Check necessary instruction has been communicated by supervisor before start of the day's works to workmen under his control.	Yes / No.	
81.	Storing of equipments is to be made properly to avoid any accident during handling.	Yes / No.	
82.	Check all Nuts and bolts are properly raised or lowered preferably using closed loop pulleys and gully bags / hand bags tied at the end for carrying nuts and bolts.	Yes / No.	
83.	Check that Fire resistant sheets are used before entrance of control cable in control room.	Yes / No.	
84.	Check air compressor tubing properly tightened.	Yes / No.	
85.	Check all carrying connectors / clamps properly tightened.	Yes / No.	

III. CONDUCTOR LAYOUT DURING CONSTRUCTION STAGE :

SN	Description of Activity	Feed back	Remarks
1.	Check all members are fixed in structure and ensure proper size of Nuts and Bolts are rigidly tightened and punching / tacking / tack welding is done in towers / structures before undertaking conductor laying job.	Yes / No.	
2.	Ensure proper scaffolding arrangements made during laying of conductor (While Power Line crossing etc).	Yes / No.	
3.	Ensure that all members are fitted in structure before undertaking conductor laying work.	Yes / No.	
4.	Ensure that the discharge rod is electrically tested before use.	Yes / No.	
5.	Ensure whether the structure is properly earthed.	Yes / No.	
6.	Only nylon or polypropylene ropes should be used during conductor laying in vicinity of live overhead lines.	Yes / No.	
7.	Ensure that PTW has been taken from the concerned authority when extension of existing substation is under execution.	Yes / No.	
8.	Ensure that Winch, Pulleys etc. are properly earthed.	Yes / No.	
9.	For LT lines, check whether special persons are posted at each point of isolation till return of permit (PTW) if positioning of person is not possible then it is to be seen that all the point of isolation has been kept in the locked position till the work is in progress.	Yes / No.	
10.	Whether the network of LT lines has been thoroughly checked and precautions taken against inadvertent charging.	Yes / No.	
11.	Check that proper arrangement is made / available for grounding LT lines coming across during conductor laying. (This can be done by way of portable earthing and short circuiting devices which cab be engaged to and disengaged from LT lines, keeping away from the LT lines until all operations on the same are completed and all man and materials are removed from the LT lines).	Yes / No.	
12.	Check the provision and proper positioning for the guying and back staying (Where necessary).	Yes / No.	
13.	Check working of hydraulic crimping machine.	Yes / No.	
14.	Check before and after crimping, dimensional changes in clamps and are in accordance with the drawings and specifications.	Yes / No.	

IV. SWITCHYARD EARTHING DURING CONSTRUCTION STAGE:

SN	Description of Activity	Feed back	Remarks
1.	Check that while earthing conductor crossing the road is laid 300 mm below the road or at greater depth depending upon the site conditions.		

SN	Description of Activity	Feed back	Remarks
2.	Check that while laying the Earthing conductor in outside	Yes / No.	
	area is buried at least 600 mm below the furnished		
	ground level.		
3.	Check that the earthing pads have been provided for the	Yes / No.	
	apparatus / equipments at accessible position.		
4.	Check all steel columns, metallic stairs are connected to	Yes / No.	
	nearby earthing grid conductor by two earthing leads.		
5.	Check of earthing of lightening fixtures, receptacles	Yes / No.	
	switches, junction boxes lighting conduits has been done		
	by a separate earthing conductor.		
6.	Check that the railway tracks within switchyard area has	Yes / No.	
	been earthed at a spacing of 30 Mts. / specified distance		
	and also at both ends.		
7.	Check cable trays has been connected to earthing flat of	Yes / No.	
	50X6 mm / specified sized earthing flat at intervals		
	specified in approved drawing.		
8.	Check that this earthed flat is earthed at about 30 Mts.	Yes / No.	
	distance.		
9.	All accessories in transformer and reactor like radiators	Yes / No.	
	tank, cooling banks etc are connected to the earthing		
	grid at minimum two points.		
10.	Check metallic conduits are not used as earth continuity	Yes / No.	
	conductor.		
11.	Check flexible earthing connectors should be provided for	Yes / No.	
	the moving parts.		
12.	Check sheath and armor of single core power cable is	Yes / No.	
10	earthed at switchgear end and equipment side.		
13.	Check contact surface of earthing pads for jointing free	Yes / No.	
14	from scale, paint, enamel, grease, rust or dust.		
14.	Check that light poles, junction boxes on the poles, cable	Yes / No.	
	and cable boxes / glands, lockout switches etc. are		
	connected to the earthing conductor running along with the supply cable which intern is connected to the		
	earthing grid conductor at a minimum two points.		
	Check earthing conductor which is generally buried 2000	Yes / No.	
15.	mm outside the switchyard fence. All the gates and every		
13.	alternate post of the fence are to be connected to		
	earthing grid.		
16.	Check megger used for measuring soil resistivity is	Yes / No.	
10.	calibrated with desired accuracy.		
17.	The earth resistivity has been measured in dry weather	Yes / No.	
	condition.		
18.	Check the earthing of Transformers and Shunt reactor,	Yes / No.	
	earth pits are constructed as per relevant standard /		
	approved drawing.		
	Check that the measured value of combined earth	Yes / No.	
19.	resistance should be less than 1 Ohm.		
	Check that for earth electrode and individual earth pits,	Yes / No.	
20.	this value should not be more than one Ohm.		

SN	Description of Activity	Feed back	Remarks
	Check all non current carrying metal parts shall be	Yes / No.	
21.	effectively earthed by two separate and distinct earth		
	connections (Indian Electricity Rule 61,67)		
22.	Check that all pylon supports in the Fire Fighting HVSW	Yes / No.	
	system has been earthed to the earthmat.		

V. GENERAL POINTS COMMON FOR ALL ACTIVITIES DURING EXCAVATION, CASTING OF FOUNDATION

Erection of structures, laying of Conductor, storage and transportation of material:

SN	Description of Activity	Feed back	Remarks
1.	Check Supervisors / Workmen have been provided with required healthy PPEs. Like (Safety helmet / Safety Belts / Safety Shoes / Gum Boot etc. as applicable)	Yes / No.	
2.	Check availability of First Aid Box with required medicines at site.	Yes / No.	
3.	Check Site Instruction register is available at site.	Yes / No.	
4.	Ensure Supervisor / Gang Leader always issues instruction to the Workmen including contractor labour before start of work.	Yes / No.	
5.	Ensure supervisory staff from Power Grid is available at site during construction.	Yes / No.	
6.	Check all driver and plant operators are holding valid driving license.	Yes / No.	
7.	Check the vehicle for rescue is available at site.	Yes / No.	
8.	Ensure engaged labour are aware of the job.	Yes / No	
9.	Ensure supervisor / workmen engaged in the field are aware of First Aid Techniques (Such as in case of Electric Shock, Fall from the height, Snake bite and the person rescued from buried under the debris, rescue of person from drowning etc.	Yes / No.	
10.	Check for availability and to keep a record of nearby Hospital / Doctor in case of emergencies arises.	Yes / No.	
11.	While transporting heavy consignment of conductor / EW drums from central store to site by the use of Cranes, Truck, Tractor. The safety aspect for construction and failure of brake system of moving machinery is to be checked.	Yes / No.	
12.	At least one dry powder type of portable fire extinguisher shall be provided especially where explosive or blasting agents are used for excavation. (If applicable)	Yes / No.	
13.	Check the competence (Qualification / experience) of supervisor / gang leader of contractor.	Yes / No.	
14.	Wire mesh rolls shall be secured in order to prevent dangerous recoiling action.	Yes / No.	
15.	Proper unloading arrangement has been made at site (Preferably with crane) to unload the material.	Yes / No.	

SN	Description of Activity	Feed back	Remarks
16.	After unloading the material visual inspection of the	Yes / No.	
	materials has been carried out along with the erection		
	contractor to check that the material has not been		
	damaged or not (Galvanizing is proper or not)		
	As per approved Field Quality Plan etc.		
17.	While transporting the heavy laden equipment like transformer / Reactor by road from Rly Stn to Sub station check whether for all safety precaution taken. Like safe lifting capacity of crane, safe load on culvert / Bridge / Nala / Drain etc.and working plan is available at site with specific reference to safety e.g. local earthing, skilled &	Yes / No.	
	experience manpower, proper T&P, strength and LT wires / HT wires interrupting the height of equipment and the required clearance maintained etc. Permission to be obtained from concerned authority if required. "Impact recorder on the equipment like Reactor / Transformer must be installed during transportation"		
18.	Check that the adequate and safe means of access and aggress has been provided for all work places as far as reasonably practicable and is being used by the workers.	Yes / No.	
19.	Check proper illumination is provided at the work places and their approaches including passage ways.	Yes / No.	
20.	Check that the lamps have been protected by suitable guards where necessary to prevent danger, in case the lamp breaks.	Yes / No.	
21.	Check loose materials which are not required for use shall not be placed or left so as dangerously to obstruct work places or passage ways.	Yes / No.	
22.	Check all projected nails has been removed or bent over to prevent injury.	Yes / No.	
23.	Check scrap, waste and rubbish has not been allowed to accommodate on the site or the scrap materials has been stored at the isolated place.	Yes / No.	
24.	Check that the worker while working at height scaffold materials, waste materials and tools are not being thrown by them to cause injury to any person.	Yes / No.	
25.	Check whether contractor has procured required quantity of PPE considering maximum number of erection gangs deployed at one time. Check the quantity of PPEs.	Yes / No.	
26.	Check that the PPEs required by the workmen are being utilized by them always.	Yes / No.	
27.	Check the worker is under constant surveillance by the other person while working at height.	Yes / No.	
28.	Check construction site has been barricaded for unauthorized persons / animals.	Yes / No.	
29.	Check that lifting appliances and machines and vehicles used on the construction site is of sound material and good quality and is free from patent defects and is strong enough to with safely the load and stresses to which they	Yes / No.	

SN	Description of Activity	Feed back	Remarks
	will be subjected.		
30.	Check structures and equipment is being used only for the purpose for which they were intended.	Yes / No.	
31.	Check equipment has been operated by the competent person.	Yes / No.	
32.	Check portable ladders shall not exceed 9 Mts. in length, other wise may cause danger while climbing of person and back legs shall be equally braced.	Yes / No.	
33.	Check unskilled labour are not utilized for skilled jobs and only experience persons are deployed for erection.	Yes / No.	
34.	Check a well planed and documented procedure for the entire Construction works of Sub station shall be prepared by contractor and get approved from Power Grid for distribution to Contractors' field staff and Power Grid for follow up.	Yes / No.	
35.	Check no metallic measuring tapes are being used during expansion of charged bays.	Yes / No.	
36.	Check metal ladders are not being used in the vicinity of exposed live electrical equipment.	Yes / No.	
37.	Check one bore well is available for water supply in case Municipal Construction supply is not available	Yes / No.	
38.	Check charged area of a yard should be properly fenced off.	Yes / No.	
39.	Check ladders / lengthy articles / lengthy equipments etc. should always be carried in horizontal position.	Yes / No.	
40.	Check insurance by contractor for the labour to provide adequate coverage for any accident etc.	Yes / No.	

Signature

Signature

Name :	Name :	Name :
Designation:	Designation:	Designation :
AEGCL & APDCL Representative	Rep. from Contractor	Rep. from AEGCL & APDCL

ANNEXURE – 7

DETAILS OF PUBLIC CONSULTATION

" Public Meeting"

Subject: Eastern Regional Power Lysten improvement Project. Ranges Venne: Community Hall near NH31, Nowhict-Kamrup (rurn) Assam Construction of 220 KN Rangia - Amingnon, T/L & associated 33KV distribution lines (Under world bank assistance & under North

Date

Date: 10-02-2014 Details of meeting:-

te discuss the various isures against the above banctioned project. Representatives of PowerGARID, AEGCL & other bead victage headmen and some other common public were also present in the meeting. A brief of the NOrth Eastern Region Power/Supten improvement project Hall not NH-31, Rangia, District - Kam rup (rural), Assam to day the 10th February 2014, a public meeting has been arranged at Community

(NERPSIP) under the world bank, assistance has been deliberated at the begining of the meeting by Provergrid representative. Importance & necessity of the Project, necessicily for upgradation of existing transmission edistribution methody, vanious environmental & Docial issues associated with the project have been briefly discussed and apprised to the public present in the meeting.

by the public are summarized as below :-Concern about the pros & corn of the project. The various values raised Subsequently representatives from the public and raised various

To avoid habiteted & plantation areas during detailed survey of line.

To engage local Lebourer force during construction power .

10 expedite the process of Compensation.

imposance of the project and assured their co-operation during implementation by the project. However all the public present have agreed to the necessity and

AEGCL/ POWERGRID have assured all issues will be taken care during

implementation stage of the project. Adequate provisions have been kept

in the NERPSIP for addressing all compensation related measures of the project. For extending their support in completing the project with vote of theories to the organizer. Attendence Sheets enclosed :- 1 the Third drafe agen parties addre of the

काअभा-कर्ष हेड्ट अहाब साधवान ट्यामा कवा उम्र 1

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লাক উপসিৎ কাৰ্মুহি ক্ৰাণক সহাণিৰ ভাষায়। ৰাবৃহৰ প্ৰভাষত সম্বাহ ভকাই সাৱধাৰে ভিত্তিদ্য কৰাৰ্ব ইাস মিতিকাত দেয়াবস। আইৰে সভাই লোক মোম ভিৰ্মিত লাৰ্চ্বিধ দিয়ায় কই লাগৰ তেঁৱৰ লবা-

* . સ્માર્ટ પેલ ગેલકોલ ઝાલ મુખ્યત્વન હ્યાલ આઉશ- વિશ્વ સ્થાર્ટ બેસ્ટ્રી શ્વા પ્રાપ્ત પ્રાપ્ત પ્રાપ્ત છે. ભાજ અદ્વાદયન વલ વૃદ્ધનેલ સાન્યત્વન વ્રાપ્ત આઉશ- વિશ્વ સ્થા ।

* स्थित कार्यों स्थाय खीरीय लिक्क हीवाव विश्वान कार्योठ निर्वाय कथा. अभ्य कार्योंव स्थाय खीरीय लिक्क हीवाव विश्वान कार्योठ निर्वाय कथा.

* Co State महिनय आइंग्रहाय अवाअस्ट याहितक अभ यावेता गांव छोंगे. अलस्ट हिंग्रही, महिनय कडिंग्र अर्थ्य क्रान

अल्भल एग्रेंड्या कार्यात कार्याय होतिहाल मार्थन स्थल मार्ग्र होत्रहा हार्या स्थलम स्थलमा स्थलमा स्थलमा स्थलमा स

कुमेर समिति अभीताम स्वर्त्या सम्बद्ध रहामव भवा हिरान सम्बद्ध 1 रहे कि आस्ति आस्ति स्वर्त्या !

रामेह भवाने हिलाए) ज्यादायोह प्रमायित इंदलवानेग- टेल्क्स जगहान आहार जाहांद्व नामेल्टाक वियोरत निवास लिस्ट्रिंटन वियम् विवार ह्यार व्याह्त प्राज्यने जिडल्प नामेल्टाक दियाग्रेत विवास लिस्ट्रिंटन वियम् विवार ह्याह व्याह्यां निडल्प नामेल क्रान्ट्रिक विवास निवासिंह विवासिंह देवल्यनीया- टेल्क्स जगहान और, प्रसंस नामेल्टाक दियाग्रेत विवास लिस्ट्रिंट विवास हिंदा ह्याह व्याह्यां निडल्प नामेल व्याह्यां क्रिया प्राप्तां हे व्याग्रं 1 हेछा अहार व्याह्यां निडल्प नामेल विवास) ज्यादीया प्राप्तां हे व्याग्रं 1 हेछा अहार व्याह्यां निडल्प नामेल व्याह्यां निर्वास क्रियां विवास विवास हिंदा व्याह्यां निक मान्यं क्रियां निक क्रियान नामेल व्याह्यां क्रियां व्याह्यां नामेल्ट कार्युक व्याह्यां व्याह्यां विवास विवास विवास क्रियां क्रियां क्रियां क्रियां क्रियां क्रियां क्रियां क्रियां कार्युक व्याह्यां व्याह्यां व्याह्यां विवास क्रियां विवास क्रियां क्रियां क्रियां क्रियां क्रियां क्रियां क्रियां क्रियां क्रियां क्र कार्युक व्याह्यां क्रियां विवास क्रियां क्र क्रिया क्रियां क्रियां क्रियां विवास क्रियां क्रिया क्रियां क्र क्रियां क्रिया क्रियां क्रिया क्रियां क्रिया क्रियां क्रिय

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भूम : बालाइत्या ह्वय NH-31 स्वत्या बाह्या रेजन्म सम्हि हिंग्रहा है। भूम : बालाइत्या ह्वय NH-31 (७७ ट्वाह्य बाह्या रेजन्म सम्हित हिंग्रहार) प्राय

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LINE : 220 KV RANGIA - AMINGAON T/L

অসমৰ শক্তি খণ্ডক পৰ্যাপ্ত পৰিমানে শক্তিশালী কৰিবলৈ বিশ্ববেংকে (The WORLD BANK) ভাৰত চৰকাৰৰ জৰিয়তে অসম চৰকাৰক এক ঋণ ব্যৱস্থাৰ সুবিধা প্ৰদান কৰিছে যাৰ দ্বাৰা উপ-আস্থান (Sub-Station), পৰিবহন লাইন (Transmission Line), বিতৰণ লাইন (Distribution Line) সমূহৰ নিৰ্মান কাৰ্য্য আৰু পূৰ্বতে থকা উপ-আস্থান সমূহৰ বিস্থাৰ (Augmantation/Expansion) কৰা হব। শক্তি খণ্ডৰ উন্নয়নৰ এই আঁচনিৰ জৰিয়তে

১) পৰিবহন বিতৰণ ব্যৱস্থাৰ (Transmission & Distribution Network) পৰিবহন ক্ষমতা বৃদ্ধিৰ লগতে পৰিবহন আৰু বিতৰণ ক্ষতি (T & D Loss) হ্ৰাস কৰা আৰু ২) চাহিদাৰ ক্ষেত্ৰ (Demand side management) খনৰ বাবেও বিশেষ ব্যৱস্থা গ্ৰহন কৰা হব। অসম বিদ্যুৎ গ্ৰীড্ নিগম লিমিটেড (AEGCL) হৈছে উপৰুক্ত আঁচনিৰ কাৰ্যকাৰী সংস্থা (Executing Agency)। উক্ত আঁচনিৰ অধীনত ২২০ কে. ভি., ৰঙিয়া- আমিনগাঁও পৰিবহন লাইন নিৰ্মান কাৰ্য্য হাতত লোৱা হৈছে। পৰিবহন লাইনৰ নিৰ্মান কাৰ্য্যৰ সময়ত কোনো ধৰনৰ অস্থায়ী ক্ষতিৰ বাহিৰে স্থায়ী ভূমি অধিগ্ৰহনৰ (Land Acquisition) প্ৰয়োজন নহয়। এই প্ৰকল্পৰ জৰিয়তে ক্ষতিগ্ৰস্ত পৰিয়ালক সমূচিত ক্ষতিপুৰণৰ ব্যৱস্থা কৰা হব। শক্তি খণ্ড উন্নয়নৰ এই আঁচনিৰ জৰিয়তে সমাজৰ আৰ্থ-সামাজিক ব্যৱস্থা স্বলীকৰণৰ ক্ষেত্ৰত পৰ্যাপ্ত পৰিমান সহায় কৰিব।

অসম বিদ্যুৎ গ্রীড় নিগম লিমিটেড, অসম

PUBLIC MEETING"

Subject

Construction of 132 ku De Amingaon. Hazo + ransmission fine (Under WORLD BANK) presistance under NER Power System Improvement Project and provided 33 kr distribution dines regarding : Public Temple plemises (Village - KATAMURA Sangsari , North Quarahati, Assam.

Dated

Vanue

: 0/- 02- 20/4

Joday, dated the of st February 2014 at asound 11 Am, a publie moeting has been convened at KATAMURH Village under SANGSART DEV. BLOCK, in North Cruwahate, Assam to discuss the various issues associated with the proposed 132 kv D/C. Amingaon - Hazo Transmission dine and 1. to appsise the ganeral public about the WORLD BANK funded North Eastern Region Power System Improvement Project (NERPSIP) The Representative of Assam Electricity Gried Coreportion Ito (AEGCL) alongwith sepresentative of Power Ciric Conformation of India Itd and the village headmen/Occoburhas of the nearby areas are present in the oforesaid meeting. From Arga & POWERGRID Side a brief overview on the proposed NERPSIP in various districts of Assam its be implemented under WORLD BANK funding and an overview of the subject mentioned project these been deliberated to the general public altending the meeting. The necessity of the Project necessity of uppradation of present Gransmission & distribution network of Assan various environment & socioaconomic issues, benefit of the Project compensation issues etc. have been discussed at length in the meeting. Subsequently elter being (EGU/POWERGRI) Side, it is requested

ul progression The connor preblic The denner preblic the density people in various works associated Par ertcan be plouided Gao-Bushan Dusing il required ploper the Rayed 50 Proposet raised by the ane been raised by the the theory end How we ww the allender publie will dhe Justomand" that helping compansation to necosity St sburs amout atte and playeel whill for any moeting . Headman (3.00 - Kushan on works and finalization lecal Organized Project. Cham. heilt enclosed 4 - Z assuscol cille lege-8 The meeting her been concer-to at the public for promising compensation imponsulation ate reaised by cugage from 1 de compansation Direct poynont of co appelled domes - copeditions have 2 e neeling agreed to inplanariation clarification iksver 6 place billy in make AEGEL/POWERGRID Representative the 19 Marks de litre vonue and dogistice Elle. Village issues raised dowel Survey diving in peridad 6 Raue plajeet related for payment of caused auxing felleas :-10 engage docal Pours ystem inter - dia Sheet tenent mously apponpriate estidoon. ite Hegard Pugeer plouisions have Concerent line Vote of thanks proude the garnine taken asse of may be ansciate V Terdance a naurni est an als as compansation ultimately wid 135000 (Jalious Che Che lave alle That) & |2 | Kaise hand for Lina 5 ale 2 NERPSIP Aleguate Admage-Orrang col public Hequest char ne jeg public aa ¥ grom Valious will CHIC Note all licita ¥ W.M. 60 G S ŝ The Che So a X

ব্রাজহুত্রা য়ভা रिड्छ : 262 द्वा. हि. जगहातमाउ - 24(का अत्विश्व त्रर्श्वे নির্মন ব্যন্দত (বিশ্ববিষ্ঠেষ রাম্পায়)ত) म्रान : उगजश्वा- क्रानुब आर मत (- क्रान्स्वर- गाउ) जिल्हानि **63**व छन्नराधे 602-20-2038 जगाल २ (क्रम्रस्पर्व), 2028 क्रित्नेब २२ राजाण, राज्येस्वा ठगाउँ (बाजरूजा समित आरुप्तानार्ध) हररहारि - उउठ छ उपरगोर्ग - २७२ (क. हि. आह्या भाषा - अहियश्त लाहेन तिडार्न उम्हर्ण এগ্রানি ব্যজহার্দ বরা তার্রাহ্রত হৈ হায়। টি হার রহাত আহান্টিল ব্যাহজ , সাভর্দা , অঘন বাজিক বিদ্যুত নিস্তা লিজিডেও বিষণ नार्वाहा प्रकल लाइगब छाउ कर्ष तात्व हो उद्या लित्रि दिव न्द्राय राष्ट्रीय के निष्ठ - यहात कार्य - प्राहीय कार्य - प्रहीय कार्य - प्रहीय कार्य जायम बाजि रु निमुख निम्न लिग्निर्टंड जार पहराषीकुड कुछ) भक्तर जबडत् पक्ष निश्च त्रकब (THE WORLD BANK) आश्रमुं নিষদর বনসীয়া অর্থনির বেগ্র বিন্ধরে মানুমেন আলোনো राखा करा। लगएक देर जगहनिव अख्याद्रीयात्र, निम्नक পৰিবঃন আৰু বিতৰণ লাহনৰ প্ৰয়াতণৰ আৰম্বশ্বসতা अकल्पन रखीनहरू जगत गड़ीरन हरे कार्य कार्य कार्य कियादायू २-बिङ्गालाय उपत्मात्म कडा २३७ विम्राज जिल्ला निर्मात जाए अचिवश्त लार्श्त निरम् क अक्षा कित्राहा क्रांचियुवर् स्तारे रेडेरे निरुधार्यो के सम्बद्ध करहेद करहेद कराय कृष्टिमकल भिवा निर्धा दिवल फारे रिहर कहा । इंग्रं य विहास य हास्टर हिर्माय कार्य हास्टर পৰা পকলেতিৰ অন্তৰ তেওলোকৰ মাজমত नाक्ष कार्बन (त . (कारंग इन्)

¥ নিজনে কায়ৰ ক্ষাত স্থানীয় নেকৰ উদ্ধে নিজনে কায়তি বিগেজ কৰা আৰু ক্ষালীয় নিকলে উপস্থায় কৰিছা আৰু ব্যৰম্থা কৰা । - 2014 E ... अषव्याग्री जायम जिसम विषु विविद्यत ियिश्र राष्ट्र प्रथा दार्ड के खार दे खार राष्ट्र उछ् अक्ट उद्य नित निति का या 27 द्रित िहेट रहती की हिराह्य जियिश्वाद्य दुने क्र जार्गानेक स्वार्ग्यनेक यात अकलग् क उन्हार अहत्वाज कहाना का न टुडे राख्य गण्या भीवामाट व्यक्त रहा । तियाः इसम्हत् राइप्रिकर त्राज आहे हिन्द्रा इला

দেকে ভারে নাম্য দেশ বিভিন্ন ভার্ত্রনি ভার্ত্রনি ভার্ত্রনি দেশকে হার্ত্র ব্যান্ত ব্য ব্যান্য ব্যান্ত ব্যান্ত

भ পৰিবংন নাইনৰ এৰপিকা) ক ভাৰিবংন নাইনৰ এক প্ৰদা মকনক মন্ত্ৰমত লৈ কে নাইনক কৰিতে অৰ্জন কৰা





LINE : 132 KV AMINGAON - HAZO T/L

অসমৰ শক্তি খণ্ডক পৰ্যাপ্ত পৰিমানে শক্তিশালী কৰিবলৈ বিশ্ববেংকে (The WORLD BANK) ভাৰত চৰকাৰৰ জৰিয়তে অসম চৰকাৰক এক ঋণ ব্যৱস্থাৰ সুবিধা প্ৰদান কৰিছে যাৰ দ্বাৰা উপ-আস্থান (Sub-Station), পৰিবহন লাইন (Transmission Line), বিতৰণ লাইন (Distribution Line) সমূহৰ নিৰ্মান কাৰ্য্য আৰু পূৰ্বতে থকা উপ-আস্থান সমূহৰ বিস্থাৰ (Augmantation/Expansion) কৰা হব। শক্তি খণ্ডৰ উন্নয়নৰ এই আঁচনিৰ জৰিয়তে

১) পৰিবহন বিতৰণ ব্যৱস্থাৰ (Transmission & Distribution Network) পৰিবহন ক্ষমতা বৃদ্ধিৰ লগতে পৰিবহন আৰু বিতৰণ ক্ষতি (T & D Loss) হ্ৰাস কৰা আৰু ২) চাহিদাৰ ক্ষেত্ৰ (Demand side management) খনৰ বাবেও বিশেষ ব্যৱস্থা গ্ৰহন কৰা হব। অসম বিদ্যুৎ গ্ৰীড্ নিগম লিমিটেড (AEGCL) হৈছে উপৰুক্ত আঁচনিৰ কাৰ্যকাৰী সংস্থা (Executing Agency)। উক্ত আঁচনিৰ অধীনত ১৩২ কে. ভি., আমিনগাঁও- হাজো পৰিবহন লাইন নিৰ্মান কাৰ্য্য হাতত লোৱা হৈছে। পৰিবহন লাইনৰ নিৰ্মান কাৰ্য্যৰ সময়ত কোনো ধৰনৰ অস্থায়ী ক্ষতিৰ বাহিৰে স্থায়ী ভূমি অধিগ্ৰহনৰ (Land Acquisition) প্ৰয়োজন নহয়। এই প্ৰকল্পৰ জৰিয়তে ক্ষতিগ্ৰস্ত পৰিয়ালক সমূচিত ক্ষতিপুৰণৰ ব্যৱস্থা কৰা হব। শক্তি খণ্ড উন্নয়নৰ এই আঁচনিৰ জৰিয়তে সমাজৰ আৰ্থ-সামাজিক ব্যৱস্থা স্বলীকৰণৰ ক্ষেত্ৰত পৰ্যাপ্ত পৰিমানে সহায় কৰিব।

অসম বিদ্যুৎ গ্রীড় নিগম লিমিটেড, অসম

÷ O Qe 60 S 281 R Ν विष्येश्वरा स्प्रेय 8 6. 18 cy of (2) REN V Earling objects . and a Deersinger Sugla Blackert Dona. (Cleft's Rowsin's Son - Homenwal ballite Spectanoz the borndy (- 13, chirachturch, Therebasar Baro Mazlar Dehon depute Selar. Snidding Salle - mud (Rosa) Narcayon selaborat Calib Jan Vaner Kalili Atildun Rahman Ulpal Cohain Elashi Bas Mohendin: Kalishi . - (0 Dereden) 8800 Wainer vacin . Smaril Atilun Rahman (Rongen; Burgan) zitayan Pehateuranya. (Romania) Sumil Sharm (Browngoor, Karlencon Neipen Chr. Nath (Rangia, 1.6.c) ganta Q (2322 × 7232 (20,253 Sharm Samo • • Sarra an, AEG 220 Ver. त्म भूभ भूभ 5-19RK Baghkini, Romain) Whi Dani (WORLD BANK) (Runder) (Re-patrice) Bainch Batan (Rarge -Bon 1224-21 Jacon, A1631-L'arto -DURNE Quist yours (2) Tanjo

41. 40. 422, 38) 202 SALES (J. Nigerrowninda G. N. aunning", (ASP 15 / AP Dec) Sukuman mission Normdan Show by here wist Senier a three According K. C. Bannen Hourt Deur 333320 28130 3 Rangtathe 11th ray & Feb 2014, A A A 2-1957-2 QL-NO 9864293318

অসম বিদ্যুৎ গ্রীড্ নিগম লিমিটেড, অসম

সহায় কাৰব। জৰিয়তে সমাজৰ আৰ্থ-সামাজিক ব্যৱস্থা পৰিবহন লাইনৰ নিৰ্মান কাৰ্য্যৰ সময়ত কোনো ধৰনৰ অস্থায়ী ক্ষতিৰ বাহিৰে স্থায়ী ভূমি পৰিয়ালক সমূচিত ক্ষতিপুৰণৰ ব্যৱস্থা কৰা হব। শক্তি খণ্ড উন্নয়নৰ এই আঁচনিৰ আধিগ্ৰহনৰ (Land Acquisition) প্ৰয়োজন নহয়। এই প্ৰকল্পৰ জৰিয়তে ক্ষতিগ্ৰস্ত উপৰুক্ত আঁচনিৰ কাৰ্যকাৰী সংস্থা (Executing Agency)। উক্ত আঁচনিৰ অধীনত বিশেষ ব্যৱস্থা গ্ৰহন কৰা হব। অসম বিদ্যুৎ গ্ৰীড্ নিগম লিমিটেড (AEGCL) হৈছে পৰিবহন ক্ষমতা বৃদ্ধিৰ লগতে পৰিবহন আৰু বিতৰণ ক্ষতি (T & D Loss) হ্ৰাস ২২০ কে. ভি., ৰণ্ডিয়া- আমিনগাঁও পৰিবহন লাইন নিৰ্মান কাৰ্য্য হাতত লোৱা হৈছে। কৰা আৰু ২) চাহিদাৰ ক্ষেত্ৰ (Demand side management) খনৰ বাবেও ১) পৰিবহন বিতৰণ ব্যৱস্থাৰ (Transmission & Distribution Network) খণ্ডৰ উন্নয়নৰ এই আঁচনিৰ জৰিয়তে সবলীকৰণৰ ক্ষেত্ৰত পৰ্যাণ্ড পৰিমানে

Line), বিতৰণ লাইন (Distribution Line) সমূহৰ নিৰ্মান কাৰ্য্য আৰু পূৰ্বতে কৰিছে যাৰ দ্বাৰা উপ-আস্থন (Sub-Station), পৰিবহন লাইন (Transmission BANK) ভাৰত চৰকাৰৰ জৰিয়তে অসম চৰকাৰক এক ঋণ ব্যৱস্থাৰ সুবিধা প্ৰদান

থকা উপ-আস্থান সমূহৰ বিস্থাৰ (Augmantation/Expansion) কৰা হব। শক্তি

অসমৰ শক্তি খণ্ডক পৰ্যান্ত পৰিমানে শক্তিশালী কৰিবলৈ বিশ্ববেংকে (The WORLD

LINE : 220 KV RANGIA - AMINGAONT T/L

আঁচনিৰ সাবলেষ

200 a a of GIA 700% 200 30 min Do 26 Phartati Botto 28 Whal arro 2 00 20 ى 6 S 40 0 5 Ri 00 3 0 ine by Lander Dry Boro, RaToner Swar Br SP2. Deba kanta PMD May 200 ि विदेश्य , every pours , and Rama Parties. Annal Roxo todiala boo. - जीवा यीया Atnomita Bono Roke Mader John conorde 25870 noreupl any misa asna विश्व (वर्कद म् भूष भूष geno A12 970 しんろうろ 20 20 ý 202 হ্যাহায়্য 1 (97) 23 DMIN GAON 3 भुछे 12751 6 -HAZO OTU STASAS PN BAR + 2

20 al and the monand 2.8 million of the sol AEGCL 26 m - Mr 1- 2(6) POWERGRID 3. K. Sharma, AGM, Rangia vinele MRS. G. chaknoberly AGM Fra 6/8/27 U Sr Executive (ENV) R. Saruel Barwal. , A Gun r , 12 22 .12 FM 6 1) (arour graza) 41 Gray (45Md- art-2) Itere windly (is) recreased start

অসম বিদ্যুৎ গ্রীড্ নিগম লিমিটেড, অসম

সহায় কৰিব। জৰিয়তে সমাজৰ আৰ্থ-সামাজিক ব্যৱস্থা সবলীকৰণৰ ক্ষেত্ৰত পৰ্যাপ্ত পৰিমানে পৰিয়ালক সমূচিত ক্ষতিপুৰণৰ ব্যৱস্থা কৰা হব। শক্তি খণ্ড উন্নয়নৰ এই অধিগ্ৰহনৰ (Land Acquisition) প্ৰয়োজন নহয়। এই প্ৰকল্পৰ জৰিয়তে ক্ষতিগ্ৰস্ত পৰিবহন লাইনৰ নিৰ্মান কাৰ্য্যৰ সময়ত কোনো ধৰনৰ অস্থায়ী ক্ষতিৰ বাহিৰে স্থায়ী ভূমি ১৩২ কে: ভি., আমিনগাঁও- হাজো পৰিবহন লাইন নিৰ্মান কাৰ্য্য হাতত লোৱা হৈছে। উপৰুক্ত আঁচনিৰ কাৰ্যকাৰী সংস্থা (Executing Agency)। উক্ত আঁচনিৰ অধীনত বিশেষ ব্যৱস্থা গ্ৰহন কৰা হব। অসম বিদ্যুৎ গ্ৰীড় নিগম লিমিটেড (AEGCL) হৈছে কৰা আৰু ২) চাহিদাৰ ক্ষেত্ৰ (Demand side management) খনৰ বাবেও পৰিবহন ক্ষমতা বৃদ্ধিৰ লগতে পৰিবহন আৰু বিতৰণ ক্ষতি (T & D Loss) হ্ৰাস ১) পৰিবহন বিতৰণ ব্যৱস্থাৰ (Transmission & Distribution Network) আঁচনিৰ

কৰিছে যাৰ দ্বাৰা উপ-আস্থান (Sub-Station), পৰিবহন লাইন (Transmission

খণ্ডৰ উন্নয়নৰ এই আঁচনিৰ জৰিয়তে থকা উপ-আস্থান সমূহৰ বিস্থাৰ (Augmantation/Expansion) কৰা হব। শক্তি Line), বিতৰণ লাইন (Distribution Line) সমূহৰ নিৰ্মান কাৰ্য্য আৰু পূৰ্বতে

BANK) ভাৰত চৰকাৰৰ জৰিয়তে অসম চৰকাৰক এক ঋণ ব্যৱস্থাৰ সুবিধা প্ৰদান অসমৰ শক্তি খণ্ডক পৰ্যাপ্ত পৰিমানে শক্তিশালী কৰিবলৈ বিশ্ববেংকে (The WORLD

আঁচনিৰ সাবলেষ



LINE : 132 KV AMINGAON - HAZO T/L

Photographs of Public Consultation meeting held on 10.02.2014 at Rangia







Photographs of Public Consultation meeting held on 01.02.2014 at village Katamura







ANNEXURE – 8 CONTENTS OF FEAR

Annexure -8: Table of Content for Final Environment Assessment Report (FEAR) for Transmission and Distribution Project

Section - I: Project Description: Brief description of the background, objective of the project, resultant benefit and scope of the work.

Section – II: Baseline Data: Description of the relevant physical, physiographical, and socioeconomic condition of the project area including description of natural resources base like forest resources or any other environment sensitive areas like National Park sanctuary etc. along with description of climatic condition, population and other demographic features of the project area.

Section -III: Policy, Legal and Regulatory Framework: Description of the policy, Legal and Regulatory framework applicable to transmission project and the environmental requirement under which environment assessment has been carried out.

Section – IV: Major Features of Final Route & Environment Impact: Brief description of the environmental criteria for selection of route and major features of final route alignment, details of forest involvement including number of trees and species of the trees likely to be effected. The details of forest clearance and environmental impact matrix describing in brief the extent of impact of transmission line.

Section – V: Potential Environmental Impact, Evaluation and its Management: Description of the measures adopted and under implementation for identified impact due to project location, design, construction, O&M details of public consultation and its documentation, details of contractual conditions regarding safeguard issues under scope of contract for compliance and conclusion listing the category of the project based on the impact and analysis.

Section – VI: Monitoring and Organization Support Structure: Description of the monitoring plan, reporting pattern/frequency, external monitoring requirement/timing for potential environment & social issues with compliance status of Environment Management Plan (EMP) and organization support structure.

Enclosures:

- 1) Original Topo / GIS map with Final route marked
- 2) Public Consultation details like list of participants, photos etc.
- 3) Copy of Forest proposal and Compensatory Afforstation plan.
- 4) Forest approval letters
- 5) Tree, Crop & Tower footing compensation details
- 6) Contract conditions regarding safeguard issues.
- 7) Budget/Expenditure
- 8) Compliance details of safety checklist/measures

ANNEXURE – 9 BUDGET ESTIMATION

Annexure – 9 : Budget Estimate Towards Forest and Crop/Tree/ Tower Footing Compensation

Total 220 K Total 132 k	XV line length Xv tower locations V line length V tower locations		30 Kms 100 approx 40.2 kms. 134 approx.
A. Compen	sation		
1 Fores	t	-	Nil
2. Crop	& Trees		
- Transmis	ssion Line length in Private /Revenue lan	id - 70.20) kms.
- Crop/tree	e compensation for 220 Kv & 132 kV line- (7	70.2 x 5,00),000) = Rs. 362.5 lakhs
- Distribu	tion Line length in Private /Revenue land	l – 98.72 k	(ms.
- Crop/tr	ee compensation for 33 kV line - (98.72 x 50	0,000)	= Rs. 49.36 lakhs
3. Land c	ompensation for tower footings - (234 to	owers x 10	0,000) = Rs. 23.40 lakhs
	Sub Total A (1+2+3)	-	Rs. 435.26 lakhs
B. Implen	nentation Monitoring & Audit		
i)	Man-power involved for EMP implementa & Monitoring in entire route of Transmiss lines & distribution line (Rs.10, 000/-x 196	ion	= Rs. 19.00 lakhs
ii)	Independent Audit (LS) if needed		= Rs. 10.00 lakhs
	Sub Total (B)	-	Rs. 29.00 lakhs
	GrandTotal (A+B)		= Rs. 464.26 lakhs