FINAL ENVIRONMENT ASSESSMENT REPORT (FEAR) FOR T & D NETWORK IN MOKOKCHUNG, KOHIMA, PHEK, WOKHA, ZUNHEBOTO, DIMAPUR & MON DISTRICTS UNDER NERPSIP TRANCHE-1, NAGALAND

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ABBREVIATIONS

ADC	-	Assistant Deputy Collector
AHH	-	Agricultural Households
AP	-	Affected Persons
CA	-	Compensatory Afforestation
CEA	-	Central Electricity Authority
CFC	-	Chlorofluorocarbon
CPIU	-	Central Project Implementation Unit
CPR	-	Common Property Resources
CPTD	-	Compensation Plan for Temporary Damage
CRM	-	Contractor's Review Meeting
DC	-	Deputy Collector
DPN	-	Department of Power, Nagaland
DPR	-	Detailed Project Report
EMF	-	Electro Magnetic Field
EMP	-	Environment Management Plan
EN	-	Endangered
EPA	-	Environment Protection Act
ESMU	-	Environment and Social Management Unit
ESPPF	-	Environment and Social Policy & Procedures Framework
FEAR	-	Final Environment Assessment Report
FRA	-	Forest Right Act
FSI	-	Forest Survey of India
GA	-	Geographical Area
GCC	-	General Conditions of Contract
GHG	-	Green House Gas
GIS	-	Geographical Information System
GoI	-	Government of India
GoN	-	Government of Nagaland
GPS	-	Global Positioning System
GRC	-	Grievance Redress Committee
GRM	-	Grievance Redressal Mechanism
GSDP	-	Gross State Domestic Product
GW	-	Green Wash
HFL	-	High Flood Level
HQ	-	Head Quarter
IA	-	Implementing Agency
IBA	-	Important Bird Area
ICNIRP	-	International Commission on Non-Ionizing Radiation Protection
IEAR	-	Initial Environment Assessment Report
ISFR	-	India State of Forest Report

ITI	-	Industrial Training Institute
IUCN	-	International Union for Conservation of Nature
Km	-	Kilometer
kV	-	KiloVolt
LC	-	Least Concerned
LILO	-	Line-In Line-Out
MDF	-	Moderately Dense Forest
MoEF&CC	-	Ministry of Environment Forest & Climate Change
MSE	-	Medium and Small Enterprise
MVA	-	Mega Volt Ampere
MW	-	MegaWatt
NA	-	Not Assessed
NBSAP	-	National Biodiversity Strategy and Action Plan
NBSS&LUP	-	National Bureau of Soil Survey & Land Use Planning
NER	-	North East Region
NERPSIP	-	North Eastern Region Power System Improvement Project
NH	-	National Highway
NOC	-	No Objection Certificate
NPV	-	Net Present Value
NT	-	Near Threatened
NTFP	-	Non Timber Forest Product
NU	-	Nagaland University
OF	-	Open Forest
PCB	-	Poly Chlorinated Biphenyl
PF	-	Protected Forest
PGCIL	-	Powergrid Corporation of India Limited
PIU	-	Project Implementation Unit
PRA	-	Participatory Rural Appraisal
PWD	-	Public Works Department
RF	-	Reserved Forest
RFA	-	Recorded Forest Area
RFCTLARRA	-	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act
ROW	-	Right of Way
RSET	-	R S Envirolink Technologies Pvt. Ltd.
S/s	-	Substation
SDO	-	Sub Divisional Officer
SH	-	State Highway
SIA	-	Social Impact Assessment
SMF	-	Social Management Framework
SPCU	-	State Project Coordination Unit
Sq km	-	Square Kilometer

ST	-	Scheduled Tribes
T&D	-	Transmission and Distribution
TOF	-	Tree Outside Forest
TRC	-	Terrace Rice Cultivation
VDF	-	Very Dense Forest
VU	-	Vulnerable
WB	-	World Bank
ZSI	-	Zoological Survey of India

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EXECUTIVE SUMMARY

North Eastern Region Power Supply Improvement Project (NERPSIP) is a World Bank funded project aimed at improving the impoverished power transmission and distribution system in the North Eastern states of India with Power Grid Corporation of India Ltd. (POWERGRID), the single transmission utility of the country as the implementing agency (IA). The present Final Environmental Assessment Report (FEAR) is for the transmission and distribution system in Dimapur, Kohima, Mokokchung, Mon, Phek, Wokha and Zunheboto district and has been undertaken to verify the actual locational details of the project elements, to report any impacts on the biodiversity and protected area and the project affected people, and to assess the compliance of the Initial Environmental Assessment Report (IEAR) /Environment Management Plan (EMP) prepared and submitted by the IA for the instant project. The elements of the present project include one 220 kV transmission line of 85 km, five 132 kV transmission lines of 78.333 km, construction of four new transmission sub-stations, bay extension of four transmission sub-stations, nine 33 kV distribution lines of 54.58 km, construction of nine new distribution sub-stations and augmentation/ bay extension of fourteen distribution sub-stations.

The topography of the districts is mainly hilly, part of Dimapur, Mokokchung and Mon district is plain also. However, apart from one small 132 kV transmission line all the transmission lines are in hilly region. Similarly, apart from 2 distribution lines all the distribution lines are in hilly region. About 75% of the landscape has a forest cover (open forest, plantations) mostly in the hilly terrain, and the rest (25%) is constituted by jhum land, agricultural fields, settlements etc. Most of the land is privately owned and some are under the jurisdiction of the Village Council.

The final layout of transmission lines has been carefully selected from three given options. The alignment has successfully avoided all reserve forests, protected areas, all ecological and social sensitive areas such as protected areas, sacred groves, community conserved areas, important bird areas, wetlands, settlements, common property resources, etc. The land use along the RoW (35 m for 220 kV and 27 m for 132 kV) of lines comprises of agricultural land, private plantation and govt. land. The original length of the line has been reduced to 163.333 km from earlier 177.05 km due to further optimization during ground truthing survey. As a result, the environmental

footprints have been reduced without any additional impacts as envisaged in IEAR. A total of 547 towers are being/to be erected for all 6 proposed transmission lines.

Similarly, the distribution lines too have been aligned mostly along the existing roads and by avoiding dense forest areas. Here, the RoW corridor being narrower (15m) will further reduce the necessity of tree felling. Much of the line would only need lopping of branches for unhindered passage. The land use along the RoW of lines comprises of agricultural land, private plantation and govt. land. The original length of the line has been increased to 54.58 km from earlier 46.06 km due to further optimization during ground truthing survey. However, considering that distribution line has minimum environmental footprints and without any change in land use and other base line data, no additional impacts of any kind apart from earlier identified impacts in IEAR/EMP are anticipated. A total of around 848 poles are being/to be erected for all 9 proposed distribution lines.

Sub-station locations are based on environment and social aspects and technical requirement. 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; CPR including feasibility of acquisition were considered for analysis. The social aspects are provided due weightage after technical requirement in decision making for selection/finalization of land for substation. In the instant case land for all the proposed substations are either in possession of DPN or identified for purchase on willing seller–willing buyer basis.

Impacts due to project have been analyzed for all the phases of project i.e. during design, construction and operation. Since, no involuntary acquisition was involved and fresh lands were secured only through private purchase there is no R & R and resettlement issues. Due to electricity supply, land value is expected to increase, therefore, possibility of land value depreciation is not envisaged. Final routes of lines and sites for construction of new sub-stations don't involve any monuments of historical or cultural significance. Since forest area covered under Forest (Conservation) Act, 1980 has been completely avoided with careful selection of route alignment, therefore, provisions of the Forest (Conservation) Act, 1980 shall not prevail. However, in case of felling of trees in non-designated forest areas DPN/IA shall provide fund for compensatory afforestation for planting 3 trees for every tree to be felled subject to availability of land. As per existing law, land for tower/pole & right of way is not acquired and ownership of land remains with the owner and

agricultural activities are allowed to continue after construction activity. However, as per existing laws compensation for all damages (tree/crop) are paid to the individual land owner. Additionally, land compensation @100% land value for tower base is also paid to land owner as per prevailing practices. execution of the projects covered in this report has not resulted in any steep rise in traffic volume. The project does not require availing clearances from Department of Railways, Department of Telecommunications, and the Ministry of Aviation. Further, the present project requires very less vehicular movement and that too restricted to construction period only. Hence, neither any interference with other utility nor steep rise in traffic volume is anticipated/ observed. The lines proposed under this scheme don't involve any tower/ pole to be placed in river bed which could interfere with existing drainage patterns. In sub-stations, all drainage channels along or inside substations are being trained and connected to main or existing drainage to avoid any erosion due to uncontrolled flow of water.

Detailed specification with respect to equipment design and substation drainage and sewage design has been included in tender document to avoid any incidence of land and water contamination. Adequate safety measures are in place to avoid any potential fire/ explosion hazard. All the soil excavated for tower/pole footings and substations construction are optimally utilized for backfilling and the remaining soil being spread evenly and compacted. Top soil disturbed during the development of sites are used to restore the surface of the platform. Infertile and rocky material are dumped at carefully selected dumping areas and used as fill for substation/ and tower/pole foundations. Hence, possibility of erosion of exposed area due to construction activity is negligible. To contain the noise level within the 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. The proposed lines are not passing through any forest area, wildlife area. Since there is no protected area or demarcated/ documented migration path of wildlife like elephant corridor existing near to subproject locations, hence, possibility of any disturbance to wildlife is not imminent. No bird migration/fly path found in project area. Moreover, bird guard/anti perching devices are being made part of BoQ/tower design.

Majority of tower/pole locations are on hilly terrain; therefore, tower/ poles have been positioned on hilltops and where ever positioning of tower on hill top is not possible leg extension is being utilized so as to minimize/ avoid

benching/ revetment and to provide great stability. Retaining walls are also being constructed to eliminate the chances of silt runoff/ soil erosion. Out of total 542 towers being/ to be erected approx. 66% (359 no.) are with leg extension. The excavated material has been backfilled and any remaining earth, if any have been spread around the base and compacted. In case of distribution lines all the excavated soil is backfilled and compacted after erection of tubular poles. In case of sub-station, existing one are located on flat land and adjacent to existing road and new ones are also being constructed on flat land after site clearing and leveling. So far there are no instances with potential of erosion during construction of above said lines. Any adverse impact arising during the construction is limited to the boundaries of proposed substation only and neither impacts nearby habitat/property nor health & safety of neighboring community. 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 so as to avoid borrowing of the area. Issues relating to operational health and safety has been adequately addressed. The labourers are provided with safety gear and provisions for first aid and arrangement for shifting of affected persons to nearby hospitals are also in place. Compensation for injury and death has been ensured through provisions in Safety Plan & Contract condition. Proper sanitation facilities and safe drinking water are being provided in the project locations. The site managers have been advised to ensure that there are no instances of open defecation.

The IA has a continuous monitoring mechanism of the project w.r.t. compliance of the mandatory requirements as stipulated in the IEAR. Thus, the adherences to the clauses by the contractors are regularly monitored especially in respect of EMP implementation, OHS compliance. The project has thus far had zero fatality which is indicative of the strict vigil of the IA.

The Capacity building and Institutional Strengthening program of the IA is held intermittently to enhance the skills of the project officials. Further, meetings between IA and DPN are held on a monthly/ bimonthly basis to assess the work progress and difficulties encountered in respect of land acquisition, RoW and compensation if any.

Public is informed about the project at every stage of execution. Public consultation using different technique like Public Meeting, Small Group Meeting, informal meetings have been carried out during different activities of project cycle. For the Participatory Rural Appraisal (PRA), informal meetings were held with various stakeholders such as IA, contractors, labours, villagers

etc. to capture their view about the project. It emerged from the survey that the PAPs were appreciative of the project and hoped that the power scenario would improve after commissioning of the project. Local people are also getting benefited through project related employment that was being generated.

Overall, the planning and layout of the project elements have been undertaken in a judicious manner so as to ensure minimum environmental impact. However, during the implementation phase, especially in respect of the construction, strict monitoring by the IA should be undertaken so as to ensure proper compliance by the contractors with reference to the IEAR and especially with regard to compliance of the health and safety measures.

Chapter 1 INTRODUCTION & PROJECT DESCRIPTION

1.1 PROJECT BACKGROUND

India's North East Region (NER) stretches across the eastern foothills of the Himalayan mountain range and is comprised of seven states including Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura.

Recognizing that intrastate Transmission & Distribution (T&D) systems in the NER states have remained very weak and that there is a critical need to improve the performance of these networks, the Central Electricity Authority (CEA) developed a comprehensive scheme for the NER in consultation with POWERGRID and the concerned state governments. This scheme is intended to (a) augment the existing T&D infrastructure to improve the reliability of service delivery across all the NER states and (b) build institutional capacity of the power utilities and departments in the NER. This scheme is part of the Government of India's (GoI) wider efforts to develop energy resources in the NER for electricity supply within the region, to strengthen transmission networks, expand and strengthen sub-transmission systems, and extend last mile electricity connectivity to household.

GoI requested for World Bank's (WB) support in implementing a set of priority investments in six NER States In 2016, the WB has approved a loan (IBRD 470 USD Million) to the GoI for **North Eastern Region Power System Improvement Project (NERPSIP)** which aims to create a robust intrastate transmission and distribution network in all the six (6) North Eastern States. The project being funded on 50:50 (WB loan: GoI) basis except the component of capacity building for Rs. 89 crore, which GoI will bear entirely. The scheme is to be taken up under a new Central Sector Plan Scheme of Ministry of Power (MoP).

MoP, GoI has appointed Power Grid Corporation of India Limited **(PGCIL/ POWERGRID)** as Implementing Agency (IA) to six North Eastern States for the said project under Tranche-1 in close coordination with the respective State Governments/Utilities. However, the ownership of the assets shall be with the respective State Utilities/State Government which upon progressive commissioning shall be handed over to them for taking care of Operation and Maintenance of assets. POWERGRID is also facilitating in building the institutional capacity of the state departments and utilities to continue

managing the rehabilitated networks in an efficient manner. The state wise scope of works proposed under Tranche-1 is given below in **Table 1.1**.

Table 1.1: State Wise Scope of Work Proposed Under Tranche-1

State	Transmission/ Sub-station (132kV & above)			Distribution (33kV)		
	Line (km)	New S/s (No.)	Total MVA (New & Aug.)	Line (km)	New S/s (No.)	Total MVA (New & Aug.)
Assam	233	11	1644	479	16	240
Manipur	254	2	160	131	13	229.4
Meghalaya	225	4	940	263	11	135
Mizoram	143	3	125	5	1	6.3
Nagaland	193	5	245	60	10	200
Tripura	261	9	1306.5	1096	34	450.5
Total	**1309**	**34**	**4420.5**	**2034**	**85**	**1261.2**

The project has two components namely Component A: Priority Investments for Strengthening Intrastate Transmission, Sub-transmission, and Distribution Systems, and Component B: Technical Assistance for Capacity Building and Institutional Strengthening (CBIS) of Power Utilities and Departments of Participating States. The total project cost is **Rs. 5111.33 Crore** with financing from both GoI and Bank on 50:50 basis. The Bank is providing financial support to the tune of US$ 470 million (**Rs. 2511.165 Crore**) under the Loan No.-8631-IN which was signed on 28th November, 2016 and became effective from 20th February, 2017. The loan closing date is 31st March, 2023. The remaining financing including capacity building will be met through Govt. of India funding. Details of State wise funding is placed below in **Table 1.2.**

Table 1.2: Details of State Wise Funding

State	World Bank	Government of India		Total (Rs. in Cr.)
	Project Cost (Rs. in Cr.)	Project Cost (Rs. in Cr.)	Capacity Building (Rs. in Cr.)	
Assam	729.485	729.485	14.83	**1473.803**
Manipur	213.690	213.690	14.83	**442.213**
Meghalaya	381.050	381.050	14.83	**776.933**
Mizoram	150.965	150.965	14.83	**316.763**
Nagaland	357.290	357.290	14.83	**729.413**
Tripura	678.685	678.685	14.83	**1372.203**
Total	**2511.165**	**2511.165**	**89.00**	**5111.33**

1.2 PROJECT JUSTIFICATION

The State of Nagaland is spread over an area of about 16,579 sq. km with a population of more than 19.80 lakh. The State of Nagaland faces significant bottlenecks in electricity access and availability. The present per capita energy consumption is of the order of 218 units (kWh) against the regional per capita

consumption of about 258 units and national per capita consumption of about 779 units. Department of Power, Nagaland (DPN) has generation capacity of 24 MW at Likimro Hydro Power Project of its own. Other mini hydel plants under the state sector are DuilumRoi stage I (0.54 MW), DuilomRoi stage II (0.2 MW), Telangsao (0.6 MW), Lang (1 MW) summing up to 26.34 MW. Apart from these sources of generation the remaining power requirements for DPN is met through its share from Central Sector Power generation and power purchases from electricity traders/other sources, which is wheeled through the PGCIL network of North Eastern Region. The present average peak demand of the State stands at 120 MW which is again restricted to 80 MW due to infrastructural constraints especially in the Transmission and Distribution networks.

Besides this, 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 and 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, outage 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 T&D system. Accordingly, phase wise strengthening of transmission & sub-transmission system has been proposed.

The transmission schemes proposed under Tranche-1 of Nagaland State include construction of 193 km of 220/132 kV Transmission Lines (TL) & associated 5 nos. new substation and 59 km of 33 kV Distribution Lines (DL) & associated 10 nos. substation along with augmentation & strengthening of transmission and sub-transmission spread across the State. The Power Map of Nagaland indicating the existing and proposed T&D network is placed in **Figure 1.1**. Summary of subprojects to be implemented in the State in Tranche-1 under NERPSIP along with capacity addition and cost is shown in **Table 1.3** below.

Table 1.3: Summary of Subprojects in Tranche- I Under NERPSIP

S. No.	Name of the subproject	Quantity (Nos.)	Capacity Addition (km/MVA)	Estimated Cost (Rs. in Cr.)
1	220/132 kV Transmission lines	7	193 km	729.413
2	220/132 kV substations (New/Augmentation)	10	245 MVA	

S. No.	Name of the subproject	Quantity (Nos.)	Capacity Addition (km/MVA)	Estimated Cost (Rs. in Cr.)
3	33 kV Distribution lines	10	59 km	
4	33/11kV substations (New/Augmentation)	25	200 MVA	

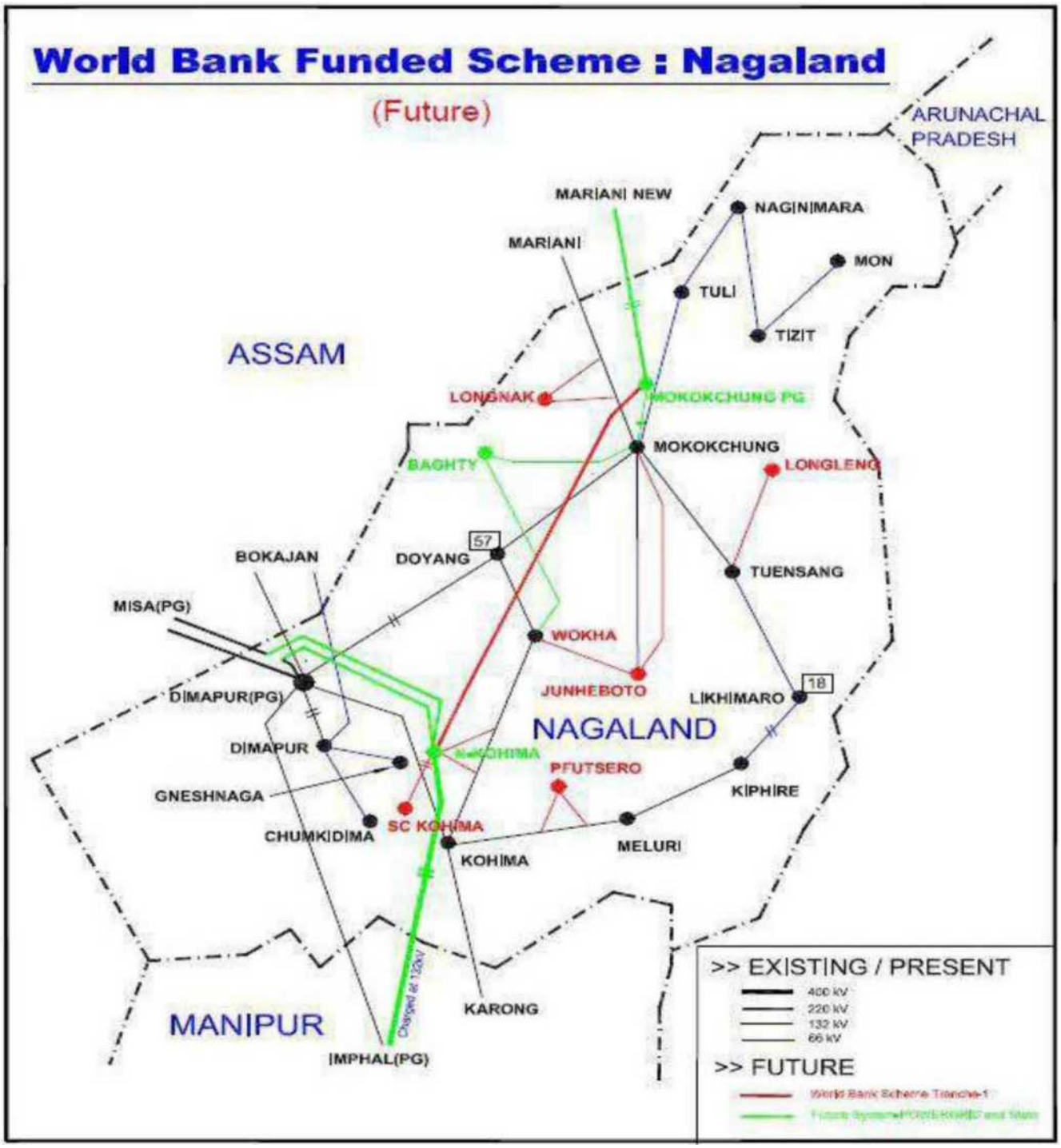


Figure 1.1: Power Map of Nagaland

1.3 PROJECT BENEFIT

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

1.4 PROJECT SCOPE & PRESENT STUDY

In line with DPN's Environment and Social Policy & Procedures Framework (ESPPF), POWERGRID carried out comprehensive environment and social assessment of each subprojects and prepared Initial Environment Assessment Report (IEAR). These reports were subsequently disclosed for public information both on the State Utility, POWERGRID and Bank website after obtaining clearance from The World Bank.

As mandated in the ESPPF, a Final Environment Assessment Report (FEAR) for each subproject need to be prepared with an objective to assess the compliance of mitigation measures identified in IEAR including implementation of EMP provisions by IA/ Contractor. However, as per Project Agreement signed between POWERGRID and Bank such study is required to be undertaken by Independent Agencies as per Term of Reference agreed with Bank. As a part of this development, POWERGRID appointed **R S Envirolink Technologies Pvt. Ltd. (RSET)** as Independent consultant vide LOA Ref No.: **NEGW/C&M/2019-20/NERPSIP/600-27/FEAR-NAG/LOA-24/311** dated **29/10/2019** to carry out FEAR study.

The present Final Environment Assessment Report (FEAR) is a document developed as a consultancy assignment to validate the work undertaken and to critically examine any deviation, if any with respect to management measures as outlined in the IEAR which is based on DPN's ESPPF, World Bank's Operational Policies and Bank's Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution.

The scope of the present study includes 220/132 kV transmission line and associated 220/132/33 kV substations, 33 kV distribution lines and associated 33/11 kV substations which are being implemented in Dimapur, Kohima, Mokokchung, Mon, Phek, Wokha and Zunheboto Districts of Nagaland. Detail of T&D network are given below and shown in **Figure 1.2.**

1.4.1 Transmission Components

The present study includes six 220/132 kV transmission lines and associated eight 220/132/33 kV substations being implemented in Kohima, Mokokchung, Phek, Wokha and Zunheboto Districts of Nagaland. Details of Transmission network are given below in **Table 1.4.**

Table 1.4: Details of Transmission Network

S. No.	Name of the Line	Name of New/ Existing Sub-station	Project District/s
1	LILO of 132 kV Mariani -	Establishment of 132/33 kV Sub-	Mokokchung

S. No.	Name of the Line	Name of New/ Existing Sub-station	Project District/s
	Mokokchung Line at Longnak	station at Longnak (New)	
2	132 kV D/C New Kohima (Zadhima) to New Secretariat Complex (NU Campus)	Establishment of 132/33 kV Sub-station at Secretariat Complex Kohima (New)	Kohima
3	LILO of both Circuit of Kohima – Meluri (Kiphire) Line at Pfutsero	Establishment of 132/33 kV Sub-station at Pfutsero (New)	Phek
4	132 kV S/C (on D/C Tower) Wokha - Zunheboto - Mokokchung Line	Bay extension of 132/33 kV Sub-station at Wokha	Wokha
		Establishment of 132/33 kV Sub-station at Zunheboto (New)	Zunheboto
		Bay extension of 132/33 kV Sub-station at Mokokchung (State Owned)	Mokokchung
5	220 kV S/C (on D/C Tower) New Kohima - Mokokchung via Wokha Line	Bay extension of 220/132 kV existing Sub-station at Mokokchung (PGCIL owned)	Kohima, Wokha, Zunheboto
6	LILO of 132 kV S/C Kohima - Wokha Line at 220 kV New Kohima Sub-station	Bay extension of 220/132 kV existing sub-station at New Kohima	Kohima

1.4.2 Distribution Components

The present study includes nine 33 kV distribution lines and associated twenty-four 33 kV substations being implemented in Dimapur, Kohima, Mokokchung, Mon, Phek, Wokha and Zunheboto Districts of Nagaland. Details of Distribution network are given below in **Table 1.5.**

Table 1.5: Details of Distribution Network

S. No.	Name of the Line	Name of New/ Existing Sub-station	Project District/s
1	33 kV line from tapping point of existing 33/11 kV Mokokchung - Mariani Line at Longtho Sub-station	Establishment of 33/11 kV Sub-station at Longtho (New)	Mokokchung
2	33 kV line from 132/33 kV Zunheboto (new) to 33/11 kV Zunheboto South Point (new) Sub-station	Establishment of 33/11 kV Sub-station at Zunheboto South Point (New)	Zunheboto
3	33 kV line from 66 kV Mokokchung (existing) to 33/11 kV Mokokchung Power House (new) Sub-station	Establishment of 33/11 kV Sub-station at Mokokchung Power House (New)	Mokokchung
4	33 kV line from 66 kV Mokokchung (existing) to 33/11 kV Mokokchung Town Hospital Area (new) Sub-station	Establishment of 33/11 kV Sub-station at Mokokchung Town Hospital Area (New)	Mokokchung
5	33 kV line from 132/33 kV	Establishment of 33/11 kV Sub-	Kohima

S. No.	Name of the Line	Name of New/ Existing Sub-station	Project District/s
	Kohima (new) Sub-station to 33/11 kV Zhadima (new) Sub-station	station at Zhadima (Chiephobozou) (New)	
6	33 kV line from 132/33 kV Pfutsero (new) to 33/11 kV Pfutsero (new) Sub-station	Establishment of 33/11 kV Sub-station at Pfutsero (New)	Phek
7	33 kV line from existing 132/66/33 kV Nagarjan Sub-station to new 33/11 kV Padampukhri Sub-station	Bay extension of 132/66/33 kV Sub-station at Nagarjan	Dimapur
		Establishment of 33/11 kV Sub-station at Padampukhri (New)	Dimapur
8	33 kV line from 33/11 Akuloto (existing) Sub-station to 33/11 kV Suruhuto (existing) Sub-station	Bay extension of 33/11 kV (Existing) Sub-station at Akuloto	Zunheboto
		Bay extension of 33/11 kV (Existing) Sub-station at Suruhoto	Zunheboto
9	33 kV line from existing 33/11 kV Pughoboto Sub-station to existing 33/11 kV Torogonyu Sub-station	Bay extension of 33/11 kV (Existing) Sub-station at Pughoboto	Kohima
		Establishment of 33/11 kV Sub-station at Tizit (New)	Mon
		Establishment of 33/11 kV Sub-station at Lalmati (Zubza) (New)	Kohima
		Capacity augmentation of 33/11 kV (Existing) Sub-station at Changtongya	Mokokchung
		Capacity augmentation of 33/11 kV (Existing) Sub-station at Mangkolemba	Mokokchung
		Capacity augmentation of 33/11 kV (Existing) Sub-station at Wokha Power House	Wokha
		Capacity augmentation of 33/11 kV (Existing) Sub-station at Chukitong	Wokha
		Capacity augmentation of 33/11 kV (Existing) Sub-station at Tseminyu	Kohima
		Capacity augmentation of 33/11 kV (Existing) Sub-station at Botsa	Kohima
		Capacity augmentation of 33/11 kV (Existing) Sub-station at ITI Kohima	Kohima
		Capacity augmentation of 33/11 kV (Existing) Sub-station at Chakabama	Kohima
		Capacity augmentation of 33/11 kV (Existing) Sub-station at Industrial Estate	Dimapur
		Capacity augmentation of 33/11 kV (Existing) Sub-station at Referral Hospital	Dimapur

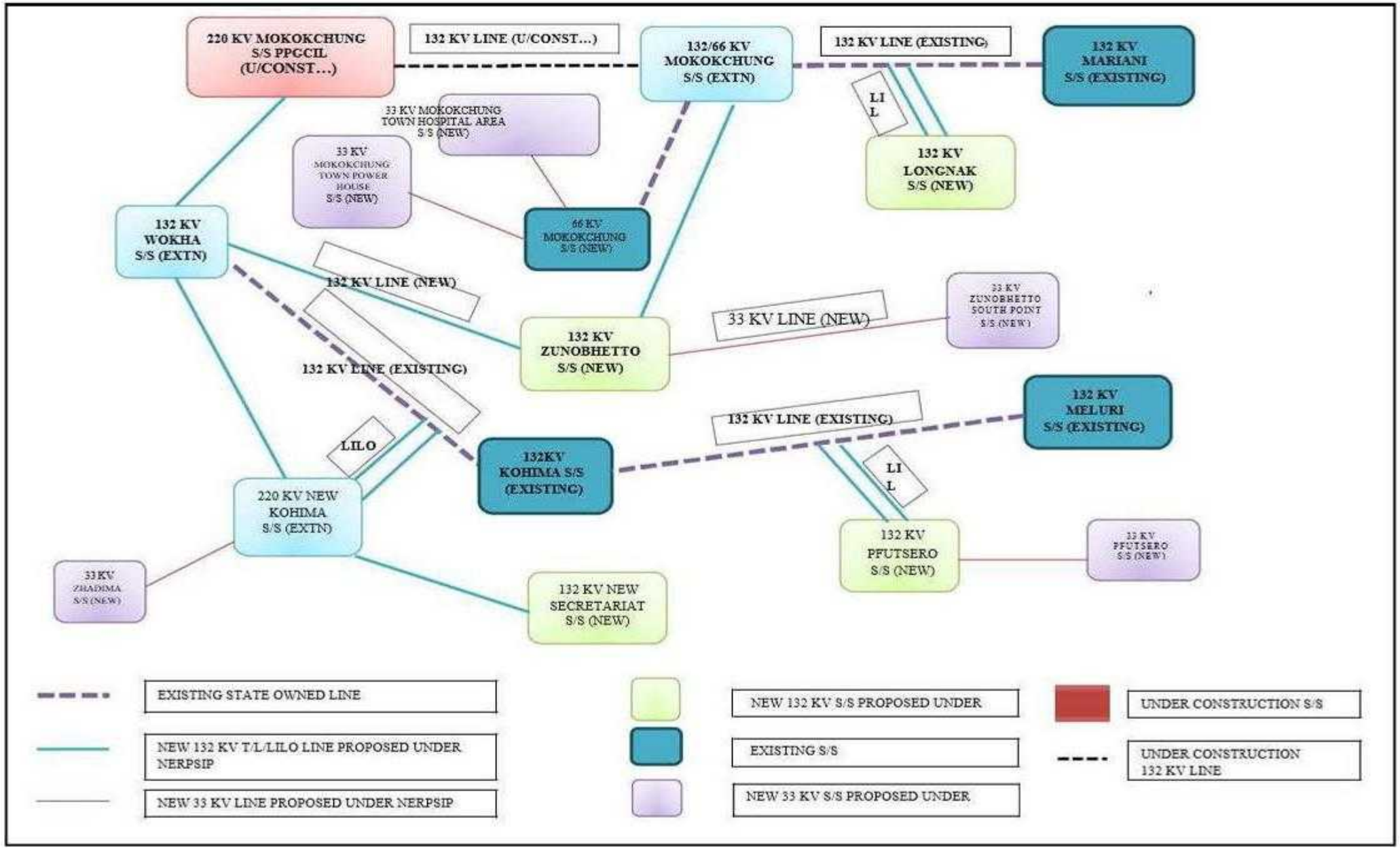


Figure 1.2: Proposed T&D Network in Mokokchung, Kohima, Phek, Zunheboto, Dimapur, Phek and Mon Districts under NERPSIP

1.5 OVERALL PROJECT PROGRESS

A brief status on project implementation progress of various transmission & distribution components till March, 2020 is given below in **Table 1.6**.

Table 1.6: Brief Status on Project Implementation Progress

S. No.	Name of the T & D Components	Progress as on March, 2020
A	**Transmission and Distribution Line**	
1	LILO of 132 kV Mariani - Mokokchung Line at Longnak	➢ 5 out of 5 tower foundation completed ➢ 5 out of 5 tower erection completed ➢ Stringing (0.637 km) yet to commence
2	132 kV D/C New Kohima (Zadhima) to New Secretariat Complex (NU Campus)	➢ 22 out of 48 tower foundation completed ➢ 9 out of 48 tower erection completed ➢ Stringing (13.971 km) yet to commence
3	LILO of both Circuit of 132 kV S/C Kohima – Meluri (Kiphire) Line at Pfutsero	➢ 10 out of 10 tower foundation completed ➢ 7 out of 10 tower erection completed ➢ Stringing (2.685 km) yet to commence
4	132 kV S/C (on D/C Tower) Wokha - Zunheboto -Mokokchung Line	➢ 9 out of 168 tower foundation completed ➢ Tower erection (168 Nos.) yet to commence ➢ Stringing (50.293 km) yet to commence
5	220 kV S/C (on D/C Tower) New Kohima - Mokokchung via Wokha Line	➢ 85 out of 285 tower foundation completed ➢ 17 out of 285 tower erection completed ➢ Stringing (86.942 km) yet to commence
6	LILO of 132 kV S/C Kohima - Wokha Line at 220 kV New Kohima Sub-station	➢ 16 out of 33 tower foundation completed ➢ Tower erection (33 Nos.) yet to commence ➢ Stringing (9.54 km) yet to commence
7	33 kV line from tapping point of existing 33/11 kV Mokokchung - Mariani Line at Longtho Sub-station	➢ 14 out of 44 poles casted and erected ➢ Stringing (1.2 km) yet to commence
8	33 kV line from 132/33 kV Zunheboto (new) to 33/11 kV Zunheboto South Point (new) Sub-station	➢ 38 out of 93 poles casted and erected ➢ Stringing (5.186 km) yet to commence
9	33 kV line from 66 kV Mokokchung (existing) to 33/11 kV Mokokchung Town Hospital Area (new) Sub-station*****	Re survey of 16 km of route alignment has been completed with DPN, Nagaland and report submitted to NERPSIP, Guwahati

S. No.	Name of the T & D Components	Progress as on March, 2020
10	33 kV line from 132/33 kV Kohima (new) Sub-station to 33/11 kV Zhadima (new) Sub-station	Completed ➢ 13 out of 13 poles erected (1 no. 4 pole, 3 nos. double pole & 3 nos. single pole) ➢ Stringing (0.542 km) completed
11	33 kV line from 132/33 kV Pfutsero (new) to 33/11 kV Pfutsero (new) Sub-station	➢ 13 out of 133 poles casted and erected ➢ Stringing (3.6 km) yet to commence
12	33 kV line from existing 132/66/33 kV Nagarjan Sub-station to new 33/11 kV Padampukhri (new) Sub-station	➢ 112 out of 192 poles casted and erected ➢ Stringing (6.152 km) yet to commence
13	33 kV line from 33/11 Akuloto (existing) Sub-station to 33/11 kV Suruhuto (existing) Sub-station	➢ Checking of the survey going on due to excessive number of poles/ km
14	33 kV line from existing 33/11 kV Pughoboto Sub-station to existing 33/11 kV Torogonyu Sub-station	➢ Survey completed from Pughoboto Jn. to Pughoboto balance Torogonyu to Pughoboto Jn. yet to be done
B	**Transmission and Distribution Sub-stations**	
1	132/33 kV Sub-station at Longnak (New) (2 x 25 MVA)	➢ Land area measuring 4.7 acre secured from single landowner through private purchase on willing buyer willing seller based on negotiated/market rate. ➢ CRB under progress. ➢ Boundary wall, equipment foundation work under progress.
2	132/33 kV Sub-station at Secretariat Complex Kohima (New) (2 x 25 MVA)	➢ Land area measuring 3.4 acre is Govt. land and is provided by DPN. ➢ Site levelling works almost completed ➢ RCC Retaining wall construction is under progress ➢ 10 no. 132 kV Tower 1 no. LM Tower foundation casting completed ➢ Till date more than 1000 Cu.M. RCC casting done ➢ Excavation works started for Column Footing of CRB ➢ 1 no. 25 MVA TFR Fdn. Construction works under progress
3	132/33 kV Sub-station at Pfutsero (New) (2 x 25 MVA)	➢ Land area measuring 4.94 acre secured from single landowner

S. No.	Name of the T & D Components	Progress as on March, 2020
		through private purchase on willing buyer willing seller based on negotiated/market rate. ➢ Re-Engineering of the layout is being taken up by the CC Engg. in order to protect the site from the landslide.
4	Bay extension of 132/33 kV Sub-station at Wokha	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ Civil work complete & equipment erection work yet to commence
5	132/33 kV Sub-station at Zunheboto (New) (2 x 25 MVA)	➢ Land area measuring 14.64 acre secured from six landowners through private purchase on willing buyer willing seller based on negotiated/market rate. ➢ Site leveling under progress. ➢ Civil work under progress
6	Bay extension of 132/33 kV Sub-station at Mokokchung (State Owned)	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ Civil work & equipment erection work under progress
7	Bay extension of 220/132 kV Sub-station at Mokokchung (PGCIL owned)	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ Civil work & equipment erection work under progress
8	Bay extension of 220/132/33 kV Sub-station at New Kohima (Zhadima)	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ Civil work & equipment erection work almost complete
9	33/11 kV Sub-station at Longtho (New) (2 x 5 MVA)	➢ Land area measuring 1.04 acre is Govt. land and is provided by DPN. ➢ Excavation: 40/40 Nos. PCC: 40/40 Nos. RCC up to Plinth Beam: 36/40 Nos. Plinth Beam- 86 m

S. No.	Name of the T & D Components	Progress as on March, 2020
		➢ 1 no. Transformer pad completed and another up to wing wall level completed
10	33/11 kV Sub-station at Zunheboto South Point (New) (2 x 5 MVA)	➢ Land area measuring 0.76 acre is Govt. land and is provided by DPN. ➢ Rafting in both the Transformer Pads are completed.
11	33/11 kV Sub-station at Mokokchung Power House (New) (2 x 10 MVA)	➢ Land area measuring 0.15 acre is Govt. land and is provided by DPN. ➢ Civil work & equipment erection work yet to commence
12	33/11 kV Sub-station at Mokokchung Town Hospital Area (New) (2 x 5 MVA)	➢ Land area measuring 0.20 acre is Govt. land and is provided by DPN ➢ 2 no. of TFR foundation completed ➢ Control room building up to plinth level completed, Column completed, roof casting in progress.
13	33/11 kV Sub-station at Zhadima (Chiephobozou) (New) (2 x 2.5 MVA)	➢ Land area measuring 0.37 acre is Govt. land and is provided by DPN. ➢ Equipment erection work under progress
14	33/11 kV Sub-station at Pfutsero (New) (2 x 5 MVA)	➢ Land area measuring 0.15 acre is Govt. land and is provided by DPN ➢ Tower foundation work under progress ➢ Transformer Erection 2 no completed
15	Bay extension of 132/66/33 kV Sub-station at Nagarjan	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ Equipment erection work under progress
16	33/11 kV Sub-station at Padampukhri (New) (2 x 10 MVA)	➢ Land area measuring 0.74 acre secured from single landowners through private purchase on willing buyer willing seller based on negotiated/market rate. ➢ Civil work yet to be completed ➢ Erection work under progress
17	Bay extension of 33/11 kV (Existing) Sub-station at Akuloto	➢ Required land for extension work already available in the existing

S. No.	Name of the T & D Components	Progress as on March, 2020
		substation premise and hence, no fresh land secured ➢ Excavation for Control Room building columns is completed
18	Bay extension of 33/11 kV (Existing) Sub-station at Suruhoto (1 x 5 MVA)	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ Excavation for Transformer Pad foundation is completed
19	Bay extension of 33/11 kV (Existing) Sub-station at Pughoboto (1 x 5 MVA)	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ Transformer foundation completed ➢ Transformer reached at site for erection.
20	33/11 kV Sub-station at Tizit (New) (2 x 5 MVA)	➢ Land area measuring 0.15 acre is Govt. land and is provided by DPN. ➢ Transformers test charged on 02.10.2019, yet to be handed over to DPN
21	33/11 kV Sub-station at Lalmati (Zubza) (New) (2 x 5 MVA)	➢ Land area measuring 0.33 acre is Govt. land and is provided by DPN. ➢ Transformers test charged on 19.06.2019, yet to be handed over to DPN
22	Capacity augmentation of 33/11 kV (Existing) Sub-station at Changtongya (1 x 5 MVA)	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ Transformer foundation completed. ➢ 4 pole equipment foundation completed.
23	Capacity augmentation of 33/11 kV (Existing) Sub-station at Mangkolemba (1 x 5 MVA)	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ Transformer foundation completed. ➢ 4 pole equipment foundation completed.

S. No.	Name of the T & D Components	Progress as on March, 2020
		➢ Cable trench completed
24	Capacity augmentation of 33/11 kV (Existing) Sub-station at Wokha Power House (1 x 5 MVA)	➢ Land area measuring 0.47 acre secured from six landowners through DPN on willing buyer willing seller based on negotiated/market rate. ➢ Survey report is submitted for approval from DPN
25	Capacity augmentation of 33/11 kV (Existing) Sub-station at Chukitong (1 x 5 MVA)	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ CRB Columns are concreted ➢ Transformer foundation completed
26	Capacity augmentation of 33/11 kV (Existing) Sub-station at Tseminyu (1 x 5 MVA)	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ Excavation done for transformer foundation.
27	Capacity augmentation of 33/11 kV (Existing) Sub-station at Botsa (1 x 5 MVA)	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ Commissioned on 01.07.2019 (test charged yet to be put into commercial operation)
28	Capacity augmentation of 33/11 kV (Existing) Sub-station at ITI Kohima {Replacement of (2x5MVA) Transformer with (2x10MVA)}	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ (Commissioned on 7.04.2019 and 25.09.2019 both the transformers have been put into commercial operation. Provisional handing over done to DPN on 20.01.2020)
29	Capacity augmentation of 33/11 kV (Existing) Sub-station at Chakabama (1 x 5 MVA)	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ Commissioned on 13.05.2019 (put into operation but formal handing over to be done)
30	Capacity augmentation of 33/11 kV	➢ Required land for extension work

S. No.	Name of the T & D Components	Progress as on March, 2020
	(Existing) Sub-station at Industrial Estate (1 x 10 MVA)	already available in the existing substation premise and hence, no fresh land secured ➢ Commissioned on 18.03.2019 and handed over to DPN Nagaland
31	Capacity augmentation of 33/11 kV (Existing) Sub-station at Referral Hospital (1 x 10 MVA)	➢ Required land for extension work already available in the existing substation premise and hence, no fresh land secured ➢ CRB work yet to be completed. ➢ Erection work under progress.

Note: * *33 kV line from 66 kV Mokokchung (existing) to 33/11 kV Mokokchung Town Hospital Area (new) Sub-station includes 33 kV line from 66 kV Mokokchung (existing) to 33/11 kV Mokokchung Power House (new) Sub-station also*

1.6 OBJECTIVE & METHODOLOGY ADOPTED FOR FEAR STUDY

The main objectives of the FEAR study are to assess the mitigative measures as suggested in IEAR and/or EMP are effectively implemented/ addressed at the ground during pre-construction & construction stages of project cycles. The study also helps in establishing the status of compliance of various mitigation/management measures provided in the IEAR/EMP and suggests gaps or weaknesses, if any.

To achieve this, RSET undertook a comprehensive biophysical, environmental, socioeconomic data gathering exercise along the transmission/ distribution line routes and substations location to assess/verify the actual site-specific measures implemented/ being implemented by IA/ Contractor in respect of measure/ actions listed in IEAR/EMP. The methodologies adopted for instant FEAR are as follows:

Review of existing reports: Review of existing reports and data prepared and generated by POWERGRID such as Initial Environment Assessment Report (IEAR), Environment and Social Policy & Procedures Framework (ESPPF), Compensatory Plan for Temporary Damage (CPTD) etc. was undertaken and suitably incorporated in the present report.

Literature review: Review of existing literature was undertaken for collection of secondary baseline data related to physiography, climatic conditions, demography, natural resources including forests/wildlife, protected area and socio-economic features of the study area. Sources and data so collected have been mentioned below:

- 'A Revised Survey of the Forest Types of India' by Champion and Seth (1968) was used for forest type classification of forests in the study area.

- Data collected from published literature of Zoological Survey of India, Forest Survey of India, Botanical Survey of India and other research and government publications for floral and faunal diversity of the study area.

- Soil map of the study area was prepared using 'Soils of Nagaland for Optimising Land Use, NBSS Publ.67b, 2000' published by National Bureau of Soil Survey & Land Use Planning (NBSS & LUP), Nagpur.

- Conservation status of flora and fauna of the study area as per Indian Wildlife (Protection) Act (1972), threatened status according to IUCN Red List 2020.1, Red Data Book of Indian Plants by Botanical Survey of India, Kolkata.

- Census of India 2011 for demography of the study area.

Collection of primary data and Physical verification of construction elements: To gather primary data/ physical verification, a field visit/ survey of the project area along with IA and Contractor staff was made in January 2020. The data which has been collected from field visit are implementation status of proposed environmental management plan and mitigation measures as suggested in IEAR.

Ground truthing/ physical verification was made with photographic evidence and verification of record maintained by IA and Contracts for various activities for monitoring the compliance of mitigation measures like Health and Safety measures, Solid waste and sanitation, construction of protection wall/ retaining walls, status of labour camps location of proposed substations, towers, and Transmission & Distribution Lines alignments. Findings of field survey were consolidated along with secondary data for interpretation and finding the gaps for immediate necessary action.

Surveys for flora and fauna: Being a transmission line project, phyto-sociological surveys for assessment of vegetation structure/ profile in the proximity of the proposed transmission lines, corridors of transmission line routes, sub-stations, etc. were conducted wherein line transact methodology has been followed. Faunal surveys also were conducted along the same transects. As the topography along the routes varied from foothills to top of the hills. It was therefore, not feasible to chart the entire routes of proposed

transmission line as large part of the routes has steep slopes and due to issues of accessibility at present. However, during the field surveys at least 10% of the route was covered for the collection of baseline data, which in some cases constituted a continuous stretch and in some cases could be covered in parts.

The results of the primary field surveys were supplemented with secondary data to fill the gaps and further with the information generated through PRA. In addition, at all the sites bird walks were also undertaken, particularly areas under private plantations nearby the routes to locate nesting sites and for bird sightings.

Consultation: Consultation was carried out with stakeholders like POWERGRID officials, Department of Power, Nagaland officials, Contractor, migratory labours, local labours, Gram Burrah (village head) and public representatives to collect data with respect to compliance of suggested Environmental Management Plan and implementation of mitigation measures.

Development of Maps: Geo-referenced and Google maps with superimposed coordinates of project elements were generated to verify locational details and details of physical features of terrain of the project locations.

Chapter 2 BASELINE DATA

2.1 INTRODUCTION

Impact Assessment defines and assesses the potential physical, biological, and socio-economic impacts of a project and helps in formulating management and mitigation measures to minimize the impacts to a great extent. This chapter deals with the baseline status of physical, biological, socio-economic environment in the project districts as well as study area.

2.2 STUDY AREA DISTRICTS

The project is an intra-state power sector project located in the State of Nagaland and project area covers Dimapur, Kohima, Mokokchung, Mon, Phek, Wokha, and Zunheboto districts of Nagaland.

Dimapur district lies between 25°45' and 26°00' North latitude and 93°30' and 93°54' East longitude and is bounded by Kohima district on the East and Peren district in the South and Assam on its North and West. It is the most populous district of Nagaland. Total Geographical Area of the district is 927 sq km.

Kohima district lies in the south-western part of Nagaland. It has an area of 1463 sq km. Kohima is located at 25°40'N to 25°67' North latitude and 94°07' to 94°12' E longitude and has an average elevation of 1261m above sea level. It shares its borders with Assam State and Dimapur District in the West, Phek District in the East, Manipur State and Peren District in the South and Wokha District in the North.

Mokokchung district is located between 26°20'N to 26°33'N latitude and 94°32' to 94°53'E longitude. The district headquarters, Mokokchung, is at an elevation of 1,326 meters above mean sea level. The District has a total Geographical Area of 1615 sq km and is bounded by the state of Assam to its north, Tuensang to its east, Zunheboto to its south and Wokha and Assam to its west.

Mon district is located between 26°43' to 26°717´N latitude and 95°02' to 95°33´E longitude. Total geographical area of the district is 1786 Sq.km. The district is bounded on the North by Sibsagar District of Assam, on the South by Tuensang District of Nagaland and Myanmar (Burma), on the East by Myanmar (Burma) and on the West by Tuensang and Mokokchung Districts of Nagaland. On the Northeast lies the Tirap District of Arunachal Pradesh.

Phek district is in southern part of Nagaland located between 94°35'to 94°38'E longitude and 25°37' to 25°39'N latitude. It is bounded by Zunheboto and Tuensang to the north, Manipur and Myanmar to the south and east and Kohima district to the west, the district has an area of 2,026 sq. km.

Wokha District is situated in the mid-western part of Nagaland State, adjacent to Sibsagar plain of the Assam State. It is bounded by Mokokchung District in the North, Kohima District in the South. Zunheboto District in the East and the State of the Assam in the West. The Wokha District is situated at a latitude of 26°80' North and a longitude of 94°18' East with a total geographical area of 1628 sq km.

Zunheboto district is located between 25°6´ to 26°4´N latitude and 93°20´ to 95°15´E longitude and is bounded by Phek in the south, Kohima and Wokha in the west, Mokokchung in the north and Tuensang and Kiphire in the east. It has total geographical areas of 1255 sq km.

2.2.1 Physical Environment

Dimapur district, on the basis of basis of topography and physical features can be divided into two distinct regional and natural divisions, namely, (1) Jalukie-Medziphema Hills Tract and (2) Dimapur Plains, the first covering the hilly regions while the later covers mostly the plain areas. The major part of the district falls in Dimapur plain area.

The Jalukie-Medziphema Hills Tract covers the administrative circles of Dhansiripar, Dimapur Sadar, Medziphema, Nihokhu, Kuhoboto and Niuland. The altitude of the hills in this region is on an average low varying from 150 meters to 600 meters above mean sea level. Geologically, this region is confined to Tipan Series and Changapara formation (Pliocene) and Barail Series, Simsang formation of Garo Hills (Oligocene). The soils are Udalfs-Ochrepts with small areas of Ochrepts-Orthents at the northernmost tip (high base soils of humid regions, shallow black, brown and alluvial soils of northern regions recently formed soils).

The Dimapur Plains cover Dimapur town and parts of administrative circles of Dimapur Sadar Dhansiripar, Chümukedima and Medziphema. The region is the only plain sub-micron region in Nagaland. Dimapur is a fast-developing town in this region both industrially and commercially and has good communication with the rest of the country. The mean elevation of Dimapur is 260 meters above sea level. Geologically, this region is composed of Alluvium (Recent) and Burma Series and Baghmara formation of Garo Hills

(Miocene). Soils are combination of Ochrepts-Orthents, Udalfs (shallow black, brown alluvial, recently formed soils, high base status soils of humid regions.

Kohima district forms an irregular plateau with the elevated ridges and peaks. The Barail range enters the district from the south-west. Following a northward direction, the range continues through Wokha into Mokokchung and Tuensang. Kohima, the district and state headquarters, is situated on a saddle, north of the Japfü-Barail intersections. It commands charming scenery and a magnificent landscape. The highest peak in the district is Japfü (3,014 meters) and is situated in southern part of this region. Another peak called Terogvuthun is in the northern part of Kohima in Rengma areas.

Based on topography and physical features the district can be divided into two distinct regional and natural divisions, namely, (i) Kohima Hills and (ii) Tseminyu Hills. Kohima Hills is spread over the northeast-south-western portion of the district and comprises the administrative circles of Chiephobozou, Botsa, Kezocha, Jakhama, Kohima Sadar and Sechu-Zubza. Tseminyu Hills is situated on the north-western part of the district and occupies the administrative circles of Tseminyu and Tsogin. The altitude of this region varies from 600 meters to 1,800 meters. Geologically the region belongs to Dihing Series, Dupitila Series, Jaintia Series, Barail Series and Simang formation of Garo Hills. The soils are a combination of Ustalfs-Aqualfs-Aquepts, Udalfs-Orthents-Fluvents and Ochrepts-Orthents.

Mokokchung district is mainly hilly and the plain areas are very limited. The district is situated on the hill ranges of Naga Hills which is a dismembered extension of the eastern Himalayan Mountain. The hill ranges traverse more or less parallel to one another in a north-east to south-west direction. The average height of the hills varies between 1,000 meters and 1,200 meters above mean sea level. The district headquarters, Mokokchung, is at an elevation of 1,326 meters above mean sea level. There are 6 important ranges in the district. They are Japukong, Jangpetkong, Asetkong, Langpangkong, Ongpangkong and Tsurangkong. Japukong and Jangpetkong ran almost parallel to one another. Langpangkong is the easternmost range and Ongpangkong the southernmost while Asetkong is in the central position. The hill ranges are generally higher in altitude on the eastern side of the district than that of the hills of the western side. Most parts of the region are covered with thick jungles and deciduous trees which yield valuable timber and firewood.

On the basis of topography and physical features the district can be divided into two distinct regional and natural divisions, namely, (i) Eastern

Mokokchung Hills and (ii) Western Mokokchung Hills. Eastern Mokokchung Hills is spread over the eastern portion of the district and comprises the administrative circles of Ongpangkong, Kubolong, Chuchuyimlang, Changtongya, part of Tuli and Mokokchung town. The region is entirely hilly. The region has a maximum height of 1,800 meters found in Ongpangkong circle and a minimum height of about 400 meters found near Tuli station. Geologically the region belongs to Dihing Series, Dupitila Series, Jaintia Series, Barail Series and Simang formation of Garo Hills. The soils are Ustalfs-Aqualfs-Aquepts and Ochrepts-Orthents.

Western Mokokchung Hills spreads over the western portion of the district and occupies the administrative circles of Alongkima, Longchem, Mangkolemba and part of Tuli. The region has a maximum height of 1,200 meters which is found in Mangkolemba circle. The soils are a combination of Ustalfs-Aqualfs-Aquepts, Udalfs-Orthents-Fluvents and Ochrepts-Orthents.

Mon district is mainly hilly, and the plain areas are very limited. The district is situated on the hill ranges of Naga Hills which is a dismembered extension of the eastern Himalayan Mountain. The hill ranges traverse more or less parallel to one another in a north-east to south-west direction. The district headquarters, Mon, is at an elevation of 898 meters above mean sea level. Based on topography and physical features the district can be divided into three distinct regional and natural divisions, namely, (i) Champang-Phomching Hilly Region, (ii) Mon Hilly Region and (iii) Singhphan-Chiknuyu Rolling Hills.

Champang-Phomching Hilly Region lies on the southern portion of the district and comprises the administrative circles of Champang, Chen, Phomching and part of Mon Sadar. The region is entirely hilly, and the ranges spread towards east. The altitude of the rages varies from 400 to 1,800 meters approximately. The region consists mainly of tropical deciduous forests. The alpine forests are also visible on the top of the hills of this region. Vegetation is dense along the eastern part bordering Myanmar. Geologically the region belongs to Disang Series, Jaintia Series, Barail Series and Simang formation of Garo Hills. The soils are Orthents-Ochrepts.

Mon Hilly Region traverse the middle portion of the district from the east to the west covering the administrative circle of Mon town and part of Naginimora, Mon Sadar and Tizit circles. The altitude of the ranges varies from 400 to 1,800 meters. The district headquarters is situated in this region. The entire region is hilly and the ranges slope down towards the north. The ranges are covered with tropical forests of different varieties. Geologically the region consists of Disang Series (Eocene), Jaintia Series and Simang formation of

Garo Hills (Oligocene). The soils are the combination of Ustalfs- Ochrepts – Aquepts, Ustalfs-Aqualfs-Aquepts and Orthents-Ochrepts.

Singhphan-Chiknuyu Rolling Hills is situated in the extreme northern part of the district bordering Assam in the north and covers part of administrative circles of Tizit, Mon Sadar and Naginimora. The entire region is low lying area with undulating hills having an altitude varying from 200 to 600 meter approximately. The region is covered by sub-tropical forest of various species of trees useful for commercial purposes. From the geological point of view the region consists of Tipam Series and Chengapara formation (Pliocene), Dihing Series, Dupitila Series (Pleistocene), Barail Series and Simang formation of Garo Hills (Oligocene) and Jaintia Series and Disang Series (Eocene). The soils are the combination of Ustalfs-Ochrepts-Aquepts, Ustalfs-Ochrepts-Orthents and Ustalfs-Aqualfs-Aquepts.

Phek district is hilly with an altitude of about 1,444 meters above the sea level. The Phek district is sheltered by the Japfü peak to the west. The peak is 8,493 ft. high and is situated in the east of Meluri. Another peak named Terapimithu (7,200 ft.) is situated near Phek. The summits of the lofty peak are thickly wooded and clad with evergreen vegetation. The foothills are, however, deforested for jhum cultivation, yet these places have beautiful landscapes. The topography of Phek district is undulating with gentle slope to high slope.

Wokha district is situated in the mid-western part of Nagaland, adjacent to the Sibsagar plains of the Assam State. The district more or less shares the same topographical character of the other district of Nagaland having ranges and ridges bisected by seasonal streams. Based on topography and physical features the district can be divided into three distinct ranges, namely, (i) Bhandari range or Lower Range, (ii) Sanis range and (iii) Wokha range.

Bhandari range or Lower Range is the outer most part of the district which extends from Japukong range in the Mokokchung district and gradually slopes down to the Assam plains in the north-western side. Two of the most fertile valleys of the district namely, Baghty and Churang are situated in this range. This valley area is a long stretch of land and also the home of varieties of species of flora and fauna. These valleys are part of the lower range and possess the largest valley areas in the district. Of the two, the Baghty valley is the largest. The western part of the range gradually slopes down and merges with the plain of Assam.

Sanis range or the middle range is separated distinctly from the upper range by the Doyang River. The middle range appears to have merged with the Changkikong range emerging out of Mokokchung District in the north. It is a long and continuous stretch of hilly range starting with Mekokla in the north to Phyochu in the south. Had the Doyang River did not change its direction to south-west cutting this range from Phyochu, it would have extended up to Ralan area in a continuous stretch and merged with the Lower or the Bhandari range. The area is mostly hilly with rugged terrain throughout the stretch of land. On both sides of the middle range lie the intermontane valleys or low-lying areas. In the east the range dips steeply into the Doyang River and is marked by steep slopes. The west side of the range is characterized by gentle slopes which moves down and merges with the Baghty and Churang valleys.

Wokha range or the upper range covers the upper area and lies in the eastern and northern parts of the district. It is a long chain of ranges and starts from Rengma area in Kohima district and gradually bends eastwards till it reaches river Doyang. It is dominated and characterized by hilly terrains and rugged topography. Major portion of this range is composed of landforms with high elevation varying from 200 to 1970 meters above mean sea level.

The highest mountain peak in the district is Wokha peak which is locally called Tiyi Enung and on the foot of lies Wokha town, the district headquarter. The altitude of this peak (Tiyi Enung) is 1,969.61 meter. The peak is believed by some groups of the Lothas, Semas and Aos, to be a repository of their deceased. There are not many valleys in this district due to the steep character of the hills. The most important valleys are Baghty and Churang. Baghty is in lower range and is comparatively big and the land there is fertile. Churang valley is also in lower range and is in Akok – Mekokla area.

Zunheboto district is centrally located within the state of Nagaland. The district is entirely hilly. The shape of the district is semi-rectangular and extends in south-north directions. The district can be divided into two sub-micron regions based on geology, soil, rainfall, climate and vegetation namely, (i) Western Zunheboto Hills, and (ii) Eastern Zunheboto Hills.

The western Zunheboto hills are situated in the western part of the district bounded by Mokokchung district on the north, Wokha district on the west and Kohima district on the south and covers an area of 23 sq km approximately. The region covers the administrative circles of V.K., Akuluto, Atoizu, Akuhaito, Suruhoto (partly), Pughoboto and Ghathashi. There are many hill ranges running more or less parallel to one another extending from northeast to southeast. The tributaries of the river Doyang flow through this

region towards west. Geologically the region consists of Eocene (Jaintia series, Disang series) and Oligocene (Barail series and Simsang formulation of Garo hills) the soils are a combination of Udalf-Ochrepts-Orthents-Fluvents (high base status soils of humid regions, shallow black, brown and alluvial soils of northern region, recently formed soils and alluvial soils).

The eastern Zunheboto hills region covers the administrative circles of Asuto, Ahgunato, Satoi, Zunheboto town and parts of Suruhuto, Zunheboto Sadar, Saptiqa and Satakha covering an area of about 53.2 sq km approximately. The altitude of the region varies from 1,200 meters to 2,400 meters above mean sea level. The hill ranges run more or less from northeast to southwest direction. The geology of the region is also of Eocene (Jaintia series, Disang series) and Oligocene (Barail series and Simsang formulation of Garo hills). Like the region of the western Zunheboto Hills the soils are the combination of Udalfs-Ochrepts-Orthents-Fluvents.

2.2.1.1 River System

Project districts have several seasonal and perennial rivers and rivulets. The major rivers of Nagaland include Doyang, Dikhu, Dhansiri, Tizu, Tsurong, Nanung, Tsurang or Disai, Tsumok, Menung, Dzu, Langlong, Zunki, Likimro, Lanye, Dzuza and Manglu. All these rivers are dendritic in nature. While Dhansiri, Doyang and Dikhu flow westward into the Brahmaputra, the Tizu River, on the other hand, flows towards east and joins the Chindwin River in Burma. The main rivers flowing through project districts are given below in **Table 2.1**.

Table 2.1: Rivers Flowing Through Project Districts

S. No.	Name of District	Name of River
1	Dimapur	Dhansiri
2	Kohima	Diyung, Nzhu, Zubza
3	Mokokchung	Milak, Dikhu, Tsurang, Chubi, Tsumok, Menung
4	Mon	Tapi, Yangnyu, Tikong, Tiru, Tijap, Dikhu
5	Phek	Tizu, Lanye, Sedzu
6	Wokha	Doyang, Chubi, Nzhu
7	Zunheboto	Tizu, Doyang, Tsuthon

2.2.1.2 Meteorology

The climate of Nagaland has a wet climate with high humidity levels. Annual Rainfall varies from 175 cm to 250 cm with maximum rainfall occurring during months of June to September. Summer temperature varies from 16°C to 31°C, while the winter temperature varies from 4°C to 24°C. Strong North West winds blow through the state during the months of February and March.

Dimapur is under the influence of the monsoon type of climate. The climate of district is hot and humid in the plains during summer reaching a maximum of 36°C, with humidity up to 93%. While the winter months are cool and pleasant. Rainfall is moderate and is mostly due to south-western monsoon. The average annual rainfall is 1504.7 mm.

Kohima experience heavy rainfall during the monsoon months. South west monsoon sets in the middle of June and continues up to the middle of September. Rainfall is heavier on the eastern side of the region. Average rainfall is around 2,500 mm. The temperature during the summer does not rise above 32°C which is moderate while in the winter it comes down to around 2°C. During winter months of December and January, the coldest months in the year, frost in the higher hills is not uncommon. Winter and rainy seasons dominate the year while spring and autumn seasons are very short. During February-March the sky is clear for most parts of the day.

Mokokchung is under the influence of the monsoon type of climate. Rainfall is moderate and is mostly due to south-western monsoon. Average rainfall is around 2,500 mm. South west monsoon sets in the middle of June and continues up to the middle of September. The rain falls for about nine months in a year, the heaviest concentration being in July and August. The temperature during the summer months is not very high while it is pleasant during the winter. The temperature does not rise above 32°C during the summer while in the winter it comes down to around 2°C during January and February which are the coldest months in a year. During February-March the sky is clear for most parts of the day. Fogs are a common sight during the winter months. Winter and rainy seasons dominate the year while spring and autumn seasons are very short.

Mon is under the influence of the monsoon type of climate. Only two seasons are predominantly felt in this district. The summer starts generally from April and ends in September and the winter start from October and ends in March. Rainfall is moderate and is mostly due to south-western monsoon. South west monsoon sets in the middle of June and continues upto the middle of September. The rain falls for about nine months in a year, the heaviest concentration being in July and August. As compared to other regions of the state, the rainfall has been observed heaviest in the Mon hilly region during the monsoon. The temperature during the summer months is not very high while it is cold during the winter. The temperature seldom rises above 30°C during the summer while in the winter it comes down to around 20°C during January and February which are the coldest months in a year. During February-March the sky is clear for most parts of the day. Fogs are common

sights during the winter months. Winter and rainy seasons dominate the year while spring and autumn seasons are nominal and very short. The average relative humidity is 76%. The average annual rainfall ranges from 2000mm to 3000mm.

Phek district enjoys a humid sub-tropical climate. The area enjoys a cold winter and mild summer. January and February are the coldest months when the night temperature comes down to around 0°C. In summer also, it is not at all hot, rather it is cold in comparison to the adjoining plains of Assam. During summer also, the temperature does not rise beyond 32°C and the average summer temperature is 27°C.The annual average rainfall of the district is 1527 mm. The maximum rainfall occurs during the months of June and July. Rainfall generally begins from April and continues till the end of September. Average rainfall is around 1,500 mm.

Wokha district enjoys warm rainy summer and cold dry winter. Because of the difference in the landscape of the region the areas adjoining the border of Assam i.e. the lower or the Bhandari range which is mostly dominated by low lying areas experiences a slight variation in the climatic variables/elements such as temperature, rainfall, relative humidity, etc. in other words the temperature is slightly warmer and rainfall is little lesser when compared to the areas in the middle or upper range. In winter the night temperature is between 4°0 to 20°C. December and January are the coldest months. The average temperature in summer is approximately 27°C. Towards the end of the winter the wind starts blowing throughout day and night; it blows so strong that sometimes damage is caused to building and trees. The wind generally blows from southwest and sometimes its velocity rises to 100 Km. per hour. Towards the end of March, the wind slowly dies out. Southwest monsoon set in from the middle of June and continues up to the middle of September. The district received average annual rainfall of 2000 mm to 2500mm and rains for about six months in a year with greatest concentration in July and August. During summer, the average humidity is 85%, which goes sometimes up to 95% to 100%, and as such it is very damp during monsoon.

Zunheboto has a moderate monsoon type climate. During the summer, the area falls under influence of the south-east monsoon while during the winter it is under the influence of the cold north-west monsoon. Due to high altitude the temperature is cold throughout the year round. During the summer months the temperature rises to about 22°C. during the winter the minimum temperature comes down to 1° C. January and February are the coldest months of the year while May and June are the hottest months. Frost and fog are a common sight in the night during the winter months. Rainfall is

abundant and provides water for cultivation and luxurious growth of lust vegetation all year round. Most of the rains are associated with the south-east monsoon. The hills are covered with both deciduous and evergreen forests. Average annual rainfall is about 200mm. June to August are the months of rainy seasons. North-east monsoon also provides some rain during the winter months.

2.2.1.3 Soil

The soil taxonomic (family) classification map of project districts was prepared as per the data by National Bureau of Soil Survey & Land Use Planning (NBSS&LUP). Soil map prepared from this data is given at **Figure 2.1**.

According to **Figure 2.1** and **Table 2.2** Soil Unit 34 is the most dominant Group (11.48%) which is characterized by moderately shallow, somewhat excessively drained fine soils on steeply sloping hill slopes having clayey surface with severe erosion hazard and moderate stoniness. Rest all the soil units covers less than 10% of the project districts.

Table 2.2: Soils in Project Districts

Soil Unit	Description	Taxonomic Classification	Area (sq km)	Area (%)
1	Deep, well drained, fine soils on moderately sloping side slopes of the hills having loamy surface with moderate erosion hazard;	Fine, Typic kanhapludalfs	336.93	3.15
	associated with: Deep, well drained loamy soils on moderately sloping hills tops with moderate erosion hazard.	Fine - loamy, Umbric Dystrochrepts		
2	Deep, excessively drained, fine loamy soils on gently sloping of the hills having loamy surface with moderate erosion hazards;	Fine - loamy, Typic Paleudalfs	183.39	1.71
	associated with: Deep moderately well drained, fine loamy soils on gently sloping slight erosion hazards.	Fine - loamy, Typic Dystrochrepts		
3	Moderately deep, well drained, fine soils on gently sloping hill escarpment having clayey surface with moderate erosion hazard;	Fine, Umbric Dystrochrepts	195.00	1.82
	associated with: Deep, excessively drained fine loamy soils on gently sloping sides slopes of hills having loamy surface with moderate erosion hazards.	Fine - loamy, Typic Udifluvents		
4	Deep, excessively drained, fine loamy soils moderately sloping side slopes of the hills having loamy surface with moderate erosion hazards;	Fine - loamy Umbric Dystrochrepts	970.04	9.07
	associated with: Deep excessively drained fine loamy, soils on steep sloping hill tops with moderate erosion hazards and slight stoniness.	Fine - loamy, Typic Udifluvents		
5	Deep, somewhat excessively drained, loamy skeletal soils on moderately steeply sloping side slopes of hills having loamy surface with moderate erosion hazard and slight stoniness;	Loamy - Skeletal Umbric Dystrochrepts	292.68	2.74

Soil Unit	Description	Taxonomic Classification	Area (sq km)	Area (%)
	associated with: Deep, somewhat excessively drained fine soils on gently sloping side slopes of hills with moderate erosion hazards.	Fine - loamy, Typic Dystrochrepts		
6	Deep, well drained, fine loamy soils on, moderately sloping side slopes of foot hills having loamy surface with very slight erosion hazard;	Fine - loamy, Typic Paleudults	289.33	2.70
	associated with: Moderately deep well drained fine soils on gently sloping side slopes of hills having moderate erosion hazard, and slight stoniness.	Fine, Umbric Dystrochrepts		
8	Moderately shallow, excessively drained fine soils on gently sloping side slopes of hills having loamy surface with moderate erosion hazard;	Fine, Umbric Dystrochrepts	317.27	2.97
	associated with: Deep, somewhat excessively drained fine soils on steep hill tops with moderate erosion hazards.	Fine, Typic Dystrochrepts		
9	Deep, excessively drained, Coarse loamy soils on moderately steep sloping side slopes of hills having loamy surface with moderate erosion hazard;	Coarse - loamy, Typic Udorthents	553.86	5.18
	associated with: Deep moderately well drained, fine soils on moderately steep sloping hill tops with moderate erosion hazard.	Fine, Typic Dystrochrepts		
10	Deep, somewhat excessively drained, fine soils on moderately sloping side slopes of hills having loamy surface with moderate erosion hazard and very slight stoniness;	Fine, Humic Hapludults	247.46	2.31
	associated with: Moderately deep, somewhat excessively drained fine soils on steeply sloping hill tops with severe erosion hazard.	Fine, Typic Dystrochrepts		
11	Deep, excessively drained, fine soils on moderately sloping side slopes of hills having loamy surface with moderate erosion hazard and very slight stoniness;	Fine, Typic Paleudults	149.89	1.40
	associated with: Moderately shallow excessively drained loamy skeletal soils on moderately steep side slopes of hills with severe erosion hazard and moderate stoniness.	Loamy - Skeletal, Umbric Dystrochrepts		
12	Moderately shallow, somewhat excessively drained loamy skeletal soils on steeply sloping side slopes of hills having clayey surface with severe erosion hazard and moderate stoniness;	Loamy - Skeletal, Umbric Dystrochrepts	146.74	1.37
	associated with: Deep excessively drained fine soils on moderately sloping side slopes of hills with slight erosion hazard.	Fine, Typic Dystrochrepts		
13	Deep, well drained fine loamy soils on moderately steeply side slopes of hills having loamy surface with moderate erosion hazard and moderate stoniness;	Fine - loamy, Umbric Dystrochrepts	758.40	7.09
	associated with: Deep, well drained, fine soils on moderately sloping hill tops with moderate erosion hazard and slight stoniness.	Fine, Typic Paleudults		
14	Deep, somewhat excessively drained, fine soils on steeply sloping side slopes of hills with clayey surface having moderate erosion hazard;	Fine, Umbric Dystrochrepts	274.93	2.57
	associated with: Deep somewhat excessively drained fine loamy soils on moderately steep sloping hill tops	Fine - loamy, Typic		

Soil Unit	Description	Taxonomic Classification	Area (sq km)	Area (%)
	slight erosion hazard with slight stoniness.	Dystrochrepts		
15	Deep, excessively drained loamy skeletal soils on moderately steep sloping side slopes of hills with loamy surface having moderate erosion hazard and slight stoniness;	Loamy - Skeletal, Umbric Dystrochrepts	586.95	5.49
	associated with: Deep, well drained fine loamy soils on gently sloping side slopes of hills with moderate erosion hazard.	Fine - loamy, Typic Dystrochrepts		
16	Deep, excessively drained fine soils on gently sloping side slopes of hills with clayey surface having moderate erosion hazard and very slight stoniness;	Fine, Typic Paleudults	499.72	4.67
	associated with: Deep, well drained fine soils on gently sloping hill tops with severe erosion hazard and slight stoniness.	Fine - loamy, Typic Dystrochrepts		
17	Deep, excessively drained clayey skeletal soils on steeply sloping side slopes of hills having clayey surface with moderate erosion hazard and severe stoniness;	Clayey - skeletal, Umbric Dystrochrepts	95.27	0.89
	associated with: Moderately shallow somewhat excessively drained fine soils on moderately sloping hill slopes with moderate erosion and slight stoniness.	Fine, Typic Dystrochrepts		
18	Moderately deep, excessively drained, fine soils on steeply sloping hill tops having loamy surface with moderate erosion hazard;	Fine, Typic Dystrochrepts	77.37	0.72
	associated with: Moderately deep, somewhat excessively drained loamy skeletal sloping hill tops with moderate erosion hazards and slight stoniness.	Loamy - Skeletal, Pachic Haplumbret		
19	Shallow excessively drained fine loamy soils on moderately steep sloping valleys loamy surface with moderate erosion hazard and slight stoniness;	Fine - Loamy, Lithic Udorthents	74.46	0.70
	associated with: Deep, excessively drained fine loamy soils on moderately sloping valleys with severe erosion hazard and slight stoniness.	Fine - loamy, Umbric Dystrochrepts		
20	Deep, somewhat excessively drained, fine soils on gently sloping side slopes of hills having loamy surface with slight erosion hazard;	Loamy, Pachic Haplumbret	131.26	1.23
	associated with: Deep, excessively drained fine loamy soils on steeply sloping piedmont plane with moderate erosion hazards.	Fine - loamy, Typic Udorthents		
21	Moderately shallow, somewhat excessively drained fine loamy soils on moderately steep sloping side slopes of hills with loamy surface having moderate erosion hazards;	Fine - loamy, Typic Haplumbrepts	41.44	0.39
	associated with: Deep, somewhat excessively drained clayey skeletal soils on gently sloping hill tops having severe erosion hazard and moderate stoniness.	Clayey - skeletal, Pachic Haplumbrepts		
22	Deep, excessively drained fine loamy soils on moderately steeply sloping hill tops with clayey surface soils having moderate erosion hazard;	Fine - loamy, Typic Haplumbrepts	11.13	0.10
	associated with: Deep, somewhat excessively drained fine loamy soils on moderately steep sloping hill	Fine - loamy, Pachic		

Soil Unit	Description	Taxonomic Classification	Area (sq km)	Area (%)
	slopes with moderate erosion hazards	Haplumbrepts		
23	Moderately deep, somewhat excessively drained, loamy skeletal soils on steeply sloping side slopes of hills with clayey surface having moderate erosion hazard and moderate stoniness;	Loamy - Skeletal, Pachic Haplumbret	288.56	2.70
	associated with: Shallow, excessively drained coarse loamy soils on moderately steep sloping hill slopes having moderate erosion hazard and slight stoniness.	Coarse - loamy, Lithic Udorthents		
24	Deep, excessively drained fine soils on moderately sloping hill tops with clayey surface having moderate erosion hazard;	Fine, Typic Haplohumults	95.36	0.89
	associated with: Moderately deep, somewhat excessively drained fine loamy soils on nearly level hill tops having slight erosion hazard.	Fine - loamy, Dystric Eutrochrepts		
25	Moderately deep, excessively drained fine loamy soils on steeply sloping side slopes of hills with loamy surface having moderate erosion hazard and very slight stoniness;	Fine - loamy, Pachic Haplumbrepts	69.71	0.65
	associated with: Moderately deep, excessively drained loamy skeletal soils on moderately steep sloping hill tops with moderate erosion hazard and slight and slight stoniness	Loamy - Skeletal, Umbric Dystrochrepts		
26	Deep, somewhat excessively drained, fine soils on steeply sloping side slopes of hills having loamy surface having moderate erosion hazard;	Fine, Typic Paleudults	35.41	0.33
	associated with: Very shallow excessively drained coarse loamy soils on moderately steep sloping hill slopes with severe erosion and slight stoniness.	Coarse - loamy, Lithic Udorthents		
27	Deep, excessively drained fine loamy soils on moderately sloping side slopes of hills having loamy surface with moderate erosion hazard;	Fine -loamy, Typic Hapludults	501.63	4.69
	associated with: Moderately shallow somewhat excessively drained fine loamy soils on steeply sloping side slopes of hills having moderate erosion hazard and moderate stoniness.	Fine - Loamy, Umbric Dystrochrepts		
28	Moderately deep, somewhat excessively drained, loamy skeletal soils on steeply sloping side slopes of hills having loamy surface with moderate erosion hazard and very slight stoniness;	Loamy - skeletal, Typic Dystrochrepts	831.82	7.77
	associated with: Deep, somewhat excessively drained fine soils on moderately steep side slopes of hills with severe erosion and slight stoniness.	Fine - loamy, Typic Udorthents		
29	Moderately shallow, excessively drained clayey skeletal soils on moderately steep sloping side slopes of hills having loamy surface with severe erosion hazard and moderate stoniness;	Clayey - skeletal, Pachic Haplumbrepts	143.63	1.34
	associated with: Deep, excessively drained coarse loamy soils on moderately steep sloping hills tops having slight erosion hazards.	Coarse - loamy, Typic Dystrochrepts		
30	Deep, excessively drained, fine soils on moderately sloping side slopes of hills with clayey surface having moderate erosion hazard and slight stoniness;	Fine, Typic Dystrochrepts	462.46	4.32
	associated with: Moderately shallow, excessively	Loamy -		

Soil Unit	Description	Taxonomic Classification	Area (sq km)	Area (%)
	drained loamy skeletal soils on moderately steep sloping side slopes of hills with severe erosion hazard and moderate stoniness.	skeletal, Typic Dystrochrepts		
31	Deep, somewhat excessively drained, fine soils on moderately steep sloping hill slopes with clayey surface having moderate erosion hazard;	Fine, Pachic Haplumbrepts	171.70	1.60
	associated with: Moderately deep somewhat excessively drained fine soils on steeply sloping hill tops with severe erosion hazard and slight stoniness.	Fine, Typic Dystrochrepts		
33	Deep, excessively drained skeletal clayey - soils on steeply sloping hill slopes having clayey surface with moderate erosion hazard and slight stoniness;	Clayey - skeletal, Pachic Haplumbrepts	290.06	2.71
	associated with: Deep, excessively drained fine loamy soils on moderately steep sloping side hill slopes with severe erosion and moderate stoniness.	Fine - loamy, Typic Paleudults		
34	Moderately shallow, somewhat excessively drained fine soils on steeply sloping hill slopes having clayey surface with severe erosion hazard and moderate stoniness;	Fine, Pachic Haplumbrepts	1228.53	11.48
	associated with: Deep, somewhat excessively drained fine soils on steeply sloping hill tops with moderate erosion hazards and slight stoniness.	Fine, Typic Haplohumults		
35	Deep, excessively drained fine soils on moderately steep sloping side hill slopes having clayey surface with moderate erosion and slight stoniness;	Fine, Typic Paleudults	334.22	3.12
	associated with: Moderately shallow drained loamy skeletal soils on very steeply sloping hill slopes with moderate erosion hazard and moderate stoniness.	Loamy - skeletal, Dystric Eutrochrepts		
36	Shallow excessively drained fine loamy soils on moderately steep sloping valley having loamy surface with moderate erosion and slight stoniness;	Fine, loamy Lithic Udorthents	13.39	0.13
	associated with: Deep, excessively drained fine loamy soils on moderately sloping valley with severe erosion and slight stoniness.	Fine - loamy. Umbric Dustrochrepts		
TOTAL			**10700.00**	**100**

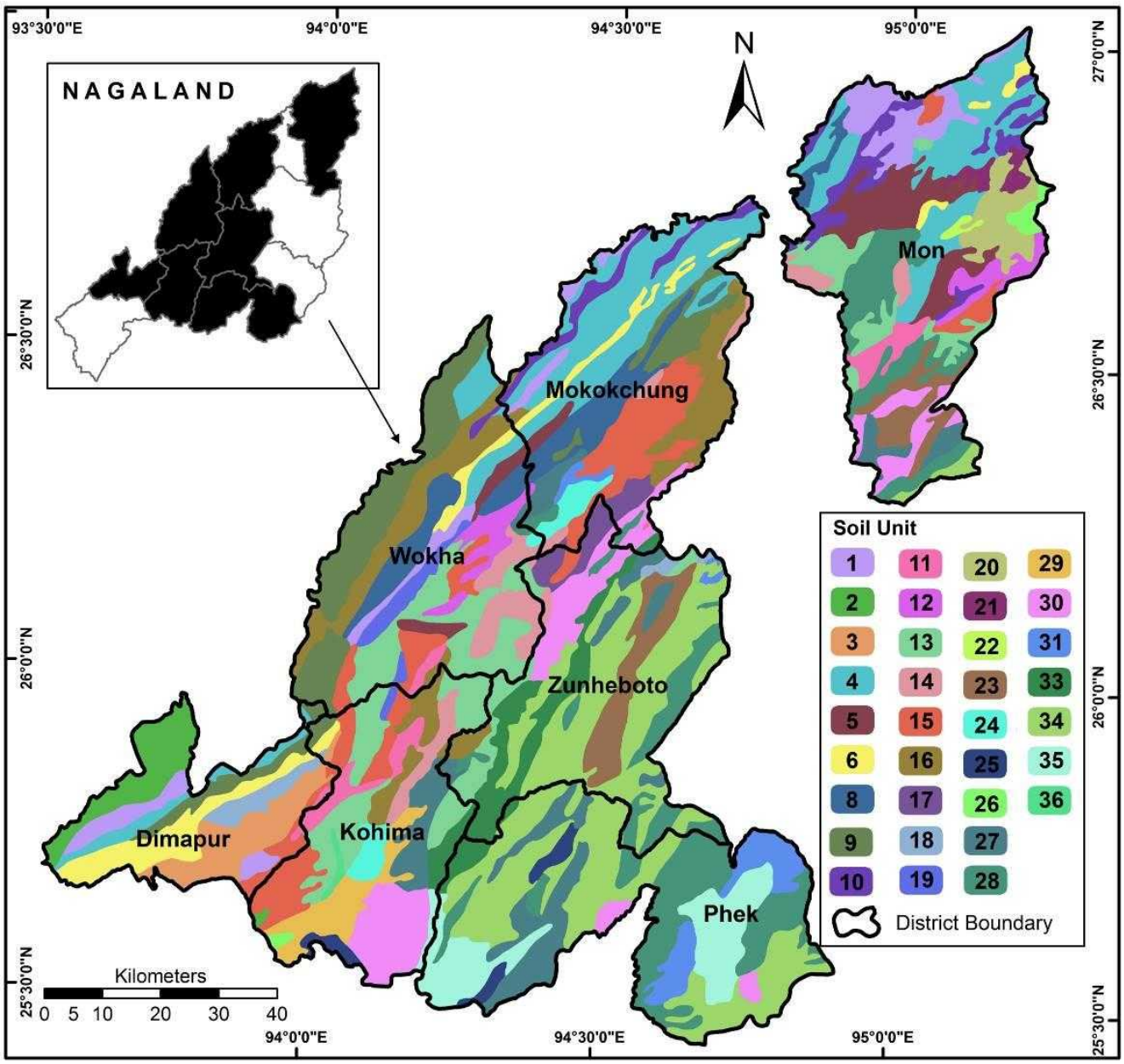


Figure 2.1: Soil Map of Project Districts
(For Legend Refer Table 2.2)

2.2.1.4 Land use Pattern

Majority of the project district area i.e. 53.1% is covered by forest area, Net sown area covers 26.3%, Other uncultivated land excluding fallow land covers 7.4%, Fallow land covers 7.2% and the rest 6% of the project district area is not available for cultivation. The general land use pattern of the project area is given in **Table 2.3**.

Table 2.3: Land use Pattern of Project Districts

Districts			Dimapur		Kohima		Mokokchung		Mon		Phek		Wokha		Zunheboto		TOTAL	
			Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)	Area (Sq km)	Area (%)
Total Geographical Area			927		1463		1615		1786		2026		1628		1255		**9072**	
Reporting Area for Land Utilization			923		1591		1610		1782		2023		1622		1248		**9177**	
Classification of Reporting Area	**Forest**		165	17.9	1011	63.5	817	50.7	1021	57.3	1248	61.7	742	45.8	614	49.2	**4876**	**53.1**
	Not Available for Cultivation	Area Under Non-Agricultural Uses	105	11.3	92	5.8	103	6.4	76	4.3	96	4.7	88	5.4	65	5.2	**537**	**5.8**
		Barren and Unculturable Land	3	0.3	2	0.1	2	0.1	3	0.1	3	0.1	3	0.2	2	0.2	**15**	**0.2**
	Other Uncultivated Land Excluding Fallow Land	Permanent Pasture and Other Grazing Land	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	**0**	**0.0**
		Land Under Misc. Tree Crops and Groves not Included in Net Area Sown	15	1.6	33	2.1	105	6.5	83	4.7	108	5.4	107	6.6	46	3.7	**390**	**4.3**
		Culturable Waste Land	16	1.7	45	2.8	70	4.3	52	2.9	54	2.7	96	5.9	46	3.7	**283**	**3.1**
	Fallow Land	Fallow Lands Other Than Current Fallows	16	1.7	66	4.1	114	7.1	93	5.2	96	4.7	171	10.6	71	5.7	**456**	**4.9**
		Current Fallow	12	1.3	22	1.4	62	3.9	32	1.8	51	2.5	84	5.2	29	2.3	**208**	**2.3**
	Net Sown Area		593	64.2	321	20.2	337	20.9	422	23.7	367	18.2	331	20.4	376	30.1	**2416**	**26.3**
Total Area for Land Utilization			**923**	**100**	**1591**	**100**	**1610**	**100**	**1782**	**100**	**2023**	**100**	**1622**	**100**	**1248**	**100**	**9177**	**100**

Source: Land use statistics, Ministry of Agriculture, GOI, 2016-17

2.2.1.5 Landslide Vulnerability

Landslide hazard stands as the second geological hazard following earthquake (Li, et. al., 1999; the U.S. Geological Survey, 2000). The Food and Agriculture Organization of the United Nations (FAO) states that steep terrain, vulnerable soil, heavy rainfall and earthquake activities make large parts of Asia highly susceptible to landslides. An area of about 0.49 million sq km out of the total area of India is vulnerable to landslide and about 0.098 sq km of an area in Northeast India is vulnerable to landslide. Nagaland comes under highly affected landslide hazard class (**Figure 2.2**).

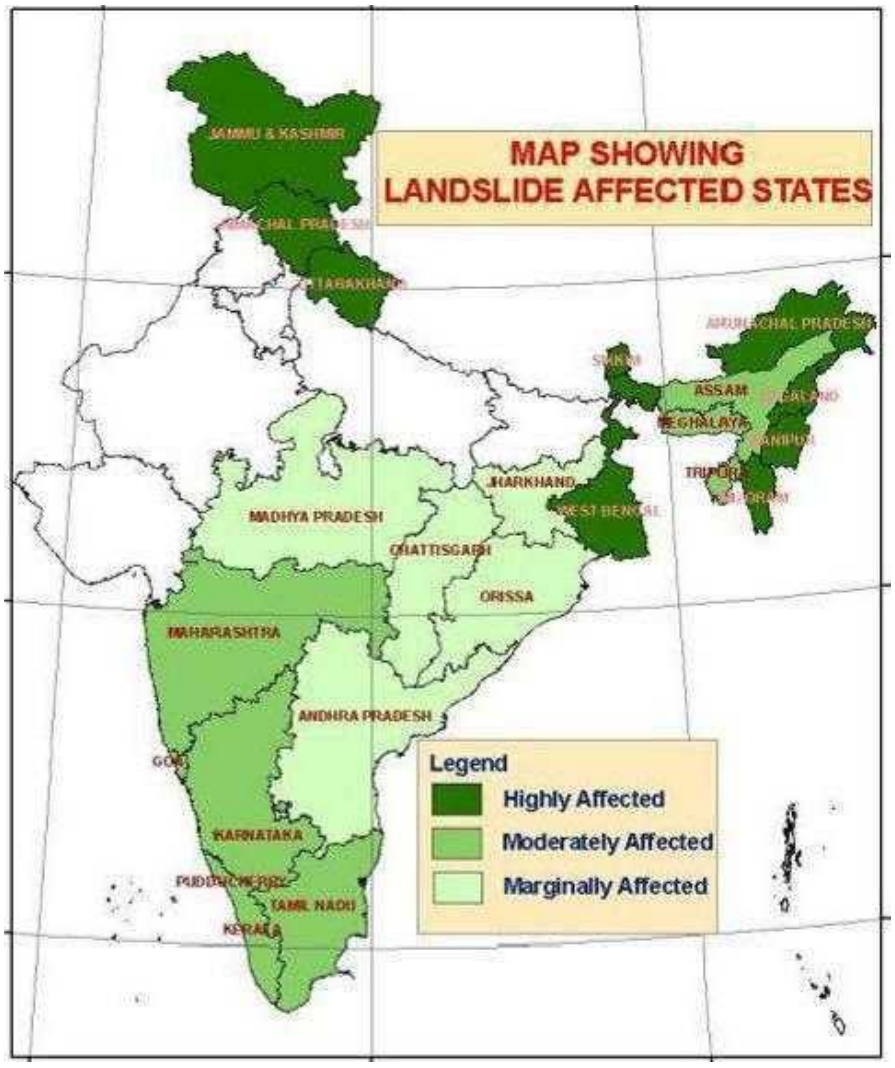


Figure 2.2: Landslide Map of India

Source: https://shodhganga.inflibnet.ac.in/bitstream/10603/220685/13/13_chapter%205.pdf

Landslide, a common phenomenon in hilly region is one of the most important factors of soil erosion. Topsoil and vegetative covers on large scale are considerably lost every year during the monsoon season. Landslides are mainly found below settlement areas, terrace fields, rolling Jhum land and road construction. The possible factors responsible for landslide occurrence may be singular or a combination of several factors. Some of the factors responsible for landslide in Nagaland are:

Soil formations: Clayey and shales have low hydraulic conductivity and can be difficult to drain. On the other hand, when the dip angle of the shale is along the slope, the soils over the shale are more susceptible to landslide. Most of the slides in the area are caused due to this reason. It is also observed that during rainy season the shallow soils lying above shale bed are prone to landslide.

Increase in the Runoff Volume: It affects the regimes of the natural downhill drains and toe cutting has been observed in many cases. Such toe cutting leads to slope failure near these natural drains. Slope failure occurring near these drains adversely affects the stability of the slope in general and leads to repeated slope failure in that area. Such toe failure also leads to blockage of drains promoting infiltration of water into the ground causing saturation of the soil, which adversely affects the stability. During the summer season, more specifically from June to October, the rainfall is heavy and almost continuous. So, permeable materials get saturated due to long continued heavy rains that, instead of the pelting rain driving individual particles in the form of 'rill' or 'rain-wash' down the slope, the whole of the surficial materials becomes a mass of mud and debris.

Faulty Road Construction: Another important factor causing landslides, it has aggravated the intensity of landslide. One of the main reasons for this is the slope cutting process while constructing the road as it disturbed the slope stability. Most of these slide areas remain weak with mud flow and sinking of highways occur every monsoon season due to the composition of loose sand and dark brown clays where water seepage are quite high.

Urbanization: Due to increasing urbanization and demand for land in the city area, and lack of enforcement of development controls, people have started construction even on the valley lines, completely blocking the drainage path in some cases. These drains need to cross the road system in several stages through culverts. Eroded soils and garbage carried down by water during torrential rainy season block many a time cross drains and lead to overflowing of water onto the road. Increasing urbanization has also increased the surface runoff because extension in the pucca ground cover or black topping through the construction of building, courtyards, roads, pavements, etc., reduces infiltration of rainwater significantly and increases surface runoff, thereby increasing the volume and discharge in the area and drain which in turn remove the top soil rapidly and also cause landslide in the areas.

In the instant scheme, during construction limited quantity of excavated material is generated from tower/pole foundations and sub-station

foundation. However, adequate mitigation measures have been given in the EMP and same are being undertaken to avoid any chances of landslide. In addition, excavation is avoided in rainy days. So far there are no instances of landslide due to any of the construction activity. Landslide due to operation and maintenance is not at all expected.

2.2.1.6 Erosion Vulnerability

Unscientific land utilization incompatible with its carrying capacity leads to land degradation which has both environmental and economic consequences. The information on land degradation is needed for a variety of purposes like planning reclamation programs, rational land use planning, for bringing additional areas into cultivation, to improve productivity levels in degraded lands etc. As per the land degradation mapping undertaken by Department of Space, GoI along with partner institutions under National Natural Resources Census (NRC), water and wind are the most important land degradation process that occurs on the surface of the earth. Rainfall, soil, physical properties, terrain slope, land cover and management practices play a significant role in soil erosion. Some of the factors responsible for soil erosion in Nagaland are:

Sheet Erosion: It is a common problem resulting from loss of topsoil. The soil particles are removed from the whole soil surface on a uniform basis in the form of thin layers. The severity of the problem is often difficult to visualize with naked eyes in the field.

Rill Erosion: When sheet erosion is severe and the surface runoff goes in the form of a concentric flow, tiny water channels are formed in the field called rills. Rills are generally associated with the cultivated lands and are visible in the ploughed soil after first heavy showers.

Gully Erosion: Gullies are formed as a result of localized surface run-off affecting the unconsolidated material resulting in the formation of perceptible channels causing undulating terrain. They are commonly found in sloping lands, developed as a result of concentrated run-off over fairly long time. They are mostly associated with stream courses, sloping grounds with good rainfall regions and foothill regions.

Landslide/ Landslip Erosion: The region is quite prone to landslides/ landslips that take a heavy toll on valuable lands, property and life besides aggravating the problem of soil erosion. Factor responsible for landslide have already been explained in earlier section.

Faulty Road Construction: As explained in earlier section.

Unscientific Disposal of Debris Generated by Road Construction: Roads are the only means of communication and form an important development activity in the region. Road construction in the mountainous terrain requires a lot of blasting and construction in a zigzag fashion. The debris thus produced is not properly disposed at dumping sites and is just pushed onto the river side slopes. This results in heavy erosion during the rainy season.

Urbanization: As explained in earlier section.

For the assessment of soil erosion vulnerable hazard area falling *en route* proposed transmission line, all the transmission lines were superimposed over erosion map of Nagaland (refer **Figure 2.3**). Except a small section of 132 kV S/C (on D/C Tower) Wokha-Zunheboto-Mokokchung Line i.e. from Tower No. 36 to Tower No. 47 of Zunheboto – Mokokchung stretch which, either falls under or in close proximity to areas vulnerable to erosion, all transmission lines are nowhere near areas vulnerable to soil erosion. Since distribution lines are along the existing roads and almost negligible excavation is required therefore, vulnerability of such sites to distribution lines is not anticipated. In the present project, chances of contribution to soil erosion or getting affected by soil erosion, vulnerable area are negligible to very low. However, adequate mitigation measures have been given in the EMP and same shall be followed to avoid any chances of getting affected by soil erosion vulnerable areas. In addition, any work shall be avoided in rainy days.

2.2.2 Biological Environment

It is pertinent to mention that, in the present project, forest area/land covered under Forest (Conservation) Act, 1980 has been completely avoided with careful selection of route alignment. Therefore, diversion of forest land is not involved in the project.

In order to analyze the impacts and plan mitigation measures, it is imperative to study baseline information for transmission line and surrounding or proximity area as well (study area), which includes forest areas under the control of individual/community/village councils. The same has been described in ensuing paragraphs.

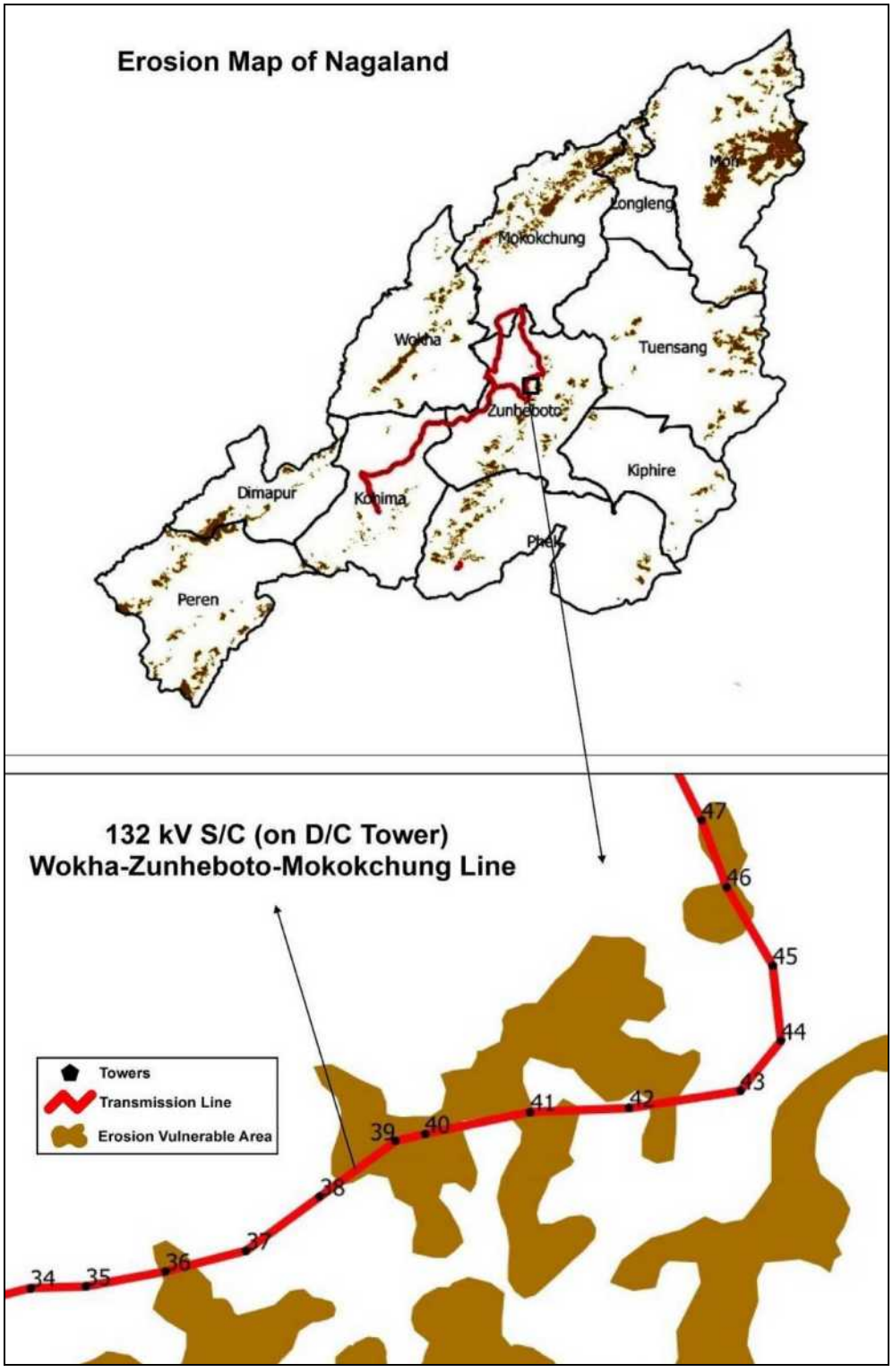


Figure 2.3: Areas Vulnerable to Erosion w.r.t. Sub-Projects

2.2.2.1 Floristics

Though Nagaland is a small State, it has been endowed with a wide variety of forest types on account of its unique geographic location and wide range of physiographic terrain. As per the Champion & Seth Classification of Forest Types (1968), the forests in Nagaland belong to seven Type Groups, which are further divided into 10 Forest Types and Plantation/Tree Outside Forest (TOF). Percentage area under different forest types of Nagaland is given below in **Table 2.4**.

Table 2.4: Percentage Area under Different Forest Types of Nagaland

S. No.	Forest Type	% of Forest Cover
1	1B/C1 Assam Valley Tropical Wet Evergreen Forest (*Dipterocarpus*)	0.61
2	1/2S1 Pioneer Euphorbiaceous Scrub	4.30
3	2B/2S2 Eastern Alluvial Secondary Semi-Evergreen Forest	17.55
4	2/2S1 Secondary Moist Bamboo Brakes	5.09
5	3C/C3b East Himalayan Moist Mixed Deciduous Forest	38.44
6	8B/C2 Khasi Sub-Tropical Wet Hill Forest	16.09
7	9/C2 Assam Sub-Tropical Pine Forest	5.84
8	9/C2/DS1 Assam Subtropical Pine Savannah	0.17
9	11B/C2 Naga Hill Wet Temperate Forest	11.32
10	12/DS1 Montane Bamboo Brakes	0.07
11	Plantation/Tree Outside Forest (TOF)	0.52
	Total	**100**

Source: India State of Forest Report 2019, Nagaland

Forests in Nagaland are largely under the community and private forests. The Forest Department owns only certain areas classified as Reserved Forests, Protected Forests, Wildlife Sanctuaries, National parks, Nurseries & Botanical Gardens, therefore the department has purchased land from private owners for Biodiversity Conservation and taking up plantations. The total land purchased by the department is approximately 192.47 sq km. The State has started 'Joint Forest Management' program to elicit active participation of villagers in creation, management and protection of plantations. Intensification of Forest Management was carried out in the State by creating adequate infrastructure and controlling the incidences of forest fire.

Recorded Forest Area (RFA) in the State is 8,623 sq km of which 234 sq km is Reserved Forest and 8,389 sq km is Unclassed Forests. In Nagaland, during the period 1st January 2015 to 5th February 2019, no forest land was diverted for non-forestry purposes under the Forest Conservation Act, 1980 (MoEF&CC, 2019).

2.2.2.2 Forest Cover

As per the India State of Forest Report (ISFR), 2019 by Forest Survey of India, the forest cover in the State is 12,486.40 sq km which is 75.31 % of the State's geographical area. In terms of forest canopy density classes, the State has 1,273.19 sq km under Very Dense Forest (VDF), 4,533.72 sq km under Moderately Dense Forest (MDF) and 6,679.49 sq km under Open Forest (OF). Forest cover map of Nagaland is given below in **Figure 2.4**.

Total forest cover in the project districts is 8164.94 sq km, which is 76.31 % of the project district's geographical area. In terms of forest canopy density

classes, the project districts have 546.84 sq km under VDF, 2938.91 sq km under MDF and 4679.19 sq km under OF. The details of forest cover of sub-project districts are given below in **Table 2.5** and **Figure 2.5**.

Table 2.5: Forest Cover in Project Districts

S. No.	Name of District	Geographical Area (GA)	2019 Assessment				% of GA
			Very Dense Forest	Moderately Dense Forest	Open Forest	Total Area	
1	Dimapur	927	24.00	161.71	406.38	**592.09**	**63.87**
2	Kohima	1463	131.70	377.68	673.28	**1182.66**	**80.84**
3	Mokokchung	1615	1.89	501.89	823.83	**1327.61**	**82.20**
4	Mon	1786	32.00	431.32	739.50	**1202.82**	**67.35**
5	Phek	2026	272.61	637.83	705.37	**1615.81**	**79.75**
6	Wokha	1628	1.00	465.13	839.68	**1305.81**	**80.21**
7	Zunheboto	1255	83.64	363.35	491.15	**938.14**	**74.75**
		10700	**546.84**	**2938.91**	**4679.19**	**8164.94**	**76.31**

Source: India State of Forest Report 2019, Nagaland

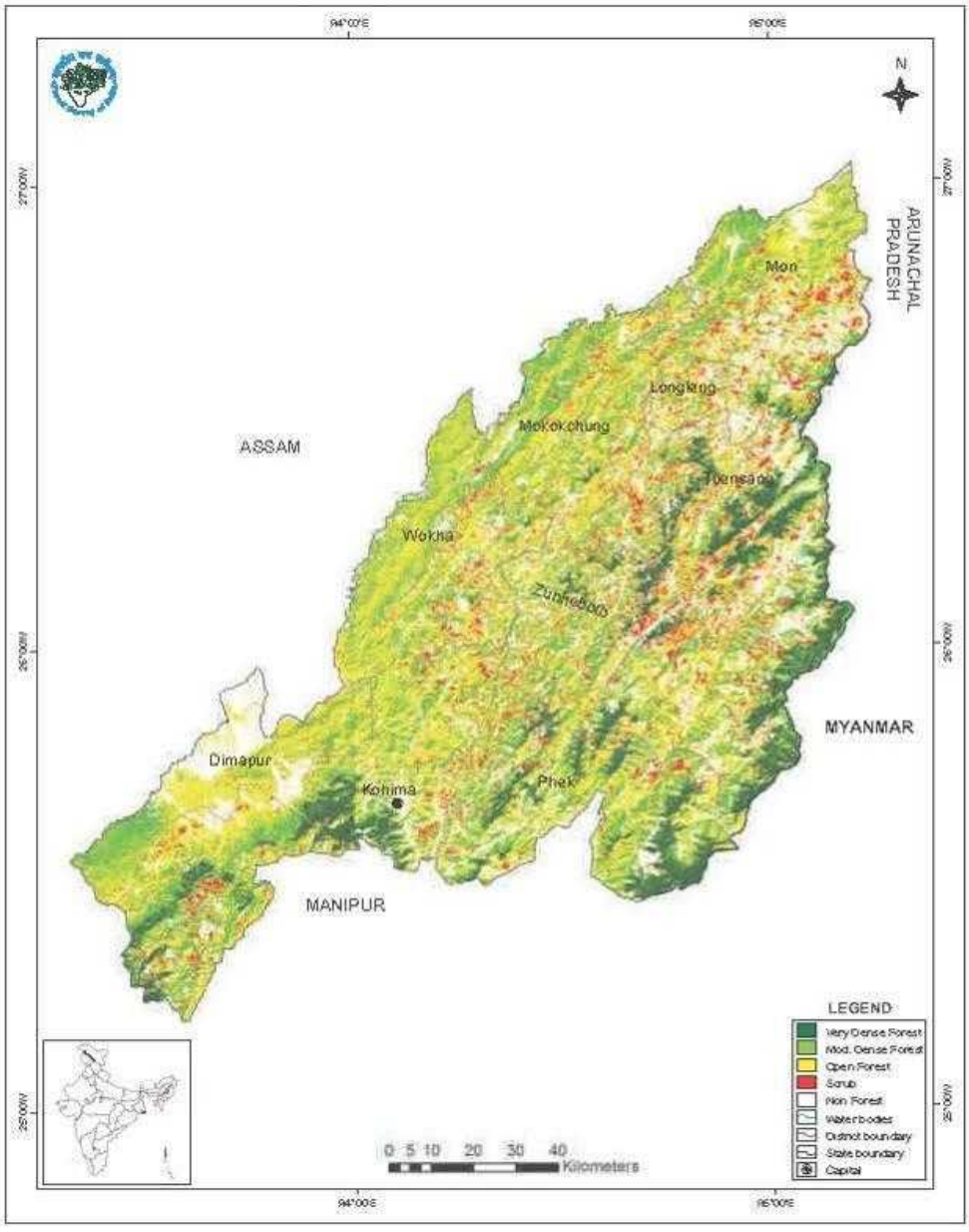


Figure 2.4: Forest Cover Map of Nagaland (Source: ISFR, FSI, Dehradun)

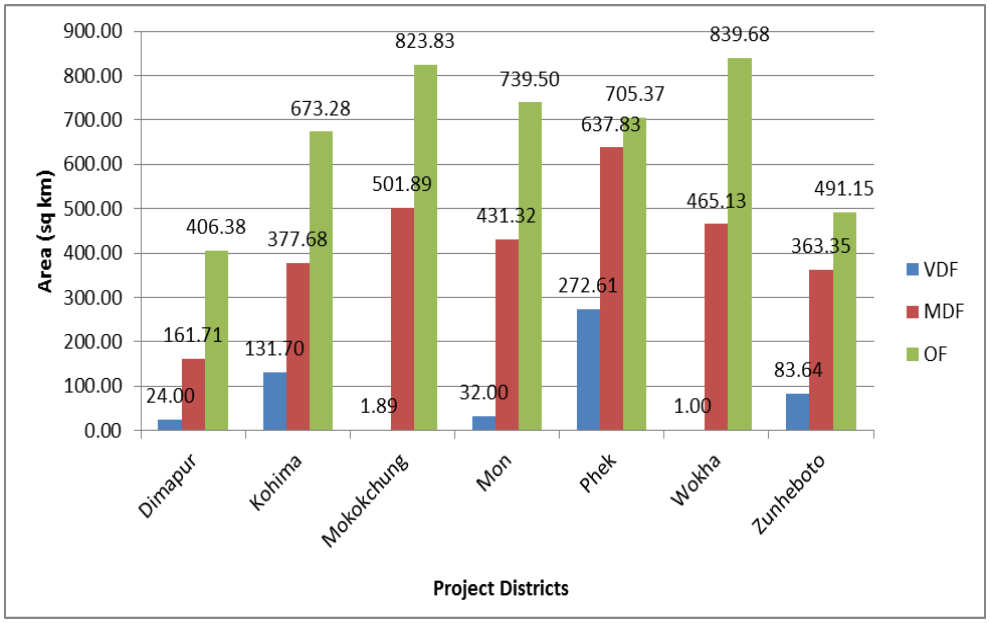


Figure 2.5: Forest Cover in Project Districts

2.2.2.3 Forest Cover inside and outside Recorded Forest Area (or Green Wash)

The State has reported extent of recorded forest area (RFA) 8,623 sq km which is 52.01% of its geographical area. The reserved and unclassed forests are 2.71% and 97.29% of the recorded forest area in the State, respectively. Due to non-availability of digitized boundary of recorded forest areas from the State, the updated Green Wash from Survey of India (SoI) toposheets which is 10,633.44 sq km has been used as proxy to the RFA boundary and the analysis of forest cover inside and outside this area is given below in **Table 2.6**.

Table 2.6: Forest Cover inside and outside Recorded Forest Area or (Green Wash) in Nagaland

	Forest Cover inside the Recorded Forest Area (or Green Wash)				Forest Cover outside the Recorded Forest Area (or Green Wash)			
	VDF	MDF	OF	Total	VDF	MDF	OF	Total
Area (sq km)	1166	3279	4282	**8727**	107	1255	2397	**3759**
Area (%)	13.36	37.57	49.07	**100**	2.85	33.38	63.77	**100**

Source: India State of Forest Report 2019, Nagaland

2.2.2.4 Floristic Diversity

As per the rapid assessment of Biodiversity carried out by Forest Survey of India (FSI) at the national level for natural forests during September 2018 to May 2019 as part of the forest type mapping exercise in respect of Nagaland, total number of species reported in the state are 306, out of which 56 are tree species, 137 are shrub species and 113 are herb species. The Shannon-Wiener

Index of Tree, Shrub and Herb species in different Type Groups of the state are given below in **Table 2.7**.

Table 2.7: Shannon-Wiener Index of Tree, Shrub and Herb species in different Type Groups of Nagaland

S. No.	Forest Type Group	Shannon-Wiener Index		
		Tree	Shrub	Herb
1	Group 1- Tropical Wet Evergreen Forests	*	3.09	2.81
2	Group 2- Tropical Semi-Evergreen Forests	2.15	2.97	2.35
3	Group 3- Tropical Moist Deciduous Forests	2.94	3.48	3.61
4	Group 8- Subtropical Broadleaved Hill Forests	2.62	3.40	2.92
5	Group 9- Subtropical Pine Forests	1.31	1.55	2.19
6	Group 11- Montane Wet Temperate Forests	1.04	1.17	1.90
7	Group 12- Himalayan Moist Temperate Forests	*	1.16	*

*Source: India State of Forest Report 2019, Nagaland; * adequate number of sample plots were not available*

2.3 STUDY AREA BASELINE DATA

2.3.1 Floristics Elements

The study area for the floristic surveys has already been defined in the Chapter 1 which is defined as area in the proximity of the proposed transmission lines on both left and right sides, corridors of transmission line routes and substations. The description of the vegetation is based upon these observations and data collected around each site collected through transects as already mentioned above.

In general, the vegetation in and areas around sampling sites is comprised of tropical wet evergreen and semi-evergreen floral elements. Therefore, field surveys for the assessment and composition of vegetation were conducted to assess the floral wealth in the proximity to the towers, sub-station and along the routes of transmission line.

A series of transects were identified along the routes of transmission line covering the corridors between the ROW of transmission line and substations. Details of transmission line and locations (transects) selected for phyto-sociological survey are as given in **Table 2.8.**

Table 2.8: Transmission Lines and Transects Locations for Vegetation Sampling

S. No.	Name of Transmission Line	Stretch Covered	Distance Covered
1	LILO of 132 kV Mariani - Mokokchung Line at Longnak – 0.64 km	Longnak S/s to Tower 4	Approx. 100 m
2	132 kV D/C New Kohima (Zadhima) to New Secretariat Complex (NU Campus) – 13.97 km	New Secretariat Complex to Tower 41	Approx. 1.5 km

S. No.	Name of Transmission Line	Stretch Covered	Distance Covered
3	LILO of both Circuit of Kohima – Meluri (Kiphire) Line at Pfutsero – 2.7 km	Pfutsero 132/33 kV S/s to Tower No. 8	Approx. 250 m
4	220 kV S/C (on D/C Tower) New Kohima-Mokokchung via Wokha Line- 86.94 km	Tower 49-Tower 52 Tower 53- Tower 56 Tower 92- Tower 107 Tower 202- Tower 206 Tower 214- Tower 222	Approx. 800 m Approx. 600 m Approx. 5 km Approx. 1.2 km Approx. 2.1 km
5	LILO of 132 kV S/C Kohima-Wokha Line at 220 kV New Kohima sub-station - 9.54 km	Tower 2- Tower 8	Approx. 1.2 km

2.3.1.1 Taxonomic Diversity

Based upon the data collected during field surveys and data/information collected from secondary sources (Jamir, 1992; Eshuo, 2012, 2013; Moaakum and Chaturvedi, 2015; Leishangthem, 2018) inventory of 211 plant species found in the area surveyed was prepared**.** Details of these 211 plant species according to their families, genera and species are given in table below.

Group	Angiosperms	Gymnosperms	Pteridophytes	Bryophytes	Total
Family	62	3	8	9	**82**
Genera	143	3	13	10	**169**
Species	184	3	13	11	**211**

A brief description of number of plant species recorded in various taxonomic groups is given in the following paragraphs.

a) Angiosperms

During the field surveys conducted in the study area 184 species of angiosperms belonging 62 families were recorded (For detailed list see **Annexure I**). These include trees, shrubs, herbs and climbers. Herbaceous component comprises of 82 species, shrubs are 34 and trees are comprised of 69 species.

Most common families recorded from the study area are Orchidaceae, Poaceae, Fabaceae, Araceae and Solanaceae, Lauraceae, Acanthaceae, Asteraceae, Moraceae, and Polygonaceae.

b) Gymnosperms

Three species of gymnosperms recorded from the study area are:

S. No.	Family	Botanical name
1	Cupressaceae	*Platycladus orientalis* (Syn. *Thuja orientalis*)
2	Gnetaceae	*Gnetum montanum*
3	Pinaceae	*Pinus kesiya*

c) Pteridophytes

During field survey thirteen species of Pteridophytes belonging to 8 families were recorded from the area.

S. No.	Family	Botanical name
1	Dennstaedtiaceae	*Pteridium aquilinum*
2	Gleicheniaceae	*Dicranopteris linearis*
3	Lindsaeaceae	*Sphenomeris chinensis*
4	Lycopodiaceae	*Lycopodium clavatum*
5	Lygodiaceae	*Lygodium flexuosum*
6	Osmundaceae	*Osmunda regalis*
7	Polypodiaceae	*Drymoglossum piloselloides*
8	Polypodiaceae	*Lepidogramitis rostrata*
9	Polypodiaceae	*Lepisorus sordidus*
10	Polypodiaceae	*Polypodium amoena*
11	Pteridaceae	*Adiantum caudatum*
12	Pteridaceae	*Onychium siliculosum*
13	Pteridaceae	*Pteris vittata*

d) Bryophytes

Eleven species belonging to 9 families of Bryophytes were recorded from the study area as follows.

S. No.	Family	Botanical Name
1	Jubulaceae	*Frullania wallachiana*
2	Lejeuneaceae	*Lejeunea curviloba*
3	Marchantiaceae	*Dumortiera hirsuta*
4	Marchantiaceae	*Marchantia linearis*
5	Marchantiaceae	*Marchantia papiliata*
6	Metzgeriaceae	*Metzgeria lindenbergii*
7	Pelliaceae	*Pellia endiviifolia*
8	Plagiochilaceae	*Plagiochila subtropica*
9	Ricciaceae	*Ricciocarpos natans*
10	Targioniaceae	*Targionia hypophylla*
11	Weisnerellaceae	*Wiesnerella denudata*

2.3.1.2 Rare Endangered and Threatened (RET) Species

Conservation status of plant species found in the study area was assessed using IUCN Red list of Threatened Species Version 2020.1 (accessed in February 2020) as well as Red Data Book of Indian Plants by Botanical Survey of India.

Majority of the 211 plant species found in the study area have not been evaluated or assessed yet by IUCN (2020.1) and only 27 species have been assessed (**Table 2.9**) and all of them fall under 'Least Concern' category of IUCN Red List.

None of the plant species falls under any threatened category of Red Data Book of Indian Plants by BSI.

Table 2.9: RET Plant Species Reported from Study Area

Family	Name of species	Conservation Status IUCN 2020.1
Anacardiaceae	*Mangifera sylvatica*	LC
Apiaceae	*Centella asiatica*	LC
Betulaceae	*Alnus nepalensis*	LC
Commelinaceae	*Commelina benghalensis*	LC
Cyperaceae	*Cyperus exaltatus*	LC
Cyperaceae	*Cyperus rotundus*	LC
Fabaceae	*Acacia pennata*	LC
Fabaceae	*Bauhinia purpurea*	LC
Fabaceae	*Bauhinia variegata*	LC
Fabaceae	*Erythrina variegata*	LC
Fabaceae	*Mimosa pudica*	LC
Fabaceae	*Parkia timoriana*	LC
Juglandaceae	*Engelhardtia spicata*	LC
Magnoliaceae	*Magnolia champaca*	LC
Meliaceae	*Chukrasia tabularis*	LC
Meliaceae	*Toona ciliata*	LC
Musaceae	*Musa acuminata*	LC
Pandanaceae	*Pandanus odorifer*	LC
Phyllanthaceaeceae	*Phyllanthus emblica*	LC
Poaceae	*Dendrocalamus giganteus*	LC
Poaceae	*Phragmites karka*	LC
Poaceae	*Poa annua*	LC
Poaceae	*Saccharum spontaneum*	LC
Simaroubaceae	*Ailanthus integrifolia*	LC
Solanaceae	*Physalis minima*	LC
Theaceae	*Schima wallichii*	LC
Urticaceae	*Urtica dioica*	LC

2.3.1.3 Invasive Species and Their Control

An invasive plant is a non-native plant that is able to persist and proliferate outside of cultivation, resulting in ecological and/or economic harm. Once established in these areas, invasive plants often continue to spread to adjacent habitats. All invasive plant species are aggressive competitors with the ability to significantly reduce diversity of native plant and also disturb & alter wildlife habitat. As per ISFR, 2019, there are four invasive species in Nagaland, *Parthenium hysterophorus*, *Ageratum conyzoides, Mikania*

micrantha and *Chromolaena odorata.* Beside these four species *Lantana camara* is another invasive species reported from all the over the state.

During the field survey *Parthenium hysterophorus* was recorded from Longnak sub-station. *Chromolaena odorata* was recorded near tower 8 of Kohima – Meluri (Kiphire) Line at Pfutsero and along the route of 220 kV S/C New Kohima-Mokokchung line. *Mikania micrantha* was recorded from 132 kV S/C Kohima-Wokha Line. *Ageratum conyzoides* was recorded at New Secretariat Complex (NU Campus) and Mokokchung-Mariani Transmission Line route.

The presence of large number of invasive plant species is indicative of degradation of vegetation in the study area i.e. transects studied along the different transmission lines, their routes and substations. This has happened mainly due to jhumming activities prevalent in the area.

As per literature review, paste of green leaves of *Ageratum conyzoides* is used for cuts & sores and paste of roots is used as anthelmintic or anti- allergic. Invasive plants spread by a variety of mechanisms, including birds, wind, and water. Human activities are also a major factor in the spread of these plants, from gardening and transport of nursery stock to erosion control and wildlife plantings.

The newly disturbed ground is prime habitat for more invasive species to colonize. A protective approach is required for eliminating or control the spread and establishment of invasive plants species, for which there are two key elements. First, project authorities would ensure to uproot all existing alien/invasive species from the labour colony and other working areas. Secondly, project workers will be discouraged to plant any alien and/or invasive species in the camp and colony areas, which may spread in the forest areas. Eliminating the invasive species by uprooting or pulling is laborious but may be the best choice for on steep or rough terrain. Replanting the area immediately with a desirable selection of native plants is necessary.

There must be an emphasis on early detection and eradication of these invasive species populations in the area especially the new population. To control and check the growth of invasive species, plantation of indigenous species in the area occupied by invasive species is also necessary. The other factor that helps in control of non-indigenous species is the increase of knowledge and awareness among the workers and villagers.

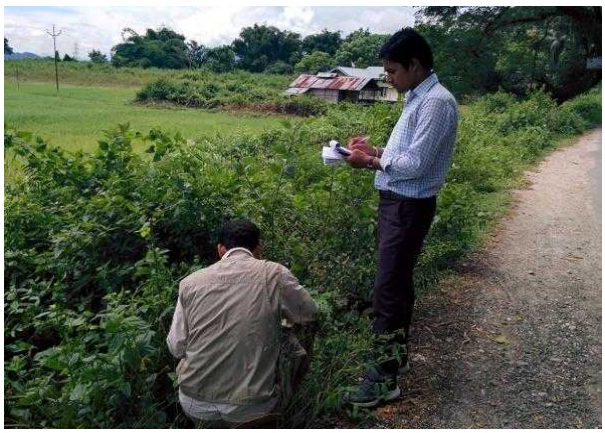
In the present project, none of the project activity contribute in the growth of any invasive species.

2.3.1.4 Vegetation Profile of the Sampling Area

Site 1: LILO of 132 kV Mariani - Mokokchung Line at Longnak – 0.64 km

The vegetation, in general, in area around Longnak sub-station is comprised of secondary vegetation with trees like *Tectona grandis, Alangium chinense, Ficus oligodon, Oroxylum indicum* and bamboos.

The area along the RoW of Mokokchung-Mariani Transmission Line at Longnak is mainly under agricultural fields, fallow and scrub land. Vegetation in the area is mainly comprised of moderate sized trees like *Alangium chinense, Ficus oligodon, Oroxylum indicum*, etc. associated with shrub species like *Acacia pennata, Aralia leschenaultia, Euphorbia pulcherrima*, *Sida rhombifolia, Strobilanthes coloratus, Ricinus communis, Murraya paniculata, Lantana camara*, *Jasminum amplexicaule,* etc. Ground cover is mainly represented by grass species like *Yushania hirsuta* (Syn. *Arundinaria hirsuta), Cyperus rotundus, Imperata cylindrica, Poa annua, Saccharum spontaneum, Thysanolaena maxima,* etc. The herbaceous layer is represented by *Ageratum conyzoides, Commelina bengalensis, Elatostema sessile* and *Lecanthes peduncularis* and *Parthenium hysterophorus*.

Agricultural Land along the route


Secondary forest of Bamboo near Sub Station


Secondary forest Sub Station

Site 2: 132 kV D/C New Kohima (Zadhima) to New Secretariat Complex (NU Campus) – 13.97 km

The site covers area along 132 kV D/C New Kohima (Zadhima) to New Secretariat Complex (NSC) and lies between NSC S/s to Pole 41. The vegetation at this site is characterized by secondary degraded form of tropical wet evergreen and semi-evergreen forest. However, comparatively undisturbed vegetation is found quite far away on upper slopes from the route of transmission lines. The vegetation composition in this area is as follows.

The main trees found in this area are *Aglaia spectabilis, Altingia excelsa, Albizia chinensis, Alnus nepalensis, Bauhinia purpurea, Bischofia javanica, Duabanga grandiflora, Macaranga denticulata, Magnolia champaca, Phoebe hainesiana, Pterospermum acerifolium, Pinus kesiya, Shorea assamica* and *Terminalia myriocarpa*.

The shrubs are comprised of species like *Acrocarpus fraxinifolius, Actinodaphne obovata, Brassaiopsis hainla, Garcinia lanceifolia, Hedychium spicatum*, *Litsea salicifolia, Lantana camara, Mesua ferrea, Magnolia hodgsonii*, *Sauropus androgynus*, etc. Undershrubs are comprised of bamboo thickets, banana, canes, palms, epiphytes and climbers. A shrubby parasitic species (*Scurrula gracilifolia*) can be observed on the trunks of tall trees.

Common climbers are species of *Argyreia, Cissus, Combretum, Derris, Entada, Hodgsonia* and *Trichosanthes*. Ground vegetation is patchy and composed of terrestrial ferns, grasses and herbs such as *Alpinia nigra, Ammomum aromaticum, Ageratum conyzoides, Phrynium pubinerve* and *Piper pedicellatum*.

Near under construction NSC sub-station vegetation is comprised of tree species like *Artocarpus heterophyllus, Bischofia javanica, Duabanga grandiflora, Alangium chinense* and *Bauhinia purpurea.* Shrubs are comprised

of *Lantana camara* and bamboo species (*Bambusa* spp. and *Dendrocalamus hamiltonii*).

Secondary Forest of Bamboo near Sub Station

Floral survey along the route

Site 3: LILO of both Circuit of Kohima – Meluri (Kiphire) Line at Pfutsero – 2.7 km

The site covered Kohima-Meluri-Pfutsero Transmission Line area and lies between tower 1 to tower 8 covering total distance of about 2.0 km. The area along the transect from tower 1 to tower 7 is characterized by vegetation comprised of tropical mixed evergreen and semi-evergreen floral elements. However, as seen from the pictures of the site below there are intermittent patches of slightly denser vegetation alternating with sparse vegetation. The vegetation composition is as follows.

The vegetation of denser patches is comprised tall trees like *Albizia procera, Altingia excelsa, Artocarpus chama, Bischofia javanica, Canarium bengalense, Duabanga grandiflora, Macaranga grandiflora, Phoebe hainesiana, Pinus kesiya, Pterospermum acerifolium, Balakata baccata, Terminalia myriocarpa,*

Alnus nepalensis, etc. In addition other tree and shrub species like *Aglaia spectabilis, Bauhinia purpurea, Cinnamomum bejolghota, Erythrina variegata, Ficus glomerata, Oroxylum indicum, Parkia timoriana, Lantana camara* and *Euphorbia pulcherrima* are also found.

Near location of Tower 8, vegetation is characterized by scrub forest with abandoned Jhum land and agricultural fields. A few trees of *Areca catechu* (Betel nut) can be seen planted near habitation. Dense thickets of bamboos (*Bambusa* spp. and *Dendrocalamus hamiltonii*) can be seen along the slopes in jhummed area along with *Lantana camara* and some tall reed grasses like species of *Imperata, Saccharum, Themeda* and *Thysanolaena*. Other plant species in the ground vegetation includes many tall undershrubs, weeds and herbs like species of *Ageratum, Bidens, Chromolaena, Colocasia, Persicaria, Pollia, Strobilanthes,* etc. along the nala.

Kohima – Meluri (Kiphire) Line at Pfutsero T/L Location of Tower 8


Location of Tower 6 and *Jhum* Land along the corridor of Kohima – Meluri (Kiphire) Line at Pfutsero T/L Location of Tower 2 & 6

Secondary Forest on abandoned *Jhum* land on the rout

Site 4: 220 kV S/C (on D/C Tower) New Kohima-Mokokchung via Wokha Line- 86.94 km

For New Kohima-Mokokchung via Wokha transmission line survey was conducted in four different transects depend on the accessibility along the rout of line. The area between tower 49 to 52 is comprised of dense mixed vegetation along the corridors of transmission line route. While rest of the surveyed area are characterised by degraded vegetation with steep slopes and the areas which are abandoned after jhum dominant by bamboo and small tree and shrub species.

In general, vegetation of the area is comprised of deciduous and evergreen tree species like *Aglaia spectabilis, Albizia chinensis, Albizia procera, Artocarpus chama* (Sam)*, Bischofia javanica, Bombax ceiba, Duabanga grandiflora* (Khokon)*, Erythrina variegata, Pterospermum acerifolium, Sterculia villosa, Terminalia myriocarpa* (Hollock)*,* etc. Shrubs include bamboos and grasses like *Saccharum, Themeda* and *Thysanolaena*. Small trees are *Arenga westerhoutii, Bauhinia purpurea, Brassaiopsis hainla, Ficus glomerata, Magnolia hodgsonii*, etc. Common shrub elements in the area are *Euphorbia pulcherrima, Lantana camara, Murraya paniculata, Bambusa tulda, Calamus* spp., *Dendrocalamus hamiltonii, Dendrocalamus strictus,* etc. The ground flora comprises of species of grasses, undershrubs and herbs like *Alpinia*, *Arundinaria, Chromolaena, Globba, Hedychium, Persicaria, Pollia* and *Thysanolaena.* The common climbers here are *Cayratia japonica, Combretum decandrum, Derris scandens, Dioscorea bulbifera, Thunbergia coccinea* and *Trichosanthes cordata*. Among angiospermic epiphytes are species of *Codonanthe devosiana, Bulbophyllum affine, Dendrobium* spp*.,* etc. The epiphytic ferns include *Cheilanthes tenuifolia, Pyrrosia obovata, Vittaria* spp.*,* etc. and orchids belonging to the genera *Bulbophyllum, Cymbidium, Dendrobium, Vanda*, etc.


220 kV S/C (on D/C Tower) New Kohima-Mokokchung via Wokha Tower Location


Plantation and natural Forest Private land in the route

Site 5: LILO of 132 kV S/C Kohima-Wokha Line at 220 kV New Kohima sub-station - 9.54 km

The area between Tower 2 to 8 in the vicinity of proposed Kohima-Wokha transmission line project is comprised of a dense mixed vegetation. The area is characterized by disturbed and degraded secondary vegetation due to abandoned jhum land. Along the corridor, the vegetation is denser on steep slopes. The tall trees are *Acrocarpus fraxinifolius, Aglaia spectabilis, Ailanthus integrifolia, Albizia chinensis, Altingia excelsa, Artocarpus chama, Bauhinia purpurea, Macaranga denticulata, Mesua ferrea, Phoebe hainsiana, Pterospermum acerifolium, Shorea assamica* and *Terminalia myriocarpa*. Smaller trees are *Actinodaphne obovata*, *Brassaiopsis glomerulata*, *Colona floribunda, Ficus oligodon, Ficus semicordata, Garcinia cowa, Gynocardia odorata, Magnolia hodgsoni,* etc. Undergrowth is comprised of dense mixed vegetation of with small trees, tall spreading shrubs, and climbers like *Lantana camara*, *Mikania micrantha*, *Murraya paniculata, Ricinus communis, Bambusa* spp., *Calamus tenuis, Cocculus orbiculatus*, *Fissistigma polyanthum, Chromolaena odorata, Debregeasia longifolia, Maesa indica, Oroxylum indicum, Rubus paniculatus, Solanum torvum* and *Strobilanthes hamiltoniana*.


Transect Survey Along the corridor of


Forest Cover of 132 kV S/C Kohima-Wokha Line at 220 kV New Kohima sub-station

2.3.1.5 Economically Important Plant Species

The people of the area use wild plants in their daily life as food, medicine, fibre, fodder, fuel wood, timber, vegetables, fruits and various minor forest products. Agriculture is the major occupation in the project area and jhum cultivation is prevalent. Jhum paddy, WRC paddy, maize, soybean, and rapeseed/mustard are main crops cultivated. Among horticultural crops are pineapple, banana, orange, passion fruit and litchi. Among vegetable chili, colocasia, leafy vegetables, tapioca, pumpkin and ginger are common.

Wild Edible Plants

List of wild edible plants used by villagers in the study area was prepared from Pradheed *et al*. (2016) and the same is given at **Table 2.10**.

Table 2.10: Wild Edible Plant Species Used by Tribes in Study Area

S. No.	Family	Name of species	Parts used
1	Anacardiaceae	*Rhus chinensis*	Fruit
2	Apiaceae	*Centella asiatica*	Leafy vegetable
3	Apiaceae	*Eryngium foetidum*	Leafy vegetable
4	Araceae	*Colocasia esculenta*	Leafy vegetable
5	Arecaceae	*Calamus tenuis*	Fruit
6	Burseraceae	*Canarium strictum*	Fruit
7	Chenopodiaceae	*Chenopodium album*	Leafy vegetable

S. No.	Family	Name of species	Parts used
8	Euphorbiaceae	*Phyllanthus emblica*	Fruit
9	Fabaceae	*Bauhinia variegata*	Flower bud
10	Lamiaceae	*Elsholtzia blanda*	Leafy vegetable
11	Moraceae	*Artocarpus chama*	Fruit
12	Moraceae	*Ficus auriculata*	Fruit
13	Rutaceae	*Zanthoxylum retusum*	Leafy vegetable
14	Solanaceae	*Solanum violaceum*	Unripe Fruit
15	Urticaceae	*Lecanthus peduncularis*	Leafy vegetable
16	Verbenaceae	*Clerodendrum glandulosum*	Leafy vegetable

Nagaland state is famous for Naga Mircha/Bhut Jolokia (*Capsicum chinense*) known as world's hottest chili, tree tomato (*Solanum betaceum*) consumed as vegetable and naga pineapple (*Ananas comosus*).

Medicinal Plants

Plant species are used for various medicinal purposes for treating various ailments by local tribal. The list of plant species used for various medicinal purposes by locals and found in the study area was prepared from Imchen & Jamir, 2011; Jamir & Tsurho, 2016 and the same is given at **Table 2.11**.

Table 2.11: Plant Species Used for Medicinal Purposes

S. No.	Family	Name of species	Parts used	Disease/ailment treated
1	Amaranthaceae	*Achyranthes aspera*	Entire plant	Diuretic
2	Amaranthaceae	*Amaranthus spinosus*	Leaves, inflorescence	Weak womb in women
3	Amaranthaceae	*Celosia argentea*	Flower	Gastric problems
4	Anacardiaceae	*Mangifera indica*	Leaves	Jaundice, stomachache
5	Apiaceae	*Centella asiatica*	Entire plant	Cough, malaria; improves hair growth
6	Apiaceae	*Coriandrum sativum*	Aerial part	Blood purifier; indigestion
7	Apocynaceae	*Alstonia scholaris*	Seeds	Constipation
8	Apocynaceae	*Catharanthus roseus*	Leaves, flower	Cancer, diabetes
9	Araceae	*Alocasia macrorrhiza*	Leaves, roots	Inflammatory diseases; a vermifuge
10	Araceae	*Arisaema tortuosum*	Roots, seeds	Gastritis, indigestion
11	Araceae	*Colocasia esculenta*	Leaves, stem, rhizome	Vermifuge, laxative
12	Araceae	*Lasia spinosa*	Aerial part	Anthelmintic
13	Arecaceae	*Areca catechu*	Seeds	A vermifuge
14	Asparagaceae	*Asparagus racemosus*	Root	Diabetes, epilepsy
15	Asteraceae	*Ageratum conyzoides*	Leaves, roots	Leaves in cuts & sores;

S. No.	Family	Name of species	Parts used	Disease/ailment treated
				roots anthelmintic, anti-allergic
16	Asteraceae	*Artemisia indica*	Stem	Soothing sore throat; a source of vitamin
17	Asteraceae	*Artemisia nilagirica*	Entire plant	Appetizer, source of vitamin; in dog bites
18	Asteraceae	*Mikania cordata*	Leaves, stem	Insect bites, itches, wounds; stops bleeding
19	Asteraceae	*Spilanthes acmella*	Inflorescence	Toothache; germicidal
20	Asteraceae	*Tagetes erecta*	Leaves	Headache, boils, muscular pain
21	Begoniaceae	*Begonia palmata*	Leaves	A febrifuge
22	Cannaceae	*Canna indica*	Leaves	Treats toothache along with *Solanum myriacanthum*
23	Caryophyllaceae	*Drymaria cordata*	Leaves	Snake and insect bites, sinus problem
24	Costaceae	*Cheilocostus speciosus*	Stem	Jaundice, headache, fever; a germicide
25	Crassulaceae	*Bryophyllum pinnata*	Leaves	Wounds, insect bites, gall bladder stone
26	Dioscoreaceae	*Dioscorea bulbifera*	Tubers	Piles, dysentery
27	Equisetaceae	*Equisetum ramosissimum*	Entire plant	Rheumatic pain, hair
28	Euphorbiaceae	*Euphorbia royleana*	Latex	Toothache, burns
29	Euphorbiaceae	*Jatropha curcas*	Branch stem	Used for brushing during toothache
30	Euphorbiaceae	*Ricinus communis*	Leaves	Rheumatic body parts, blood clotting, bone fracture
31	Fabaceae	*Albizia chinensis*	Bark	Bark paste is wrapped around injured part that supports as bandage
32	Fabaceae	*Albizia lebbeck*	Leaves, seeds	Improves womb weakness
33	Fabaceae	*Bauhinia glauca*	Roots	Problems of womb in women
34	Fabaceae	*Crotalaria pallida*	Leaves, bark	Jaundice
35	Fabaceae	*Mimosa pudica*	Leaves	Wounds, insects' bites, jaundice, urinary problem
36	Hypoxidaceae	*Curculigo orchioides*	Rhizome	Gastric problem & venereal diseases
37	Lamiaceae	*Elsholtzia blanda*	Leaves	Stomach-ache, nervous

S. No.	Family	Name of species	Parts used	Disease/ailment treated
				tension, constipation
38	Lamiaceae	*Ocimum basilicum*	Leaves	Cough, skin diseases, insect stings
39	Malvaceae	*Gossypium arboreum*	Seeds	Measles, allergies; refrigerant
40	Malvaceae	*Hibiscus rosa-sinensis*	Leaves	Dysentery, gastric problems, indigestion
41	Meliaceae	*Azadirachta indica*	Leaves	Heart problems
42	Moraceae	*Artocarpus heterophyllus*	Seeds, bark	Cancer, asthma
43	Moraceae	*Ficus altissima*	Fruits	Appetizer
44	Moraceae	*Ficus carica*	Fruits	Womb tumour
45	Musaceae	*Musa paradisiaca*	Latex	Dysentery
46	Myrtaceae	*Psidium guajava*	Leaves	Dysentery; germicidal
47	Oxalidaceae	*Oxalis corniculata*	Entire plant	Jaundice, dysentery, diarrhoea
48	Phyllanthaceae	*Phyllanthus emblica*	Fruits	Cough; source of vitamin improving eye sight
49	Piperaceae	*Piper betle*	Leaves	As antiseptic in cuts and wounds; cough
50	Poaceae	*Bambusa tulda*	Shoot	Piles
51	Pteridaceae	*Adiantum lunulatum*	Aerial part	Fever, dysentery, malaria
52	Rosaceae	*Fragaria nilgerrensis*	Fruits	Source of vitamin
53	Rutaceae	*Citrus limon*	Leaves, seeds	Headache, dysentery
54	Solanaceae	*Brugmansia suaveolens*	Leaves	Weak memory
55	Solanaceae	*Nicotiana tabacum*	Seeds	Cough, fever
56	Solanaceae	*Solanum myriacanthum*	Seeds	Toothache; germicidal
57	Zingiberaceae	*Curcuma aeruginosa*	Rhizome	Tuberculosis, cancer
58	Zingiberaceae	*Curcuma angustifolia*	Rhizome	Body ache, swelling body parts, cuts & wounds
59	Zingiberaceae	*Zingiber officinale*	Rhizome	Rheumatic pain, womb tumour

Source: Imchen & Jamir, 2011; Jamir & Tsurho, 2016

Timber yielding Tree species

Some of the timber yielding trees found in the study area are *Albizia procera*, *Chukrasia tabularis*, *Magnolia champaca*, *Actinodaphne obovata*, *Schima wallichii*, *Terminalia myriocarpa*, *Artocarpus heterophyllus* and *Mangifera sylvatica*.

2.3.2 Faunal Elements

While describing the faunal diversity in Nagaland, it would be imperative to address the ethnic composition, and their rights and privileges on forests. Forests in Nagaland are largely under the community and private forests. The tribes of the region are closely associated with the forest resources not only for their livelihood.

But on the other hands, hunting is considered as a serious activity among the tribal community in Nagaland, therefore, many rituals are performed for the successful hunting. Hunting and trapping of mammals and birds and slash and burn practice (shifting cultivation) are common phenomena in the state, which are one of the major threats to the biodiversity; therefore, scientists and ecologists have been highlighting their consequences on biodiversity for long back. Deforestation for shifting cultivation and hunting practices in the state are resulting in degradation of wildlife habitat.

To study the wild mammalian fauna of the study area, transects and trails were walked on same transects used for floral survey. During the field surveys, not a single species encountered during the transect walk. As informed by the local people, the wild mammals are found in upper reaches having dense forests and have not human interference. Due to large number of illegal hunting of these animals for the meat, medicine and other use like home decoration etc. the number of mammal's species was decreases gradually in the area and they are seen very occasionally.

Therefore, the fauna of the state has been compiled with the help of secondary sources. Data was compiled from published literature of National Biodiversity Strategy and Action Plan (NBSAP), Zoological Survey of India (ZSI) and Bhupathy *et al.* (2011). Nagaland harbours a variety of wildlife distributed throughout the state. For management and preservation of wildlife in the State, the Department of Forests, Environment & Ecology and Wildlife has a full-fledged wildlife Wing under the Chief Wildlife Warden.

2.3.2.1 Mammals

As per the data compiled, 28 species of mammals belonging 17 families of 8 orders are reported from the project districts. As per the International Union for Conservation of Nature (IUCN) Red List of Threatened Species, 2020-1, 5 species are in Endangered (EN) category, 5 species are in Vulnerable (VU) category, 4 species are in Near Threatened (NT) category, 12 species are in Least Concerned (LC) category and 2 species were Not Assessed (NA). List of

important mammals found in the project districts along with their conservation status is given in **Table 2.12.**

Table 2.12: List of Mammals

S. No.	Family	Scientific Name	Common Name	Conservation Status (IUCN 2020.1)
	Order-Artiodactyla			
1	Bovidae	*Bos frontalis*	Mithun	NA
2	Bovidae	*Nemorhaedus goral*	Goral	NT
3	Suidae	*Sus scrofa*	Wild Boar	LC
	Order- Carnivora			
4	Felidae	*Panthera tigris*	Tiger	EN
5	Felidae	*Panthera pardus*	Leopard or Panther	VU
6	Felidae	*Felis bengalensis*	Leopard Cat	LC
7	Mustelidae	*Arctonyx collaris*	Hog-badger	VU
8	Canidae	*Cuon alpinus*	Wild Dog	EN
9	Ursidae	*Melursus urinus*	Sloth Bear	VU
10	Mustelidae	*Lutra lutra*	Common Otter	NT
11	Felidae	*Felis chaus*	Jungle Cat	LC
12	Herpestidae	*Herpestes edwadsii*	Mongoose	LC
13	Canidae	*Vulpes bengalensis*	Indian Fox	LC
14	Mustelidae	*Martes foina intermedia, M. flavigula*	Martins	LC
15	Viverridae	*Paradoxums hermophroditus*	Tody Cat	LC
	Order-Cetartiodactyla			
16	Cervidae	*Muntiacus muntjak*	Barking Deer	LC
17	Cervidae	*Cervus unicolor*	Sambar	VU
	Order- Lagomorpha			
18	Leporidae	*Lepus nigricollis*	Common Hare	LC
	Order- Pholidota			
19	Manidae	*Monis crassicaudata*	Pangolin	EN
	Order- Primates			
20	Hylobatidae	*Hylobates hoolock*	Hoolock	EN
21	Lorisidae	*Nycticebus coucang*	Slow Lorris	VU
22	Cercopithecidae	*Macaca assamensis*	Assamese Macaque	NT
23	Cercopithecidae	*Canis aureus*	Jackal	NT
	Order- Proboscidea			
24	Elephantidae	*Elephas maximus*	Elephant	EN
	Order- Rodentia			
25	Sciuridae	*Petuarista petuarista*	Giant Flying Squirrel	LC
26	Hystricidae	*Hystrix indica*	Porcupine	LC
27	Sciuridae	*Ratufa indica*	Indian Giant Squirrel	LC
28	Sciuridae	*Ratufa bicolor*	Black Giant Squirrel	NA

Source: NBSAP & ZSI; Bhupathy et al. (2011)

2.3.2.2 Avifauna

As per the data compiled, 86 species of avifauna belonging 40 families of 15 orders are reported from the project districts. As per the IUCN Red List of

Threatened species, 2020-1, 1 species is in Critically Endangered (CR) category, 1 species is in VU category, 3 species are in NT category and 81 species are in LC category. List of important avifauna found in the project districts along with their conservation status is given in **Table 2.13.**

Table 2.13: List of Avifauna

S. No.	Order/ Family	Scientific Name	Common Name	Conservation Status (IUCN 2020.1)
	Accipitriformes			
1	Accipitridae	*Gyps himalayensis*	Himalayan Griffon	NT
2	Accipitridae	*Milvus migrans*	Black Kite	LC
	Anseriformes			
3	Anatidae	*Anas crecca*	Common Teal	LC
	Apodiformes			
4	Apodinae	*Aerodramus brevirostris*	Himalayan Swiftlet	LC
5	Apodidae	*Apus affinis*	Little swift	LC
6	Apodidae	*Apus nipalensis*	House Swift	LC
	Bucerotiformes			
7	Bucerotidae	*Buceros bicornis*	Great Hornbill	VU
8	Bucerotidae	*Ocyceros birostris*	Indain Grey Hornbill	LC
9	Upupidae	*Upupa epops*	Eurasian hoopoe	LC
	Caprimulgiformes			
10	Caprimulgidae	*Caprimulgus asiaticus*	Indian nightjar	LC
	Charadriiformes			
11	Charadriidae	*Vanellus indicus*	Red-wattled lapwing	LC
12	Scolopacidae	*Gallinago gallinago*	Common snipe	LC
13	Scolopacidae	*Tringa hypoleucos*	Common Sandpiper	LC
	Columbiformes			
14	Columbidae	*Columba livia*	Rock Pigeon	LC
15	Columbidae	*Ducula badia*	Mountain Imperial-Pigeon	LC
16	Columbidae	*Streptopelia chinensis*	Spotted Dove	LC
17	Columbidae	*Streptopelia orientalis*	Oriental Turtle Dove	LC
18	Columbidae	*Treron phoenicoptera*	Yellow-footed green pigeon	LC
	Coraciiformes			
19	Alcedinidae	*Alcedo atthis*	Common kingfisher	LC
20	Coraciidae	*Coracias benghalensis*	Indian Roller	LC
21	Meropidae	*Merops orientalis*	Green bee-eater	LC
	Cuculiformes			
22	Phasianidae	*Arborophila torqueola*	Hill Partridge	LC
23	Cuculidae	*Centropus bengalensis*	Lesser Coucal	LC
24	Cuculidae	*Centropus sinensis*	Great Coucal	LC
25	Cuculidae	*Eudynamys scolopaceus*	Asian Koel	LC
	Falconiformes			
26	Falconidae	*Falco amurensis**	Amur falcon	LC
	Galliformes			
7	Ardeidae	*Ardea Cinerea*	Grey Heron	LC
28	Ardeidae	*Bubulcus ibis*	Cattle Egret	LC

S. No.	Order/ Family	Scientific Name	Common Name	Conservation Status (IUCN 2020.1)
29	Corvidae	*Corvus splendens*	House crow	LC
30	Phasianidae	*Lophura leucomelanos*	Kalij Pheasant	LC
31	Phasianidae	*Syrmaticus humiae*	Mrs Hume's Pheasant	NT
32	Phasianidae	*Ophrysia superciliosa*	Himalayan Quail	CR
33	Phasianidae	*Gallus gallus*	Red Jungle Fowl	LC
34	Phasianidae	*Polyplectron bicalcaratum*	Grey Peacock-pheasant	LC
35	Phasianidae	*Coturnix coturnix*	Common Quail	LC
36	Odontophoridae	*Oreortyx pictus*	Mountain Quail	LC
	Passeriformes			
37	Campephagidae	*Pericrocotus speciosus*	Scarlet Minivet	LC
38	Corvidae	*Dendrocitta formosae*	Gray Treepie	LC
39	Corvidae	*Dendrocitta vagabunda*	Rufous Treepie	LC
40	Corvidae	*Urocissa erythroryncha*	Yellow-billed Blue Magpie	LC
41	Emberizidae	*Emberiza fucata*	Chestnut-eared Bunting	LC
42	Emberizidae	*Melophus lathami*	Crested Bunting	LC
43	Leiothrichidae	*Heterophasia capistrata*	Rufous sibia	LC
44	Leiothrichidae	*Turdoides caudatus*	Common Babbler	LC
45	Monarchidae	*Streptopelia senegalensis*	Paradise flycatcher bird	LC
46	Monarchidae	*Terpsiphone paradisi*	Indian Paradise-flycatcher	LC
47	Motacillidae	*Motacilla alba*	White wagtail	LC
48	Muscicapidae	*Chaimarrornis leucocephalus*	White-capped Water Redstart	LC
49	Muscicapidae	*Copsychus malabaricus*	White-rumped shama	LC
50	Muscicapidae	*Copsychus saularis*	Oriental Magpie Robin	LC
51	Muscicapidae	*Enicurus maculatus*	Spotted Forktail	LC
52	Muscicapidae	*Myophonus caeruleus*	Blue Whistling Thrush	LC
53	Muscicapidae	*Rhyacornis fuliginosus*	Plumbeous Water Redstart	LC
54	Nectariniidae	*Aethopyga siparaja*	Crimson sunbird	LC
55	Paridae	*Parus major*	Great Tit	LC
56	Passeridae	*Dendronanthus indicus*	Forest Wagtail	LC
57	Passeridae	*Motacilla cinerea*	Grey Wagtail	LC
58	Passeridae	*Motacilla flava*	Yellow Wagtail	LC
59	Passeridae	*Motacilla maderaspatensis*	White-Browed Wagtail	LC
60	Passeridae	*Passer domesticus*	House Sparrow	LC
61	Phasianidae	*Tragopan blythii*	Blyth's Tragopan	LC
62	Phylloscopidae	*Phylloscopus fuscatus*	Dusky Warbler	LC
63	Picidae	*Dendrocopos mahrattensis*	Yellow Crowned Woodpecker	LC
64	Pnoepygidae	*Pnoepyga albiventer*	Scaly-breasted	LC

S. No.	Order/ Family	Scientific Name	Common Name	Conservation Status (IUCN 2020.1)
			Cupwing	
65	Pnoepygidae	*Pnoepyga pusilla*	Pygmy Cupwing	LC
66	Pycnonotidae	*Hypsipetes leucocephalus*	Black Bulbul	LC
67	Pycnonotidae	*Hypsipetes madagascariensis*	Madagascar bulbul	LC
68	Pycnonotidae	*Pycnonotus cafer*	Red-Vented Bulbul	LC
69	Pycnonotidae	*Pycnonotus jocosus*	Red-whiskered bulbul	LC
70	Pycnonotidae	*Pycnonotus leucogenys*	Himalayan Bulbul	LC
71	Pycnonotidae	*Pycnonotus melanicterus*	Black-crested Bulbul	LC
72	Pycnonotidae	*Pycnonotus striatus*	Striated Bulbul	LC
73	Stenostiridae	*Culicicapa ceylonensis*	Grey-headed Canary-Flycatcher	LC
74	Sturnidae	*Acridotheres tristis*	Common Myna	LC
75	Sturnidae	*Gracula religiosa*	Hill Myna	LC
76	Timaliidae	*Mixornis gularis*	Pin-striped Tit-Babbler	LC
77	Turdidae	*Turdus merula*	Common blackbird	LC
	Pelecaniformes			
78	Dicruridae	*Dicrurus adsimilis*	Fork Tail Drongo	LC
79	Dicruridae	*Dicrurus macrocercus*	Black Drongo	LC
80	Dicruridae	*Dicrurus remifer*	Lesser Racket-tailed Drongo	LC
	Piciformes			
81	Ardeidae	*Nycticorax nycticorax*	Black-crowned Night-heron	LC
82	Megalaimidae	*Psilopogon asiaticus*	Blue Throated Barbet	LC
	Psittacifromes			
83	Psittaciormes	*Psittacula krameri*	Rose-ringed parakeet	LC
84	Psittacidae	*Psittacula roseata*	Blossom-headed Parakeet	NT
	Strigiformes			
85	Strigidae	*Otus lettia*	Collared Scops-Owl	LC
86	Strigidae	*Otus spilocephalus*	Mountain Scops-Owl	LC

Source: NBSAP & ZSI; Indian Birds Journal Vol. 6. No.2 (2010) Special Issue: Nagaland

Falco amurensis (Amur falcons), the world's longest travelling raptors was also reported from the state. These amazing raptors travel one of the longest migration routes of all birds, up to 22,000 km in a year. They arrive in north-east India from Siberia en route to their destination at Somalia, Kenya and South Africa.

In Nagaland state, Doyang Lake, Pangti village and nearby areas in Wokha district is better known as a roosting site for the Amur falcons during their annual migration from their breeding grounds to warmer South Africa. Thus, Nagaland is also known as the "Falcon Capital of the World".

The birds are the least concern under the International Union for Conservation of Nature (IUCN) Red List, and the species is categorized under Schedule-IV of the Indian Wildlife Protection Act, 1972, and the Convention on Migratory Species, to which India is a signatory (which means it is mandatory to protect the birds).

Till 2013-14, hundreds of these migratory raptors were reportedly killed in Nagaland when they arrived at Doyang reservoir in Wokha to roost every winter. The efforts of the Nagaland forest department and villagers of Wokha district ensured that not a single falcon was killed last year while on their way to South Africa from Siberia.

During field survey it was observed that neither the location of any substation nor any route of transmission line/ distribution line falls in migratory path of Amur falcons.

2.3.2.3 Herpetofauna

As per the data compiled, 15 species of reptiles and 10 species of amphibians are reported from the project districts. List of important herpetofauna found in the project districts is given in **Table 2.14.**

Table 2.14: List of Herpetofauna

S. No.	Family	Scientific Name	Common Name
Reptiles			
	Order-Squamata		
1	Agamidae	*Calotis versicolor*	Common garden lizard
2	Agamidae	*Calotis emma*	Forest crested lizard
3	Agamidae	*Draco spilonotus*	Flying Lizard
4	Boidae	*Eryx johnii*	Indian sand boa
5	Colubridae	*Zamenis mucosus*	Common Rat Snake
6	Elapidae	*Ophiophagus hannah*	King Cobra
7	Elapidae	*Bungarus caeruleus*	Common krait
8	Elapidae	*Naja naja*	Indian cobra
9	Elapidae	*Bungarus niger*	Black krait
10	Gekkonidae	*Hemidactylus garnotii*	Gecko
11	Pythonidae	*Python reticulatus*	Reticulated Python
12	Scincidae	*Eutropis carinata*	Skink
13	Varanidae	*Varanus bengalensis*	Monitor Lizard
14	Viperidae	*Trimeresurus* sp.	Pit Viper
	Order-Testudines		
15	Testudinidae	*Testudo graeca*	Tortoise
Amphibians			
	Order-Anura		
16	Bufonidae	*Bufo melanostictus*	Asian Common Toad
17	Dicroglossidae	*Hoplobatrachus tigerinus*	Indian Bullfrog
18	Hylidae	*Hyla annectans*	Tree Frog
19	Megophryidae	*Megophrys glandulosa*	The Glandular Horned Toad
20	Ranidae	*Amolops gerbillus*	Stream frog

21	Ranidae	*Pterorana khare*	Indian Flying Frog
22	Ranidae	*Rana humeralis*	Bhamo Frog
23	Ranidae	*Rana tytleri*	Yellow-striped Leaf Frog
24	Rhacophoridae	*Rhacophorus bipunctatus*	The twin-spotted Flying Frog
25	Rhacophoridae	*Rhacophorus maximus*	Giant Gliding Frog

Source: NBSAP & ZSI; Selvaraj (2013)

2.3.2.4 Butterflies

As per the data compiled, 62 species of butterflies belonging 5 families are reported from the project districts. Of which, 34 species belong to Nymphalidae family, followed by 11 species belonging to Lycaenidae family. List of butterflies found in the project districts is given in **Table 2.15.**

Table 2.15: Butterflies in Nagaland

S. No.	Family	*Scientific name*	Common name
1	Hesperiidae	*Choaspes benjaminii*	Indian Awlking
2	Hesperiidae	*Gerosis bhagava*	Common Yellow Breasted Flat
3	Hesperiidae	*Hasora chromus*	Common Banded Awl
4	Hesperiidae	*Oriens goloides*	Common Dartlet
5	Hesperiidae	*Spialia galba*	Indian Skipper
6	Hesperiidae	*Tagiades japetus*	Common Snow Flat
7	Lycaenidae	*Abisara fyllla*	Dark Judy
8	Lycaenidae	*Acytolepis puspa*	Common Hedge Blue
9	Lycaenidae	*Castalius rosimon*	Common Pierrot
10	Lycaenidae	*Chilades lajus*	Lime Blue
11	Lycaenidae	*Heliophorus epicles*	Purple Sapphire
12	Lycaenidae	*Jamides bochus*	Dark Cerulean
13	Lycaenidae	*Jamides celeno*	Common Cerulean
14	Lycaenidae	*Leptotes plinius*	Zebra blue
15	Lycaenidae	*Neopithecops zalmora*	Quaker
16	Lycaenidae	*Talicada nyseus*	Red Pierrot
17	Lycaenidae	*Taraka hamada*	Forest Pierrot
18	Nymphalidae	*Aglais cashmiriensis*	Indian Tortoise Shell
19	Nymphalidae	*Apatura ambica*	Indian Purple Emperor
20	Nymphalidae	*Argyreus hyperbius*	Indian Fritillary
21	Nymphalidae	*Ariadne merione*	Common Castor
22	Nymphalidae	*Athyma perius*	Common Sergeant
23	Nymphalidae	*Cethosia cyane*	Leopard Lacewing
24	Nymphalidae	*Charaxes bernardus*	Tawny Rajah
25	Nymphalidae	*Childrena childreni*	Large Silverstripe
26	Nymphalidae	*Cirrochroa tyche*	Common Yeoman
27	Nymphalidae	*Cyrestis thyodamas*	Common Map
28	Nymphalidae	*Danaus chrysippus*	Plain Tiger
29	Nymphalidae	*Elymnias hypermnestra*	Common Palmfly
30	Nymphalidae	*Elymnias patna*	Blue-Striped Palmfly
31	Nymphalidae	*Euploea core*	Common Crow
32	Nymphalidae	*Euripus nyctelius*	Courtesan
33	Nymphalidae	*Fabriciana kamala*	Common Silverstripe
34	Nymphalidae	*Junonia lemonias*	Lemon Pansy
35	Nymphalidae	*Kallima inachus*	Orange Oakleaf
36	Nymphalidae	*Kaniska canace*	Blue Admiral
37	Nymphalidae	*Lethe bhairava*	Rusty Forester

S. No.	Family	*Scientific name*	Common name
38	Nymphalidae	*Lethe insane*	Common Forester
39	Nymphalidae	*Moduza procris*	Commander
40	Nymphalidae	*Mycalesis perseus*	Common Bushbrown
41	Nymphalidae	*Parantica aglea*	Glassy Tiger
42	Nymphalidae	*Phalanta phalantha*	Common Leopard
43	Nymphalidae	*Polyura athamas*	Common Nawab
44	Nymphalidae	*Sumalia daraxa*	Green Commodore
45	Nymphalidae	*Symbrenthia hippoclus*	Common Jester
46	Nymphalidae	*Symbrenthia hypselis*	Himalayan Jester
47	Nymphalidae	*Vagrans egista*	Vagrant
48	Nymphalidae	*Vanessa cardui*	Painted Lady
49	Nymphalidae	*Vanessa indica*	Indian Red Admiral
50	Nymphalidae	*Ypthima asterope*	Common Threering
51	Nymphalidae	*Ypthima baldus*	Common Fivering
52	Papilionidae	*Graphium cloanthus*	Glassy Bluebottle
53	Papilionidae	*Papilio alcmenor*	Red Breast
54	Papilionidae	*Papilio polyctor*	Common Peacock
55	Pieridae	*Catopsilia pomona*	Common Emigrant
56	Pieridae	*Colias fieldii*	Dark Clouded Yellow
57	Pieridae	*Delias pasithoe*	Red-Base Jezebel
58	Pieridae	*Eurema hecabe*	Common Grass Yellow
59	Pieridae	*Ixias pyrene*	Yellow Orange Tip
60	Pieridae	*Pareronia valeria*	Common Wanderer
61	Pieridae	*Pieris brassicae*	Large Cabbage White
62	Pieridae	*Pieris canidia*	Indian Cabbage White

Source: NBSAP & ZSI; Naro & Sondhi (2014), Bhupathy et al. (2011)

2.3.3 Protected Areas

The protected area network in Nagaland occupies 222.36 sq. km area, which constitute about 1.34% of the state's geographical area. The Protected Area Network includes 1 National Park (NP) and 3 Wildlife Sanctuaries (WLS). Out of these 4 protected areas, Puliebadze and Rangapahar WLS falls in project districts. In the instant scheme, all such areas are completely avoided through careful route selection. Details of the protected areas are presented below in **Table 2.16**. Map showing location of all the protected areas in Nagaland is given at **Figure 2.6**.

Table 2.16: Protected Area Network in Nagaland

S. No.	Protected Areas	Area (sq km)	District	Year of Notification
1	Intaki National Park	202.02	Peren	1993
2	Fakim Wildlife Sanctuary	6.41	Kiphire	1980
3	Puliebadze Wildlife Sanctuary	9.23	Kohima	1980
4	Rangapahar Wildlife Sanctuary	4.70	Dimapur	1986

The nearest subproject from Puliebadze WLS is 132 kV DC New Kohima (Zadhima) to Secretariat Complex Kohima (NU Campus) Transmission Line (TL). The nearest component of the TL from the WLS is Nagaland University

Campus Gantry, which is at a distance of approx. 7.66 km (refer **Figure 2.7**). The nearest new 132/33 kV Sub-station from the WLS is at Secretariat Complex Kohima, which is at a distance of approx. 7.66 km (refer **Figure 2.7**). The nearest new 33/11 kV Sub-station from the WLS is at Lalmati (Zubza), which is at a distance of approx. 6.48 km (refer **Figure 2.7**).

The nearest subproject from Rangapahar WLS is 33 kV Distribution Line (DL) from Existing 132/66/33 kV Nagarjan Sub-station to New 33/11 kV Padampukhri Sub-station. The nearest component of the DL from the WLS is Pole no. 01, which is at a distance of approx. 2.66 km (refer **Figure 2.8**). The nearest new 132/33 kV Sub-station from the WLS is at Secretariat Complex Kohima, which is at a distance of approx. 39 km. The nearest new 33/11 kV Sub-station from the WLS is at Padampukhri, which is at a distance of approx. 7 km.

2.3.4 Community Reserves

Community Reserves are the biodiversity abundant lands that are privately or community-owned and are managed by the individual(s)/communities in possession of the area. These reserves allow for extraction of natural resources, the levels of which are governed by a multi-stakeholder Reserve Management Committee. Community Reserve Management Committee is to consist of five representatives nominated by the local Village Panchayat or the Gram Sabha, and one representative each from the State Department of Forest and Wildlife.

As per information available from State forest department and ENVIS Centre on Wildlife & Protected Areas, the State Government of Nagaland had Notified 57 Community Reserves (**Table 2.17**) under section 36C (1) of the Wildlife Protection Act, 1972. In the instant scheme, all such areas have been completely avoided through careful route selection.

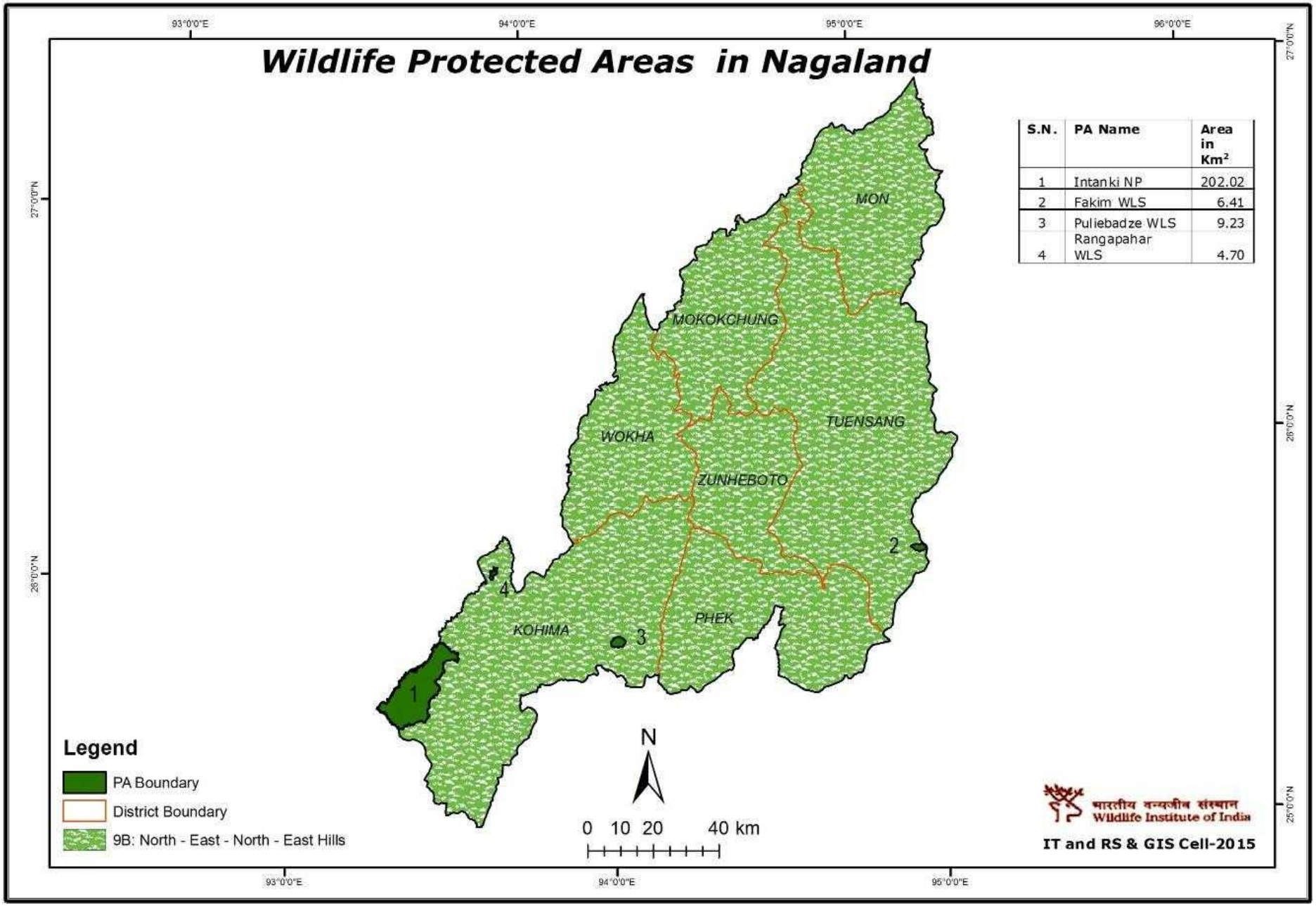


Figure 2.6: Protected Area Map of Nagaland

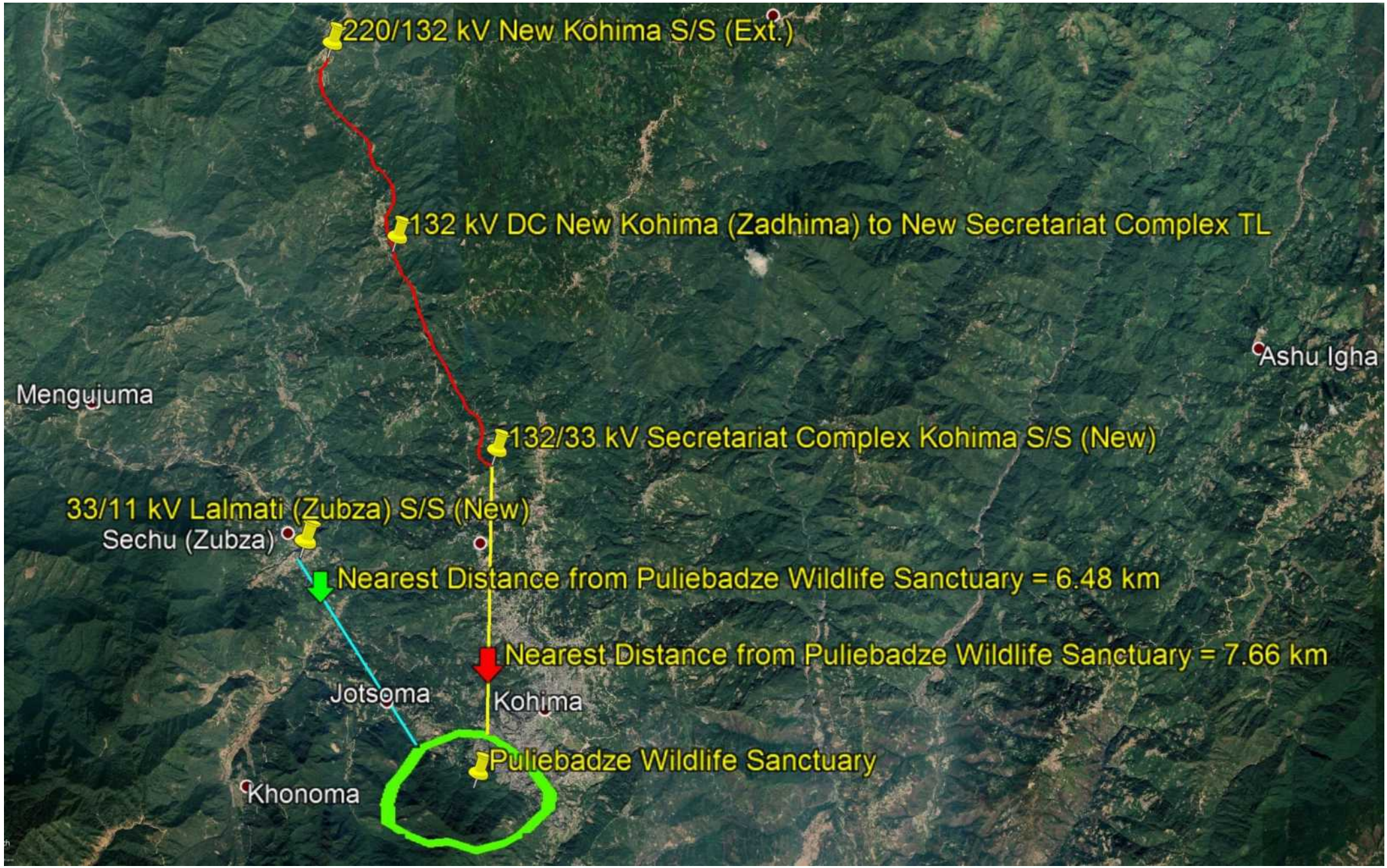


Figure 2.7: Distance of Sub-Projects from Puliebadze Wildlife Sanctuary

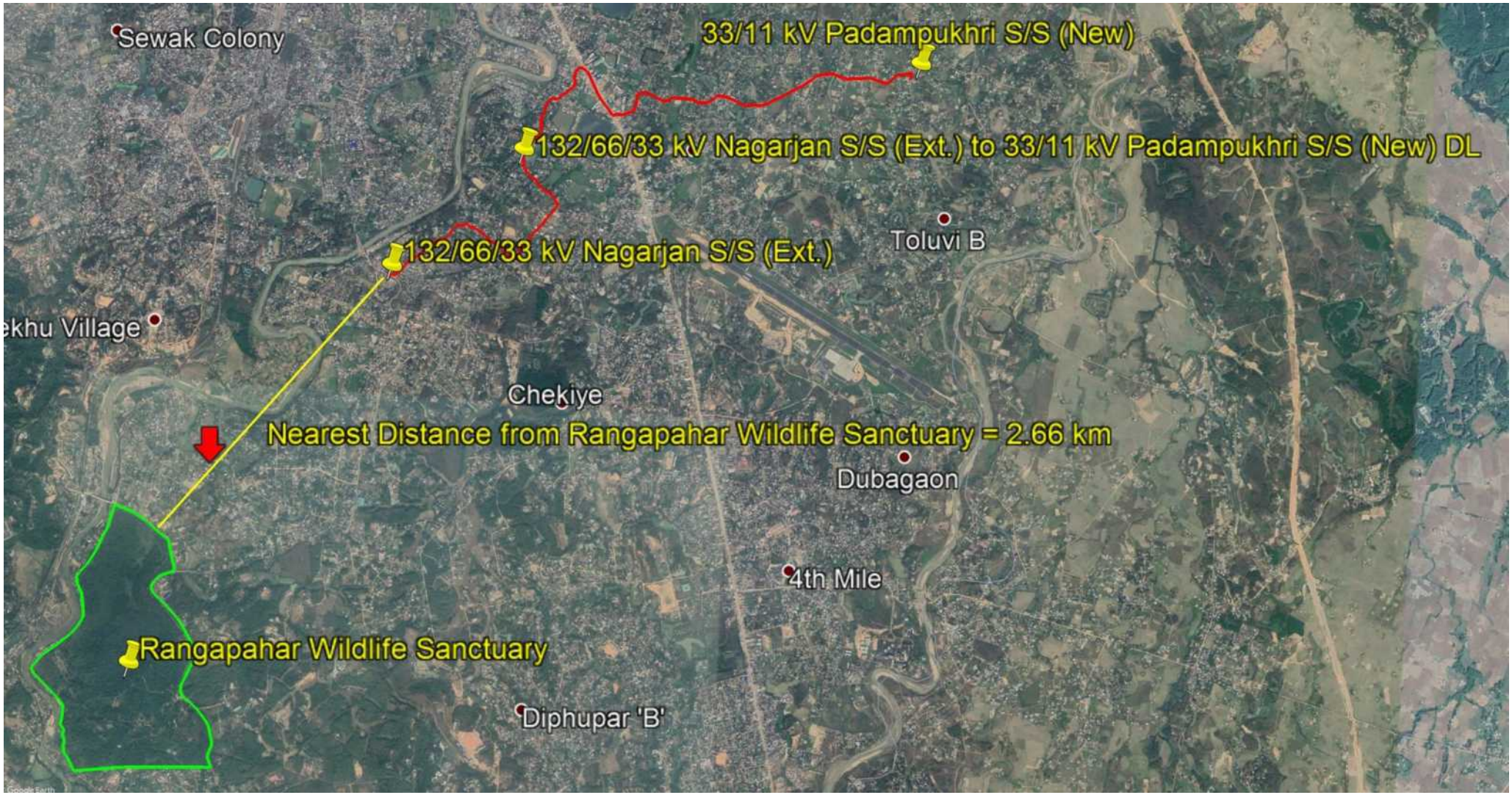


Figure 2.8: Distance of Sub-Projects from Rangapahar Wildlife Sanctuary

Table 2.17: List of Community Reserves Notified Under section 36C (1) Wildlife Protection Act 1972, in Nagaland

S.No.	Name of Community Reserve	Year of Establishment	Area (km^2)
1	Atoizu Community Reserve	2015	4.0
2	Benreu Community Reserve	2018	30.0
3	Bhumbak Community Reserve	2018	6.5
4	Bonchu Community Reserve	2009	9.05
5	Chemekong Community Reserve	2015	29.175
6	Chishilimi Community Reserve	2015	3.5
7	D. Khel, Kohima Village Community Reserve	2015	3.0
8	Dihoma Community Reserve	2015	2.0
9	Gariphema Community Reserve	2018	2.65
10	Hukphang Community Reserve	2018	3.0
11	Jotsoma Community Reserve	2018	5.0
12	Kanjang Community Reserve	2018	1.0
13	Kezoma Community Reserve	2018	2.65
14	Khekiye Community Reserve	2015	2.5
15	Khonoma Community Reserve	2018	2.65
16	Khrieyalienuomaiko Community Reserve	2018	2.65
17	Khrokhropfu – Lephori Community Reserve	2009	6.15
18	Khudei Community Reserve	2018	4.8
19	Khutur Community Reserve	2018	4.89
20	Khwuma Khel Jotsoma Community Reserve	2018	3.0
21	Kidema Community Reserve	2018	2.65
22	Kigwema Community Reserve	2015	2.65
23	Kikruma Community Reserve	2015	1.1
24	Kilo Old Community Reserve	2018	2.0
25	Kiyelho Community Reserve	2018	3.0
26	Litem Community Reserve	2018	1.6
27	Lizuto Community Reserve	2015	2.5
28	Longra Community Reserve	2018	2.275
29	Longtang Community Reserve	2018	5.8
30	Lotovi Community Reserve	2018	1.0
31	Luzaphuhu Community Reserve	2015	14.0
32	Mezoma Community Reserve	2015	2.85
33	Morakjo Community Reserve	2015	6.5
34	Mpai Namci Community Reserve	2018	20.0
35	Nerhema Perazatsa Community Reserve	2018	20.0
36	Nerhema Yaoke Community Reserve	2018	20.0
37	Nian Community Reserve	2018	2.0
38	Noksen Community Reserve	2018	1.0
39	Piphema “A” Community Reserve	2018	1.0
40	Piphema “B” Community Reserve	2018	2.8
41	Rangkang Community Reserve	2018	5.15
42	Sakhabama Community Reserve	2018	2.5

S.No.	Name of Community Reserve	Year of Establishment	Area (km^2)
43	Sangdak Community Reserve	2018	5.09
44	Scaly-Mopungchuket Community Reserve	2009	15.0
45	Sitap Community Reserve	2018	1.5
46	Tamlu Community Reserve	2018	2.0
47	Thsuruhu Community Reserve	2015	2.7
48	Tsekhewelu Community Reserve	2015	8.0
49	Tsiepama Community Reserve	2015	3.325
50	Tuophema Village Community Reserve	2018	2.5.
51	Viswema Community Reserve	2018	2.65
52	Wakchin Chingla Community Reserve	2018	30.0
53	Yali Community Reserve	2018	14.0
54	Yangpi Community Reserve	2018	3.0007
55	Yaongyimchen Community Reserve	2018	8.0
56	Yongshei Community Reserve	2018	1.5
57	Yonyu Community Reserve	2018	4.8

Source: https://forest.nagaland.gov.in/introduction/ (accessed on 29April 2020)
http://www.wiienvis.nic.in/Database/Community%20Reserves_8228.aspx (accessed on 29April 2020)

2.3.5 Sacred Groves and Community Conserved Areas (CCA)

India is well known for nature's worship, which plays an integral role in the lives of many communities. Every aspect of religious and cultural practices is deeply rooted with the forest that helps in nature conservation. These types of forest bring the concept of "sacred groves". Generally, sacred groves are a tract of virgin forest, harbouring rich biodiversity and protected traditionally by the local communities as a whole. The area of scared groves ranges from few square meters to several hectares.

In Nagaland, various ethnic groups have preserved and protected several forest patches and even individual trees or animals with the belief in nature's worship. As per available data, there are 33 sacred groves and community conserved areas in the project districts (refer **Table 2.18**). In the instant scheme, all such areas are completely avoided through careful route selection.

The details of nearest distance i.e. less than 5 km of aerial distance between any sacred groves or community conserved areas from any component of the transmission line or distribution line are given below and shown if **Figure 2.9** to **Figure 2.11**. From the map it is evident that though the distance is less than 1 km, route of lines is totally opposite to these sacred groves or community conserved areas.

- **Chakasang Sacred Grove:** Approx. 0.63 km from Tower No. 01 of LILO of both circuit Kohima – Meluri (Kiphire) line at Pfutsero and Approx. 0.94 km from Pole No. 12 of 33 kV line from New 132/33 kV Pfutsero S/S to New 33/11 kV Pfutsero S/S (refer **Figure 2.9**).

- **Ngatipang Sacred Grove, Ungma Village:** Approx. 0.24 km from Pole No. 66 of Existing 33 kV line from 66 kV Mokokchung to New 33/11 kV Mokokchung Town Hospital Area Sub-station (refer **Figure 2.10**).

- **Ngaza Sacred Grove, Ungma Village:** Approx. 0.52 km from Pole No. 50 of Existing 33 kV line from 66 kV Mokokchung to New 33/11 kV Mokokchung Town Hospital Area Sub-station (refer **Figure 2.10**).

- **Longkhum Community Conserved Area:** Approx. 1 km from Tower No. 269 of 220 kV S/C (on D/C Tower) New Kohima - Mokokchung via Wokha TL (refer **Figure 2.11**).

Table 2.18: List of Sacred Groves & Community Conserved Areas in Project Districts

S. No.	Name of Sacred Groves/ Community Conserved Areas	Location
District: **Mokokchung**		
1	Jangjalong, Waromung village	94°31'05.3" E 26°32'18.3" N
2	Yimchingkaba, Lakhuni village	94°25'15.10" E 26°32' 24.46" N
3	Ngatipang, Ungma village	94°30'11.73" E 26°17'46.73" N
4	Ngaza, Ungma village	94°30'05.784" E 26°17'42.72" N
5	Naginimora	94°49'30.36" E 26°48'33.78" N
6	Kaiviou CCA in Longwa	95°11'18.48" E 26°39'58.85" N
7	Kanglatu CCA in Changtongya	94°39'57.66" E 26°34'0.37" N
8	CCA in Longkhum	94°24'35.37" E 26°15'54.02" N
9	Meinkong CCA	
10	CCA in Changki	94°23'20.23" E 26°25'25.76"N
District: **Wokha**		
11	Mount Tiyi	94°16'27.55" E 26°12'32.59" N
12	Potsow lan, between Mt. Totsu and Mt. Tiyi	94°07'07.2" E 26°01'31.9" N
13	Limyon ('Red field'), Echuyonton	94° 09'1.6" E 26°02'06.9" N
14	Liko Emvu ('Unclean land'), Yanphiso	94°19'1.4" E 26°04'05.4" N
15	Ali-Merum ('Red Soil'), N. Longidang village	94°28'11.6" E 26°88'18.5" N
16	Sako-Selek, N. Longidang village	94°09'22.8" E 26°02'27.2" N
17	Doyang Reservoir	94°25'58" E 25°59'30" N
18	Baghty CCA	94°12'32.27" E 26°14'43.74" N
District: **Zunhebhoto**		
19	Yemetsu Lhove, Mishelili village	94°60'09" E 25°53'28.9" N
20	Sungato, Mishelimi village	94°15'42.1" E 25°53'8" N
21	Ghosu bird sanctuary, Ghukiye village	94°26'1.10" E 25°59'31.50" N
22	Tizu CCA	94°31'33.96" E 25°51'25.64" N
23	Chishilami CCA	94°22'21.11" E 25°53'38.61" N
District: **Mon**		
24	Oloanu, Zakho village	95°05'58" E 26°49'20.20" N
25	Naginimora	94°49'30.36" E 26°48'33.78" N

S. No.	Name of Sacred Groves/ Community Conserved Areas	Location
26	Kaiviou CCA in Longwa	95°11'18.48" E 26°39'58.85" N
District: **Phek**		
27	Chakasang area	94°17'56.42" E 25°34'42.91" N
28	CCA in Lazuphu	94°28'9.93" E 25°37'29.03" N
29	CCA in Chizami	94°22'57.52" E 25°36'3.47" N
30	CCA in Kikruma	94°14'13.42" E 25°35'39.76" N
District: **Kohima**		
31	Khonoma Sanctuary	94°00'04" E 25°37'35" N
32	Kigwema CCA	94°8'10.48" E 25°36'47.86" N
33	Sendenyu CCA	94°7'5.86" E 25°54'6.71" N

Source: https://shodhganga.inflibnet.ac.in/bitstream/10603/219638/13/13_chapter%204.pdf
https://shodhganga.inflibnet.ac.in/bitstream/10603/125730/7/07%20chapter%203.pdf
https://www.iccaconsortium.org/wp-content/uploads/2018/02/Documentation-of-Community-Conserved-Areas-of-Nagaland-final.pdf

2.3.6 Important Bird & Biodiversity Areas (IBAs)

Bird Life International (www.birdlife.org) has identified 9 Important Bird & Biodiversity Areas (IBAs) in Nagaland. These IBAs cover 606.25 sq km area, which constitute about 3.66% of the state's geographical area. Out of these 9 IBAs, only 5 IBAs falls in project districts. However, the proposed transmission and distribution lines don't pass through any IBAs. In the instant scheme, all such areas are completely avoided through careful route selection. Details of the IBAs are presented below in **Table 2.19**.

The IBAs which are nearest from subprojects i.e. within 10 km aerial distance are Khonoma Nature Conservation & Tragopan Sanctuary and Puliebadze-Dzukou-Zapfu IBA from 132 kV DC New Kohima (Zadhima) to Secretariat Complex Kohima (NU Campus) TL and Pfutsero-Chizami IBA from LILO of both Circuit of Kohima – Meluri (Kiphire) TL. The distance of IBAs with respect to T&D network and sub-stations is given in **Figure 2.12** and **Figure 2.13**.

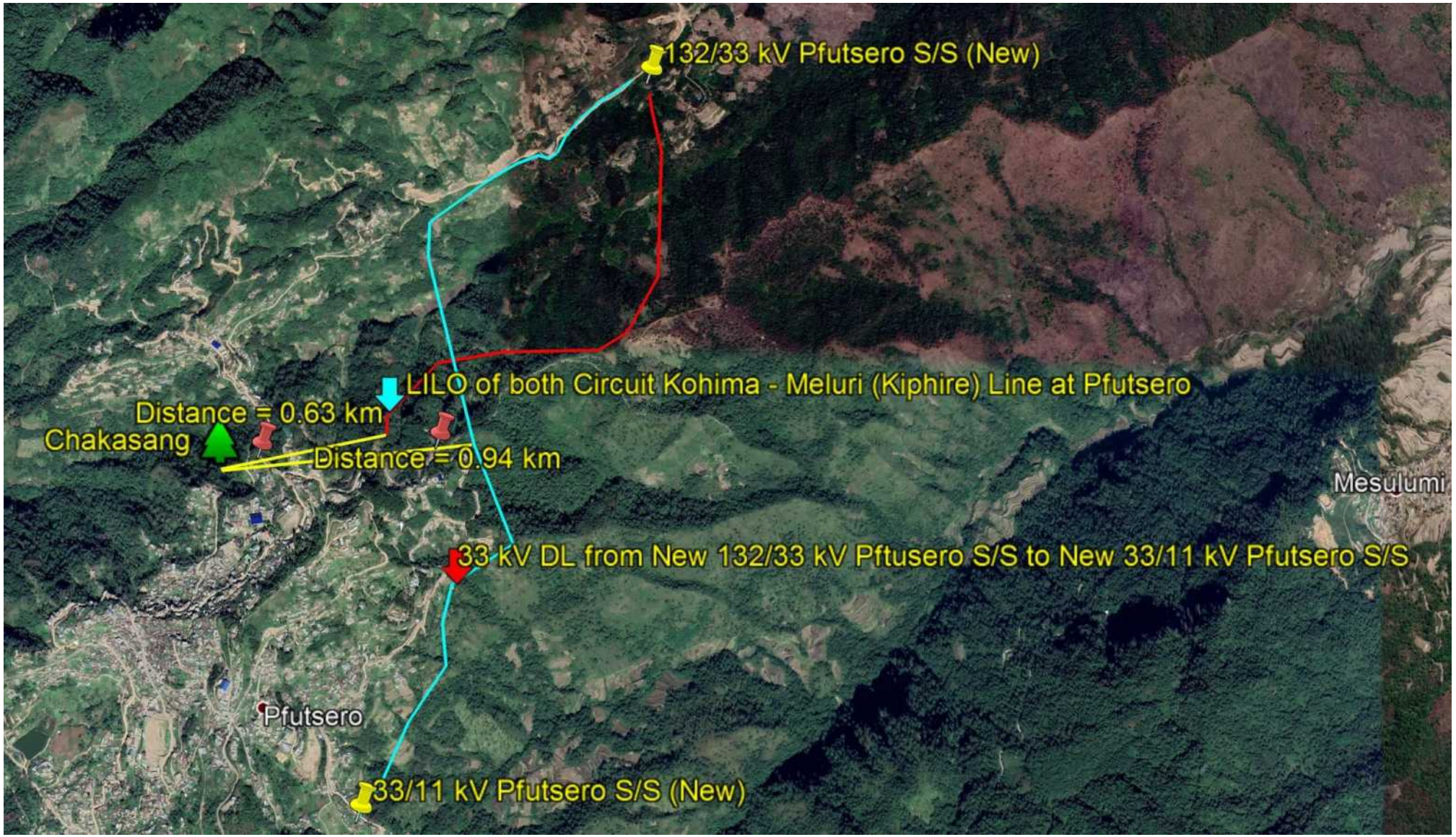


Figure 2.9: Distance of Chakasang Sacred Grove in Phek District w.r.t. to Sub-Projects

Figure 2.10: Distance of Ngaza and Ngatipang Sacred Groves in Mokokchung District w.r.t. to Sub-Project

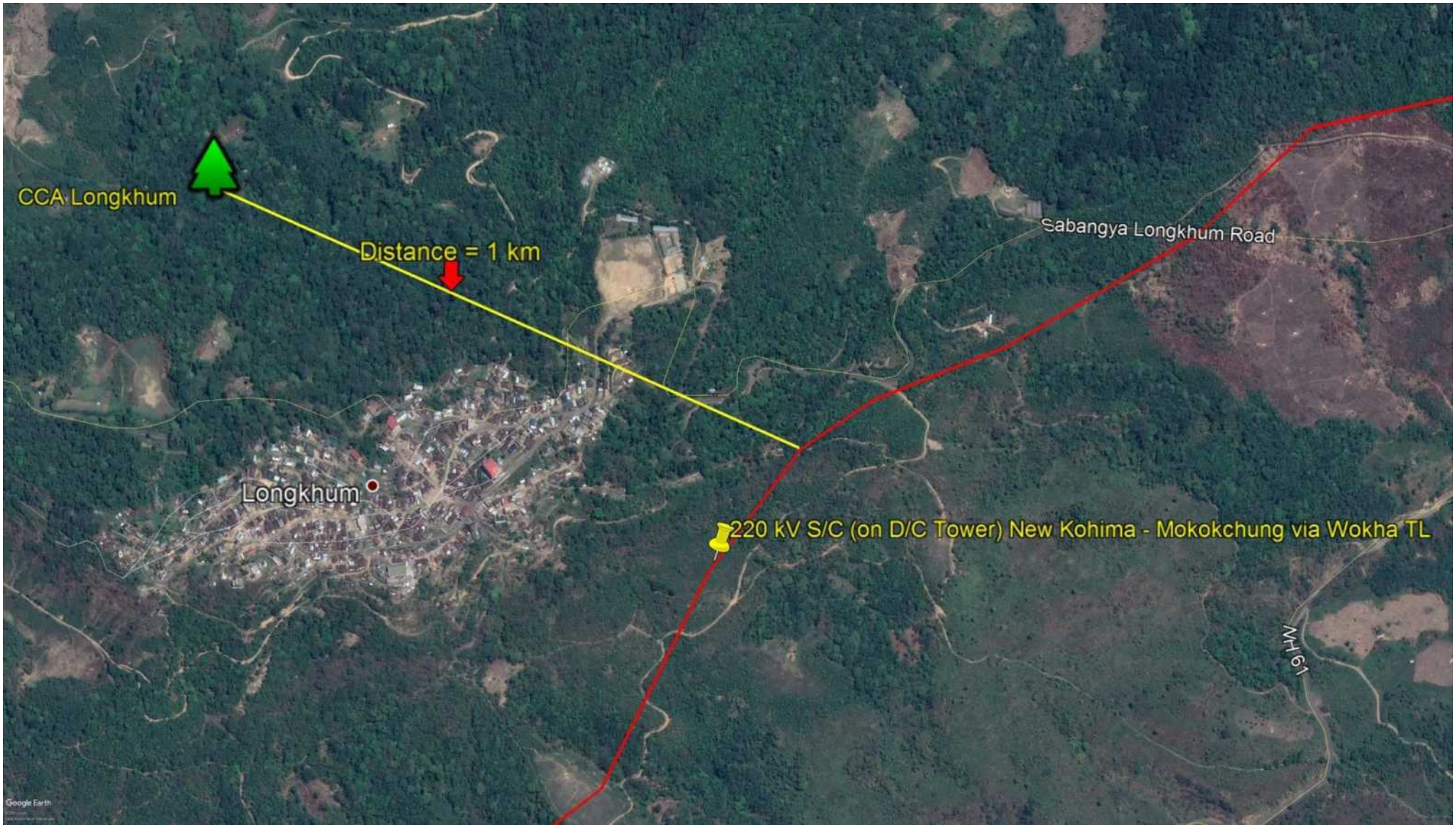


Figure 2.11: Distance of Longkhum Community Conserved Area in Wokha District w.r.t. to Sub-Project

Table 2.19: Important Bird & Biodiversity Areas in Nagaland

S. No.	IBA Code	IBA Name	Criteria	Important Species	Area (sq km)	District
1	IN421	Fakim Wildlife Sanctuary and Saramati area	A1, A2	*Tragopan blythii, Syrmaticus humiae, Aceros nipalensis*	30.00	Kiphire
2	IN422	Intaki National Park	A1, A3	*Cairina scutulata, Aceros nipalensis*	202.02	Peren
3	IN423	Khonoma Nature Conservation and Tragopan Sanctuary	A1, A2	*Tragopan blythii, Apus acuticauda*	25.00	Kohima
4	IN424	Mount Paona	A1, A2	*Tragopan blythii, Aceros nipalensis*	30.00	Peren
5	IN425	Mount Zanibu	A1, A2	*Tragopan blythii, Syrmaticus humiae, Columba punicea, Aceros nipalensis*	40.00	Phek
6	IN426	Mount Ziphu	A1, A2	*Tragopan blythii, Syrmaticus humiae, Gallinago nemoricola, Aceros nipalensis*	50.00	Phek
7	IN427	Pfutsero-Chizami	A1, A2	*Tragopan blythii, Syrmaticus humiae*	70.00	Phek
8	IN428	Puliebadze-Dzukou-Zapfu	A1, A2	*Tragopan blythii, Apus acuticauda*	109.23	Kohima
9	IN429	Satoi Range	A1, A2	*Tragopan blythii, Syrmaticus humiae, Aceros nipalensis*	50.00	Kiphire

Source: http://www.birdlife.org/datazone/country/india. Checked on 2020-04-24
http://wiienvis.nic.in/Database/IBA_8463.aspx Checked on 2020-04-24

International Bird Areas are achieved through the application of quantitative ornithological criteria, grounded in up-to-date knowledge of the sizes and trends of bird populations. The Global criteria are as follows:

A1. Globally threatened species

Criterion: The site is known or thought regularly to hold significant numbers of a globally threatened species, or other species of global conservation concern.

A2. Restricted-range species

Criterion: The site is known or thought to hold a significant component of a group of species whose breeding distributions define an Endemic Bird Area (EBA) or Secondary Area (SA).

A3. Biome-restricted species

Criterion: The site is known or thought to hold a significant component of the group of species whose distributions are largely or wholly confined to one biome.

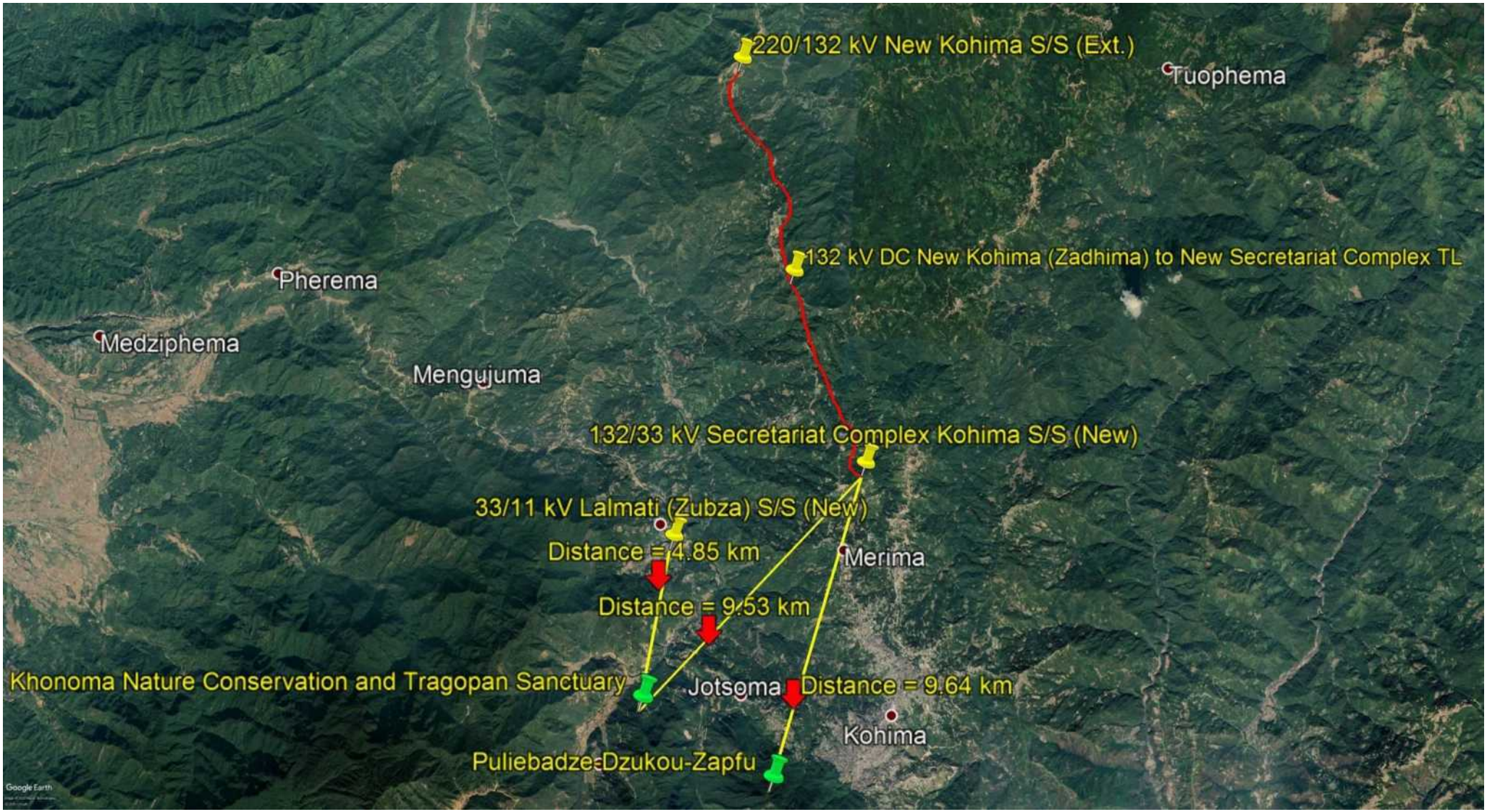


Figure 2.12: Distance of IBAs in Kohima District w.r.t. to Sub-Projects

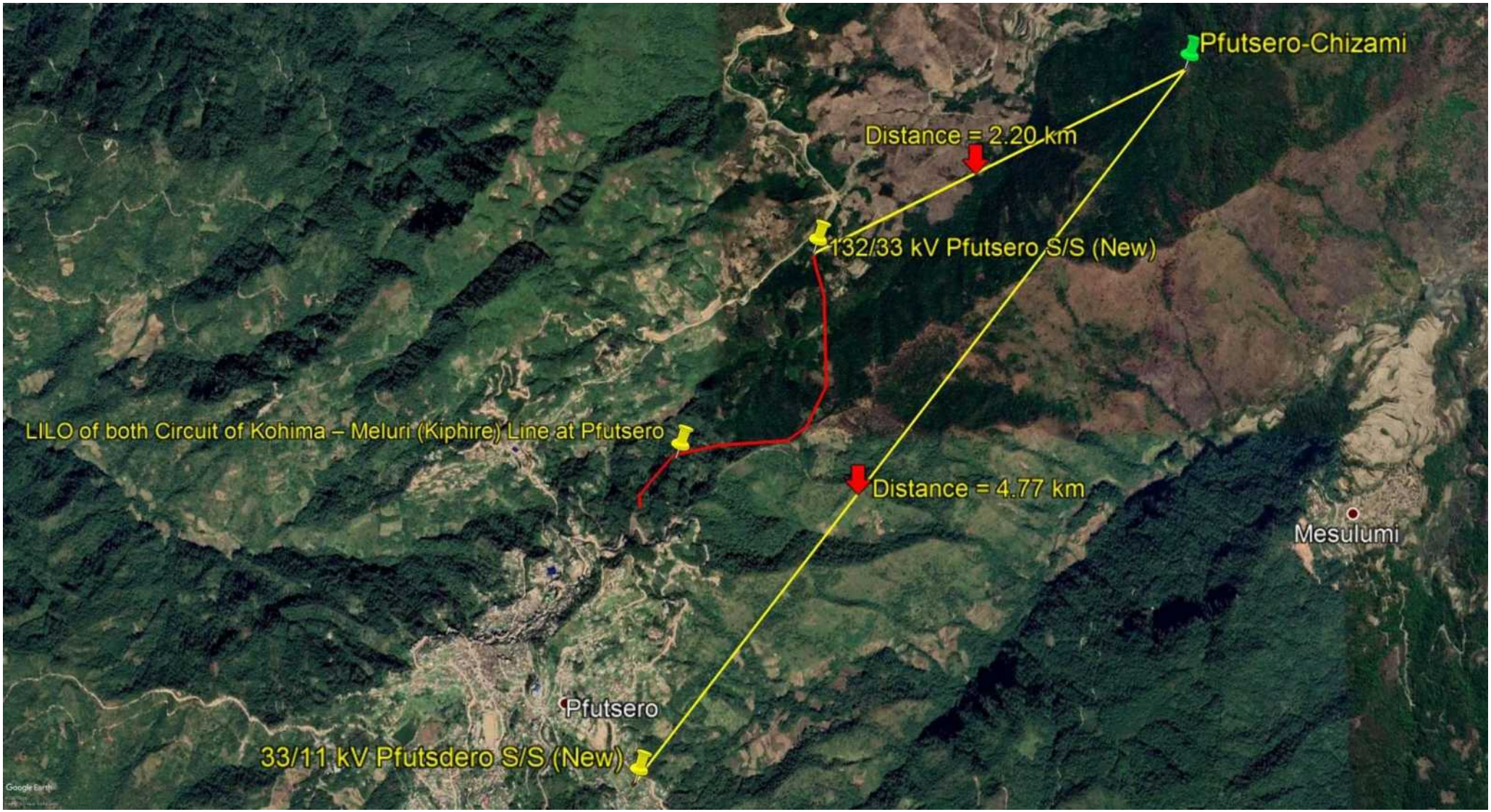


Figure 2.13: Distance of Sub-Projects in Phek District w.r.t. to Nearest IBA

2.3.7 Wetland

As per the National Wetland Atlas of India, the estimated wetland area of the state is 21544 ha area, which is 1.3% of total geographic area of the state. It includes 267 small wetlands (<2.25 ha) also. Total number of wetlands present in the State is 421, however, none of the wetlands is in the Ramsar list. Doyang Lake, Chathe Reservoir, Shilloi Lake and parts of Tizu river are important wetlands of the State. River/Stream is the single most dominant wetland type of the state with 89.37% contribution. Among, other wetland types, reservoir/barrage is the major one. Two reservoirs are mapped with 1547 ha area (7.18%). Only one natural lake/pond is mapped with 3 ha area. Wetland map of the state is shown in **Figure 2.14**.

In the project districts, the estimated 15371 ha, which is 1.4% of total geographic area of the project districts. It includes 232 small wetlands also. District wise area of wetlands (type-wise) in project district is given in **Table 2.17.**

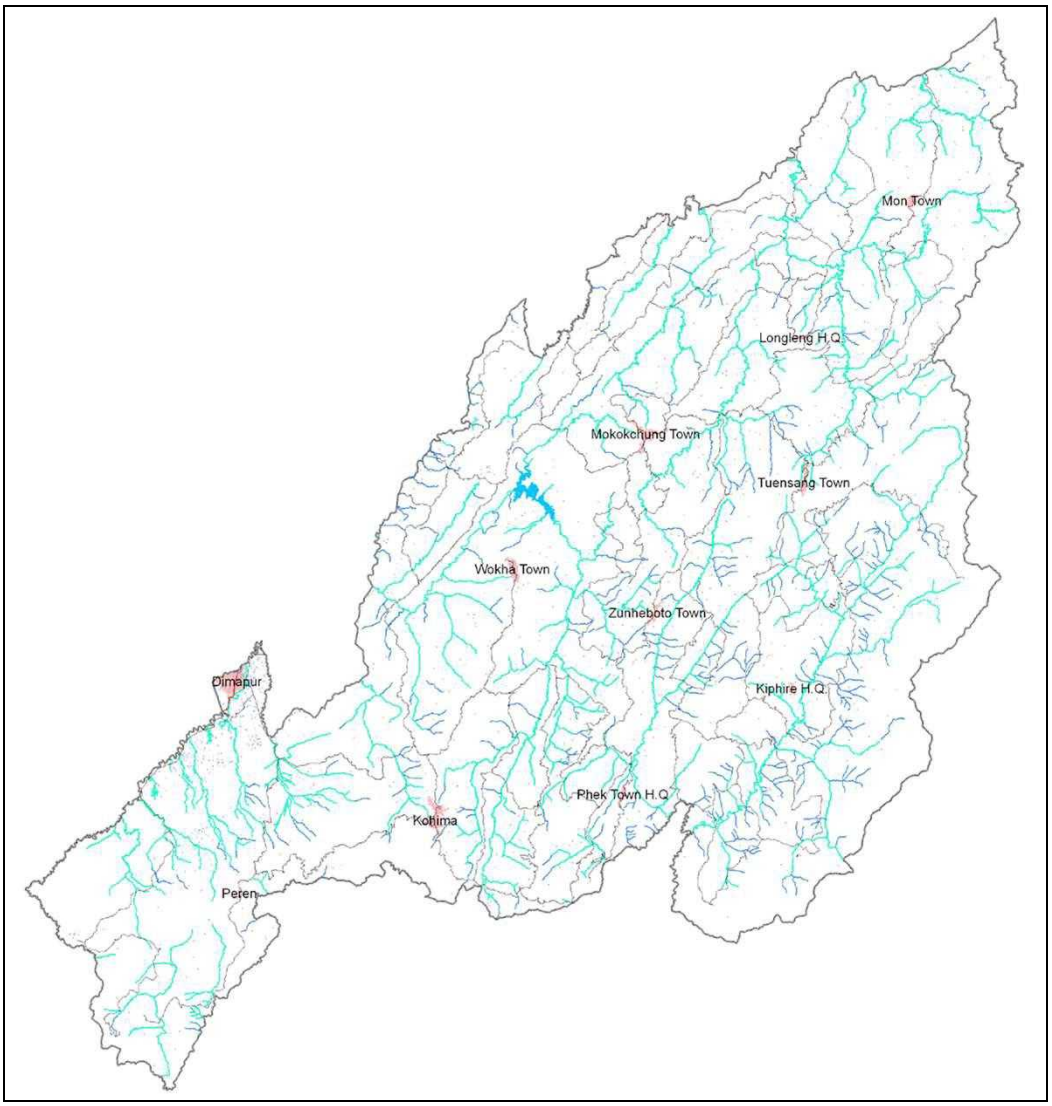


Figure 2.14: Wetland Area Map of Nagaland

Table 2.20: District Wise Area of Wetlands (Type-Wise) in Project Districts

S. No.	Name of District	Geographical Area (sq km)	Wetland Type Area (ha)						Sub Total (ha)	Wetlands (<2.25 ha)	Total (ha)
			Lake/ pond	Ox-bow lake/ Cut-off meander	Waterlogged (Natural)	River/ Stream	Reservoir / Barrage	Tank/ Pond			
1	Dimapur	927		3	334	1494	11	41	1883	130	**2013**
2	Kohima	1463	3			1161			1164	9	**1173**
3	Mokokchung	1615			20	1713			1733	14	**1747**
4	Mon	1786		6	6	2792			2804	16	**2820**
5	Phek	2026			15	2394			2409	5	**2414**
6	Wokha	1628			32	1336	1536		2904	42	**2946**
7	Zunheboto	1255				2242			2242	16	**2258**
	TOTAL	**10700**	**3**	**9**	**407**	**13132**	**1547**	**41**	**15139**	**232**	**15371**

2.4 SOCIO-ECONOMIC ENVIRONMENT

For sustainable development, it is important to understand social and economic conditions of the community in the region, impacts of development on the community, measures to mitigate negative impacts and enhance the positive impacts. For new development initiatives, socio economic assessment plays an important role to ensure community participation and their acceptance of the development activity. It also helps in planning the activities for local area development.

Nagaland has a high literacy rate of 80.1 per cent. Majority of the population in the state speaks English, which is the official language of the state. The state offers technical and medical education. Nevertheless, agriculture and forestry contribute majority of Nagaland's Gross Domestic Product. Most of state's population, about 68 per cent of the total, depends on rural cultivation. The main crops of the state are rice, millet, maize, and pulses. Cash crops, like sugarcane and potato, are also grown in some parts. Plantation crops such as premium coffee, cardamom, and tea are grown in hilly areas in small quantities, but a large growth potential. Most people cultivate rice as it is the main staple diet of the people. About 80% of the cropped area is dedicated to rice. Oil seeds is another, higher income crop gaining ground in Nagaland. The farm productivity for all crops is low, compared to other Indian states, suggesting significant opportunity for farmer income increase. Currently the Jhum to Terraced cultivation ratio is 4:3; where Jhum is local name for cut-and-burn shift farming. Jhum farming is ancient, causes a lot of pollution and soil damage, yet accounts for majority of farmed area. The state does not produce enough food and depends on trade of food from others states of India. Forestry is also an important source of income. Cottage industries such as weaving, woodwork, and pottery are also an important source of revenue. Tourism has a lot of potential, but largely limited due to insurgency and concern of violence over the last five decades. Nagaland's gross state domestic product for 2004 is estimated at $1.4 billion in current prices.

Dimapur is one of the main commercial hubs of Nagaland and is referred as Gateway to Nagaland and Manipur. According to 2011 census, the district has a population of 378,811 with a population density of 409 per sq. km. The sex ratio of the district is 919 females for 1000 males. 59.1% of the total district population is schedule tribe (**Table 2.21**). The district enjoys a good literacy rate of around 84.8% (**Table 2.22**). Total working population of the district is 40%, of which 81% are main workers and 19% are marginal workers (**Table 2.23**). Of the main workers, 17% are cultivators, 4% are agricultural labour, 2%

are household worker and the rest 77% are 'other workers' (**Table 2.24**). The agriculture in the district is Terrace Rice Cultivation (TRC), rain fed and traditional. By and large mono cropping is practiced in the district. The TRC paddy alone covers an area of 32,900 ha where as Jhum covers about 7,800 ha. The second important crop in the district is Maize, which covers about 2500 ha. Important Pulses such as pea, lentil, black gram, beans, green gram, pigeon pea and oilseeds such as groundnut, soybean, sesame, sunflower, mustard, linseed, etc. are also grown in the district. Commercially viable crops such as sugarcane, ginger, jute, turmeric, tea, potato etc. are also grown in the district covering an area of 1,580 ha. Number of registered industrial units belonging to MSE sectors is 575, while registered industrial units belonging to Medium and large scale is 12.

The main indigenous inhabitants of **Kohima** District are the Angami Nagas and the Rengma Nagas. But Kohima being the capital city, has a cosmopolitan appearance. As of 2011 Census, Kohima district has a population of 267,988. Out of this, male population numbers 138,966 while females' numbers 129,022. Population density of the district is 213 per sq. km. The sex ratio of the district is 928 females for 1000 males (**Table 2.21**). Kohima has an average literacy rate of 85.2%, higher tha'n the national average of 74.04%: male literacy is 88.7% and female literacy is 81.5% (**Table 2.22**). Total working population of the district is 43%, of which 87% are main workers and 13% are marginal workers (**Table 2.23**). Of the main workers, 38% are cultivators, 1% are agricultural labour, 1% are household worker and the rest 60% are other workers' (**Table 2.24**). Though some minerals like sand, sandstone, boulder stone etc. have been reported from the district, there are no Public Sector or large-scale Industries are in the district. Total number of registered industrial units in the district is 204, which are micro enterprises.

Mokokchung is the cultural center of the Ao people and is economically and politically the most important urban center in Northern Nagaland. According to the 2011 census, Mokokchung district has a population of 194,622 and a sex ratio of 925 females for every 1000 males (**Table 2.21**). The district enjoys a high literacy rate of 91.6% (**Table 2.22**). Total working population of the district is 59%, of which 71% are main workers and 29% are marginal workers (**Table 2.23**). Of the main workers, 52% are cultivators, 6% are agricultural labour, 2% are household worker and the rest 40% are 'other workers' (**Table 2.24**). Agriculture is the main source of livelihood in the district with a total cultivable area of 18433 Ha. Rice, Tuber, Maize, Soybean and Mustard the main crops while Tea and Orange are the main cash crops. Total number of registered Industrial units in the district is 95, while number of medium and large industrial units is 6.

Mon district's main inhabitants belong to Konyak tribe of Nagas. According to 2011 census, the total population of the district is 250,260, with a population density of 140. The sex ratio of the district is 899 females for 1000 males (**Table 2.21**). The district has a literacy rate of 57.0%, which is lower than the corresponding National figure (**Table 2.22**). Total working population of the district is 51%, of which 81% are main workers and 19% are marginal workers (**Table 2.23**). Of the main workers, 80% are cultivators, 4% are agricultural labour, 1% are household worker and the rest 15% are 'other workers' (**Table 2.24**). The economic condition of the people lags behind when compared to the living conditions of the people of other districts in Nagaland. As it is in the remotest part of Nagaland, its economic development has not been satisfactory. The recent trend in the District is tea-cultivation by the local people. The gentle slopes of Mon provide ample scope for developing the Mon District for the cultivation with all modern techniques. Only 121 registered small-scale industries are present in the district.

Phek district is the home to Chakhesangs and Pochurys tribes of Nagas. The district has a population of 163,418 with a population density of 81 people/sq km. Phek has a sex ratio of 951 females for every 1000 males **(Table 2.21)** and a literacy rate of 78.1% **(Table 2.22)**. Total working population of the district is 49%, of which 79% are main workers and 21% are marginal workers (**Table 2.23**). Of the main workers, 69% are cultivators, 2% are agricultural labour, 1% are household worker and the rest 28% are 'other workers' (**Table 2.24**). TRC is widely practiced. Besides agriculture, some allied activities like salt making, weaving, bamboo and wood carving and fruit juice making also give employment to a part of the population. Total number of registered industrial units in the district is 22, while there is only one registered medium and large-scale industrial unit.

Wokha district is primarily inhabited by Lothas tribe of Nagas. Total population of the district is 166,343 with a population density of 103 people/sq km. The sex ratio of the district is 968 females per 1000 males (**Table 2.21**). The district enjoys a high literacy rate of 87.7% (**Table 2.22**). Total working population of the district is 47%, of which 81% are main workers and 19% are marginal workers (**Table 2.23**). Of the main workers, 66% are cultivators, 4% are agricultural labour, 1% are household worker and the rest 29% are 'other workers' (**Table 2.24**). Cultivation is one of the main occupations of the people of this district. Jhum type of cultivation is widely practiced. The other form of cultivation is terrace, which is done in a small area. But as a result of Govt. efforts, the area under terrace is increasing. Number of registered industrial units in the district is 250, all of which are

small scale industries. Weaving, Poultry, Blacksmith, Carpentry and handicrafts are the main cottage industries of the district.

Zunheboto district is the home of the Sumi Nagas. According to the 2011 census Zunheboto district has a population of 140,757 with a sex ratio of 976 females for every 1000 males **(Table 2.21)**. The district has a healthy literacy rate of 85.3% **(Table 2.22)**. Total working population of the district is 57%, of which 62% are main workers and 38% are marginal workers (**Table 2.23**). Of the main workers, 62% are cultivators, 4% are agricultural labour, 1% are household worker and the rest 33% are 'other workers' (**Table 2.24**). Agriculture is the main stay of people's livelihood. Both Jhum and Terrace cultivation are practiced. Paddy, millet, maize, taro, French bean, potato, pumpkin, cucumber, chilly and several varieties of gourd are mainly grown. Total number of registered industrial units in the state is 95, all of which are small scale industries.

Table 2.21: Demographic Profile of Project Districts

Districts	No. of Household	Population			Sex Ratio	Scheduled Caste			Scheduled Tribe			
		Total	Male	Female		Total	Male	Female	Total	Male	Female	%
1	2	3	4	5	6 = (5/4*1000)	7	8	9	10	11	12	13 = (10/3*100)
Dimapur	78,605	378,811	197,394	181,417	919	0	0	0	223989	110892	113097	59.1
Kohima	54,391	267,988	138,966	129,022	928	0	0	0	224738	110617	114121	83.9
Mokokchung	42,690	194,622	101,092	93,530	925	0	0	0	178431	90567	87864	91.7
Mon	41,978	250,260	131,753	118,507	899	0	0	0	238285	124343	113942	95.2
Phek	36,639	163,418	83,743	79,675	951	0	0	0	157146	79536	77610	96.2
Wokha	31,891	166,343	84,505	81,838	968	0	0	0	156621	78816	77805	94.2
Zunheboto	27,835	140,757	71,217	69,540	976	0	0	0	136561	68071	68490	97.0
TOTAL	**314,029**	**1,562,199**	**808,670**	**753,529**	**932**	**0**	**0**	**0**	**1,315,771**	**662,842**	**652,929**	**84.2**

Source: Census of India, 2011

Table 2.22: Literacy Profile of Project Districts

Districts	Total population			Population (above 6 years)			Literate (Number)			Literate Rate (%)		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
1	2	3	4	5	6	7	8	9	10	11 = (8/5*100)	12 = (9/6*100)	13 = (10/7*100)
Dimapur	378,811	197,394	181,417	327,913	171,505	156,408	278,037	150,142	127,895	84.8	87.5	81.8
Kohima	267,988	138,966	129,022	231,702	120,687	111,015	197,489	107,038	90,451	85.2	88.7	81.5
Mokokchung	194,622	101,092	93,530	174086	90558	83528	159494	83479	76015	91.6	92.2	91.0
Mon	250,260	131,753	118,507	209,918	110,654	99,264	119,626	67,432	52,194	57.0	60.9	52.6
Phek	163,418	83,743	79,675	135666	69238	66428	105893	57926	47967	78.1	83.7	72.2
Wokha	166,343	84,505	81,838	146205	74207	71998	128208	67385	60823	87.7	90.8	84.5
Zunheboto	140,757	71,217	69,540	120664	60901	59763	102881	53504	49377	85.3	87.9	82.6
TOTAL	**1,562,199**	**808,670**	**753,529**	**1,346,154**	**697,750**	**648,404**	**1,091,628**	**586,906**	**504,722**	**81.1**	**84.1**	**77.8**

Source: Census of India, 2011

Table 2.23: Occupational Pattern of Project Districts

District	Total Population	Working Population												Non-Worker			
		Total Worker				Main Worker				Marginal Worker							
		Total	Male	Female	%*	Total	Male	Female	%**	Total	Male	Female	%***	Total	Male	Female	%****
Dimapur	378,811	151350	99645	51705	40.0	122358	88055	34303	80.8	28992	11590	17402	19.2	227461	97749	129712	60.0
Kohima	267,988	114825	68140	46685	42.8	99408	60839	38569	86.6	15417	7301	8116	13.4	153163	70826	82337	57.2
Mokokchung	194622	100067	57084	42983	59.0	81046	48355	32691	71.1	19021	8729	10292	28.9	94555	44008	50547	41.0
Mon	250260	147654	79425	68229	51.4	104981	58695	46286	81.0	42673	20730	21943	19.0	102606	52328	50278	48.6
Phek	163418	80277	41556	38721	49.1	63645	34382	29263	79.3	16632	7174	9458	20.7	83141	42187	40954	50.9
Wokha	166343	78412	42096	36316	47.1	63512	35692	27820	81.0	14900	6404	8496	19.0	87931	42409	45522	52.9
Zunheboto	140757	79466	41178	38288	56.5	49382	27876	21506	62.1	30084	13302	16782	37.9	61291	30039	31252	43.5
TOTAL	**1,562,199**	**752,051**	**429,124**	**322,927**	**48.1**	**584,332**	**353,894**	**230,438**	**77.7**	**167,719**	**75,230**	**92,489**	**22.3**	**810,148**	**379,546**	**430,602**	**51.9**

Source: Census of India, 2011

*Note: *Total Worker% = Total Worker/ Total Population x 100, **Main Worker% = Main Worker/ Total Worker x 100, *** Marginal Worker% = Marginal Worker/ Total Worker x 100, **** Non-Worker% = Non-Worker/ Total Population x 100*

Table 2.24: Main Worker Profile of Project Districts

Districts	Main Worker	Cultivators				Agricultural Labour				Household Industry Worker				Other Workers			
		Total	Male	Female	%*	Total	Male	Female	%**	Total	Male	Female	%***	Total	Male	Female	%****
Dimapur	122358	20591	12140	8451	16.8	4506	2743	1763	3.7	2338	1190	1148	1.9	94923	71982	22941	77.6
Kohima	99408	38017	16525	21492	38.2	911	507	404	0.9	1131	622	509	1.1	59349	43185	16164	59.7
Mokokchung	81046	42236	21940	20296	52.1	4863	3013	1850	6.0	1939	777	1162	2.4	32008	22625	9383	39.5
Mon	104981	84402	43463	40939	80.4	3947	2111	1836	3.8	609	370	239	0.6	16023	12751	3272	15.3
Phek	63645	44069	19982	24087	69.2	1311	692	619	2.1	609	303	306	1.0	17656	13405	4251	27.7
Wokha	63512	41862	20233	21629	65.9	2375	1298	1077	3.7	874	409	465	1.4	18401	13752	4649	29.0
Zunheboto	49382	30738	14787	15951	62.2	1763	858	905	3.6	613	308	305	1.2	16268	11923	4345	32.9
	584332	**301915**	**149070**	**152845**	**51.7**	**19676**	**11222**	**8454**	**3.4**	**8113**	**3979**	**4134**	**1.4**	**254628**	**189623**	**65005**	**43.6**

Source: Census of India, 2011

*Note: *Total Cultivator% = Total Cultivator/ Main Worker x 100, **Total Agricultural Labour% = Total Agricultural Labour/ Main Worker x 100, ***Household Industry Worker% = Total Household Industry Worker/ Main Worker x 100, **** Total Other Workers% = Total Other Workers/ Main Worker x 100*

Chapter 3 POLICY, LEGAL AND REGULATORY FRAMEWORK

3.1 INTRODUCTION

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. DPN, IA and contractors are undertaking 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 World Bank's Operational Policies.

3.2 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* provides:

"The State shall endeavor 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 guarantees fundamental right to life – a life of dignity to be lived in a proper environment, free of danger or disease or infection. Recently, Supreme Court has broadly and liberally interpreted the Article 21, transgressing into the area of protection of environment, and held that the citizen's right to live in an eco-friendly atmosphere is to be interpreted as the basic right guaranteed under Article 21.

Thus, the Indian Constitution now has a two folds 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 the natural environment.

Article 371 A Provides special provision with respect to state of Nagaland which states "no act of parliament in respect of religious and social practices of the Naga, Naga customary laws and procedures, administration of civil and criminal justices involving decisions according to Naga customary law and ownership and transfer of land and its resources shall apply to the state of Nagaland, unless Legislative Assembly of the state, by a resolution, so decides".

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.

3.3 ENVIRONMENTAL PROVISIONS

Environmental issues of T&D projects are manageable given the inherently small 'foot print' of towers and flexibility in siting facilities within a relatively large host area and are mostly localized to RoW. However, transmission line project may have some adverse effects on natural resources. These impacts can be minimized by careful route selection and siting of substations. The applicable acts, rules, and relevant policies in the context of the project and its status of compliance are presented in **Table 3.1**.

3.4 SOCIAL PROVISIONS

The applicable acts, rules, and relevant policies in the context of the project and its status of compliance are presented in **Table 3.2**.

Table 3.1: Environmental Provisions

S. No.	Acts, Notifications and Policies	Relevance	Applicability to the project	Status of Compliance
1.	Electricity Act, 2003	To consolidate the laws relating to generation, transmission, distribution, trading and use of electricity. Under the provisions of Section 68(1):- Prior approval of the Govt. of Nagaland (GoN) is a mandatory requirement to undertake any new transmission project 66kV upward and for distribution project of 33kV system in the State.	Applicable - Transmission line projects are constructed under the ambit of Electricity Act, 2003 following the provisions of Section 67 & 68 of act.	Complied with: MoP, GoI approved the NERPSIP comprehensive scheme for six North Eastern States including Nagaland under vide its Office Memorandum dated 1st December 2014.
2.	Forest (Conservation) Act, 1980	To protect and conserve Forest Areas and Tree Cover. Any transmission/ distribution line traverses forest land, prior clearance is mandatorily required from Ministry of Environment, Forest & Climate Change (MoEFCC), GoI under the Forest (Conservation) Act, 1980. Government of Nagaland vide its Notification No. FOR-58/82 dated 03-07-1986 has extended the application of this Act to forest lands under the control of Forest Department. Natural forest under control of private individuals or community is not under the preview of the Act.	Not Applicable - No notified forest area is involved in any of the line routes or substations location.	Not Required
3.	Environment (Protection) Act, 1986	To protect and improve the overall environment. It is umbrella legislation for the protection and improvement of environment.	Applicable – Though some limited compliance measures notified under this EPA, 1986 are to be adhered to relevant rules and regulations under the EPA, 1986 applicable to the operations of DPN.	Complied with: Though applicable as it is umbrella legislation, however, as such statutory permission/ license is not required.

S. No.	Acts, Notifications and Policies	Relevance	Applicability to the project	Status of Compliance
i)	Ozone Depleting Substances (Regulation and Control) Rules, 2000	Regulate and control manufacturing, import, export and use of Ozone Depleting Substances under Montreal Protocol adopted on 16th September 1987	Applicable - As per the notification, certain control and regulation has been imposed on manufacturing, import, export, and use of these compounds.	Complied with: Only CFC free equipments are being procured/ specified in tender document
ii)	Batteries (Management and Handling) Rules, 2001	Provides certain restriction on disposal of used batteries and its handling and to file half yearly return in prescribed form to the concerned State Pollution Control Board.	Applicable during operation phase only – Used batteries to be disposed to dealers, manufacturer, registered recycler, reconditioners or at the designated collection centers only. A half-yearly return to be filed as per Form-8 to the Nagaland State Pollution Control Board	Batteries are used during operation phase. Hence, the issue of proper handling and disposal of batteries as per rules not an issue during construction stage.
iii)	Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008	To ensure that the hazardous wastes are managed in a manner which shall protect the health and the environment against the adverse effects that may result from such waste. The used transformer oil has been declared as a hazardous waste vide this notification.	Applicable – Requires proper handling, storage and disposed only to authorized disposal facility (registered recyclers/ reprocessors). In case it is decided to outsource the process of recycle of used oil to registered recycler as per the provisions of notification then DPN shall submit the desired return in prescribed form to concerned State Pollution Control Board at the time of disposal of used oil.	Generally Used oil is generated after 10-15 years of operation of transformers and hence the issues of handling and disposals of hazardous transformer oil is not an issue at this stage.
iv)	E-waste (Management and Handling) Rules, 2011	To ensure that e-waste is 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. It is the responsibility of the bulk consumer to ensure that e-waste generated is	Applicable – To dispose e-waste generated in environmentally sound manner by channelizing to authorized collection centres/ registered dismantler/ recyclers/ return to producers. DPN, being a bulk consumer of electrical and electronics equipment's shall maintain record as per	E-waste disposal is not an issue during construction phase.

S. No.	Acts, Notifications and Policies	Relevance	Applicability to the project	Status of Compliance
		channelized to authorized collection centre(s) or registered dismantler(s) or recycler(s) or is returned to the pick-up of take back services provided by the producer.	Form-2 for scrutiny by State Pollution Control Board.	
4.	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. All restrictions applicable to protected areas like National Park & Sanctuaries are also applicable to these reserves.	Not Applicable - The present project does not involve any biosphere reserves.	Not Required
5.	The Nagaland Tree Felling Regulation, 2002	It deals with felling of trees from non-forest and registered plantation areas. Felling of trees for construction of transmission lines would be governed under this Act wherever it is applicable.	Applicable	
6.	The Scheduled Tribes & Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006	When transmission projects pass through forest land, NOC from DC has to be obtained before Stage-II approval in compliance to FRA Act as per MoEF&CC circular dated 5th February 2013	Not Applicable - No forest clearance is involved.	Not Required
7.	Ancient Monuments & Archaeological Sites and Remains Act, 1958	To prevent damage to archaeological sites and its maintenance. It also places restriction on activities which can cause harm to the monument /property. The law is however applicable only in monuments identified by the Archaeological Survey of India.	Not Applicable - All such areas have been completely avoided.	Not Required

Table 3.2: Social Provisions

S. No.	Acts, Notifications and Policies	Relevance	Applicability to the project	Status of Compliance
1.	The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013	Act ensures appropriate identification of the affected families/ households, fair compensation and rehabilitation of titleholders and non-titleholders. The Act authorizes State Govt. (i.e. GoN) 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 DPN responsibility is limited to identification and selection of suitable land based on technical requirement and ensuring budget allocation.	Not Applicable – Till the state legislative Assembly adopts a resolution in this regard, as per the provision of Article 371 A of the Constitution of India.	Not Required
2.	Rights of Way (RoW) and Compensation	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.	Applicable - DPN may seek for GoN authorization 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.	Complied with: Implementing Agency has already been vested with powers of telegraph authority by GoI vide Gazette Notification dated Dec.24, 2003. However, compensation for all damages are being paid to the individual land owner as per the provision of Section-10 (d) of Indian Telegraph Act, 1885

S. No.	Acts, Notifications and Policies	Relevance	Applicability to the project	Status of Compliance
3.	The Right to Information Act, 2005	To provide for setting out the practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, the constitution of a Central Information Commission and State Information Commissions and for matters connected therewith or incidental thereto.	Applicable - Designated authorities to be in place.	Complied with: Designated authorities are already in place in DPN.
4.	Indian Treasure Trove Act, 1878 as amended in 1949	To provide for procedures to be followed in case of finding of any treasure, archaeological artifacts etc. during excavation.	Not Applicable - No such instances reported.	Not Required

3.5 WORLD BANK OPERATIONAL POLICY

When World Bank provide governments with financing to invest in projects such as building a road, connecting people to electricity, or treating waste water, World Bank we aim to ensure that the people and the environment are protected from potential adverse impacts. World Bank do this through policies that identify, avoid, and minimize harm to people and the environment. These policies require the borrowing governments to address certain environmental and social risks in order to receive World Bank support for investment projects. The mandatory environment and social requirements with respect to World Bank Operational Policies are presented in **Table 3.3**.

3.6 STATUTORY PERMISSION/LICENSES/NOC OBTAINED

The applicability of acts, notifications and policies have already been described in above paragraphs and table. As per the applicability, necessary permission/ licenses/ NOC so far obtained by IA or contractor are:

- Under the provisions of Section 68(1) of Electricity Act, 2003, prior approval GoN is a mandatory requirement to undertake any new transmission project 66kV upward and for distribution project of 33kV system in the State. As a part of permission/ approval, GoI approved the NERPSIP comprehensive scheme for six North Eastern States including Nagaland under vide its Office Memorandum dated 1st December 2014. In addition, Implementation/ Participation agreement between DoP and PGCIL has been signed on 26th March, 2015.

- All the contractors are operating with valid labor license as per provision under section – 12(1) of the Contract Labour (Regulation & Abolition) Act, 1970 and also certified under Section- 7(3) of the Building and Other Construction Workers (Regulation of Employment and Condition of Service) Act, 1996 from Ministry of Labour & Employment.

- All the contractors have obtained requisite insurance policy as per provisions of Employee Compensation Act, 1923 for its employed workforce.

- Since the tower locations are coming under various villages of 6 districts, No Objection Certificates (NoC) from concerned land owner/ Headman /Village Council are being obtained as per the progress of work.

Table 3.3: World Bank Operational Policy

S. No.	Acts, Notifications and Policies	Relevance	Applicability to the project	Status of Compliance
1.	OP- 4.01: Environmental Assessment	To ensure the environmental and social and sustainability of investment projects. Support integration of environmental and social aspects of projects in the decision-making process.	Applicable - E & S aspects of the project have already been integrated into management procedures based on comprehensive environment assessment undertaken by IA.	Complied with: E & S aspects of the project have already been integrated into management procedures based on comprehensive environment assessment undertaken by IA during 2015.
2.	OP- 4.04: Natural Habitats	To promote and supports natural habitat conservation and improved land use to integrate into national and regional development the conservation of natural habitats and the maintenance of ecological functions. Furthermore, to promote the rehabilitation of degraded natural habitats.	Not Applicable - The present project does not involve any natural habitats such as biodiversity area, protected area, sacred groves etc. However, NoC from village councils (Head man, Gram Burrah) and land owners are being obtained in this regard.	Not Required
3.	OP-4.11: Physical Cultural Resources (PCR)	To preserve PCR and in avoiding their destruction or damage. PCR includes resources of archaeological, paleontological, historical, architectural, and religious (including graveyards and burial sites), aesthetic, or other cultural significance.	Not Applicable - The Present project does not encroach upon any such resources.	Not Required
4.	OP-4.36: Forests	To harness 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	Applicable – Though all line routes and substation locations successfully avoided encroachment into any Protected and Reserve forests. However, line routes pass through community and private forests. To minimise adverse impact on forests, management measure already provided in DPN's ESPPF	Complied with: To minimise adverse impact on forests, management measure already provided in DPN's ESPPF of June, 2015
5.	WB EHS Guidelines for Electric Power Transmission and Distribution	The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice. The EHS	Applicable - EHS guidelines are being followed during project implementation.	Complied with: EHS guidelines are being followed during project implementation.

S. No.	Acts, Notifications and Policies	Relevance	Applicability to the project	Status of Compliance
		Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs.		
6.	OP 4.12 – Involuntary Resettlement	Covers direct economic and social impacts both resulting from Bank-assisted 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.	Not Applicable - As no involuntary acquisition invoked for securing land for proposed substations. However, fresh land required for construction of 132/33 kV substation at Longnak, 132/33 kV substation at Pfutsero, 132/33 kV substation at Zunheboto and 33/11 kV substations at Padampukhri were secured through direct Purchase on Willing Buyer Willing Seller basis on negotiated rate	Not Required.
7.	OP 4.10 – Indigenous Peoples	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.	Explicit consent from ADC and the Village Councils is required in the case of acquisition of lands which is not applicable in instant project. However, NoC of from village councils (Head man, Gram Burrah) and land owners obtained for community forest land/ADC area wherever applicable.	Complied with: NoC of from village councils (Head man, Gram Burrah) and land owners being obtained for community forest land/ADC area wherever applicable.

Chapter 4 MAJOR FEATURES OF FINAL ROUTE & ENVIRONMENT IMPACT

4.1 INTRODUCTION

Environmental impact of transmission and distribution (T&D) line projects are not far reaching and are mostly localized to RoW. However, T&D project has some effects on natural and socio-culture resources. These impacts can be minimized by careful route selection. To minimize these possible impacts, DPN & IA at the system planning stage itself try to avoid ecological sensitive areas like forest. Wherever such infringements are substantial, different alternative options are considered to select most viable route alignment. For further optimization of route modern survey techniques/tools like GIS, GPS aerial photography is 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 mitigate measures including engineering variations depending upon the site situation/location. The route/site selection criteria followed is detailed below in the ensuing paragraphs.

4.2 ENVIRONMENTAL CRITERIA FOR ROUTE SELECTION

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

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

In order to achieve this, DPN undertook route selection for individual transmission & distribution lines in close consultation with representatives of concerned Forest Department and the Department of Revenue. Although under National law, DPN has the 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.

- As a rule, alignments are generally cited away from major towns, whenever possible, to account for future urban expansion (refer **Figure 4.1 to Figure 4.13** and **Map 1** to **Map 6** for final route of all T&D network).
- 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 etc. and Google Maps to arrive at the most optimum route, which can be taken up for detailed survey and assessment of environmental & social impacts for their proper management.

Similarly, the TOR for detailed survey using modern tool like GIS/GPS also contained parameters to avoid/reduce environmental impact while deciding the final route alignment. The major objectives for detailed survey that are part of contract are summarized below:

(i) The alignment of transmission line shall be most economical from the point of view of construction and maintenance.

(ii) Routing of transmission line through protected and reserved forest area should be avoided. In case it is not possible to avoid the forest or areas having large trees completely then keeping in view of the overall economy, the route should be aligned in such a way that cutting of trees is minimum.

(iii) The route should have minimum crossing of major rivers, railway lines, and national/state highways, overhead EHP power lines and communication lines.

(iv) The number of angle point shall be kept to a minimum.

(v) The distance between the terminal points specified shall be kept shortest possible, consistent with the terrain that is encountered.

(vi) Marshy and low line areas, river beds and earth slip zones shall be avoided to minimum risk to the foundations.

(vii) It would be preferable to utilize level ground for the alignment.

(viii) Crossing of power line shall be minimal. Alignment will be kept at a minimum distance of 300 meters from power lines to avoid induction problems on the lower voltage lines.

(ix) Crossings of communication lines shall be minimized and it shall be preferably at right angle, proximity and paralyses with telecom lines shall be eliminated to avoid danger of induction to them.

(x) Area subjected to flooding searches streams shall be avoided.

(xi) Restricted areas such as civil and military airfield shall be avoided. Care shall also be taken to avoid the aircraft landing approaches.

(xii) All alignment should be easily accessible both in dry and rainy seasons to enable maintenance throughout the year.

(xiii) Certain areas such as query sites, tea, tobacco and saffron fields and rich plantation, gardens and nurseries that will present the owner problems in of right of way and leave clearance during construction and maintenance should be avoided.

(xiv) Angle point should be selected such that shifting of the point within 100 m radius is possible at the time of construction of the line.

(xv) The line routing should avoid large habitation densely populated areas to the extent possible.

(xvi) The area requires special foundations and those prone to flooding should be avoided.

(xvii) For examination of the alternatives and identification of the most appropriate route, besides making use of information/data/details available/extracted through survey of India topographical maps and computer aided processing of NRSA satellite imagery, the contractor shall also carry out reconnaissance/preliminary survey as may be required for the verification and collection of additional information/data/details.

(xviii) The contractor shall submit his preliminary observation and suggestion along with various information/data/details collected and also processed satellite imagery data, topographical map data marked with alternative routes etc. The final evaluation of the alternative routes

shall be conducted by the contractor in consultation with owners' representatives and optimal route alignment shall be proposed by the contractor. Digital terrain modeling using contour data from topographical maps as well as processed satellite data shall be done by the contractor for the selected route. A flythrough perspective using suitable software(s) shall be developed or further refinement of the selected route. If required site visit and field verification shall be conducted by the contractor jointly with the owners' representatives for the proposed route alignment.

(xix) Final digitized route alignment drawing with the latest topographical and other details/features including all river railway lines, canals, roads etc. up to 8 Kms on both side of selected route alignment shall be submitted by the contractors for owner's approval along with report containing other information / details as mentioned above.

In the instant project also, criteria for route selection as mentioned above, has been duly adhered to and the proposed 220 kV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha Transmission Line and 132 kV S/C (On D/C Tower) Wokha-Zunheboto-Mokokchung (State) Transmission Line routes have been selected from analysis of three (03) alternatives routes as described in the IEAR. Subsequently, the proposed routes were considered for detail survey by Contractor Agency (after awarding of contract). During detailed survey minor alterations as well as geometrical corrections of the route have been carried out which seems inevitable due to actual ground conditions with prime objective of avoiding dense forest/private plantation areas, settlements, Common Property Resource (CPR), and also considering the technical feasibility of the route from operation and maintenance point of view in consultation with the local village councils prevalent in the project area. Therefore, following minor change in scope of work has been observed with respect to IEAR scope which resulted due to the best effort of IA/DPN in effectively integrating safeguard and engineering measures in successful minimization of impact on forest and environment.

The proposed distribution lines connect 2 substations in close vicinity and are having line length of less than 10 km (except one distribution line), thus, having negligible environment and social impacts including no involvement of any forest area. Hence, no alternative has been studied for the distribution lines proposed under instant scheme.

For changes in scope of work with respect to IEAR scope i.e. changes in the route alignment based upon alternatives studies and detailed survey for transmission and distribution line is given is **Table 4.1**.

For sub-station, site selection analysis of 2-3 alternatives sites is usually 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; 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 of DPN or identified for purchase on willing seller – willing buyer basis and therefore, the said exercise is not so relevant for proposed project as the consent of owner is major criteria in addition to technical feasibility. However, as per the provisions of ESPPF, all land donations 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 GoN.

The finalized location of transmission and distribution substations is given below in **Table 4.2**.

Table 4.1: Change in Scope of Work w.r.t. IEAR

S. No.	Scope as per IEAR		Current Status with justification	Remarks
	Line	Substation		
Transmission Component				
1	LILO of 132 kV Mariani - Mokokchung Line at Longnak – **2.0 km**	Establishment of 132/33 kV Sub-station at Longnak (New)	Final route is 0.804 km and line length is reduced by 1.2 km due to change in tapping point from existing TL.	Meticulous realignment during ground truthing survey has reduced line length further.
2	132 kV D/C New Kohima (Zadhima) to New Secretariat Complex (NU Campus) – **6.55 km**	Establishment of 132/33 kV Sub-station at Secretariat Complex Kohima (New)	Final line route is 13.97 km and there is an increase of around 7.4 km. so that environment & social sensitive areas are avoided/ minimized. The location of sub-station was also changed from Thizama village to	• Complete avoidance of habitation areas. • Avoidance of Reserved Forest areas. • CPR are not impacted. • It does not pass through any protected area and monuments of archaeological

S. No.	Scope as per IEAR		Current Status with justification	Remarks
	Line	Substation		
			Tseisema village due to space constraints.	importance. • Tree cutting can also be minimized in valley portions along the route.
3	LILO of both Circuit of Kohima – Meluri (Kiphire) Line at Pfutsero – **3.0 km**	Establishment of 132/33 kV Sub-station at Pfutsero (New)	Final route is 2.411 km and line length is reduced by around 0.6 km due to further optimization during ground truthing survey.	Meticulous realignment during ground truthing survey has reduced line length further.
4	132 kV S/C (on D/C Tower) Wokha - Zunheboto - Mokokchung Line – **80.0 km**	Bay extension of 132/33 kV Sub-station at Wokha Establishment of 132/33 kV Sub-station at Zunheboto (New) Bay extension of 132/33 kV Sub-station at Mokokchung (State Owned)	Final route is 50.293 km and line length is reduced by around 30 km due to further optimization during ground truthing survey considering construction difficulties and RoW issues.	Meticulous realignment during ground truthing survey has reduced line length further.
5	220 kV S/C (on D/C Tower) New Kohima - Mokokchung via Wokha Line – **85.0 km**	Bay extension of 220/132 kV existing Sub-station at Mokokchung (PGCIL owned)	Final line route is 86.637 km and there is a negligible increase of around 1.637 km. so that environment & social sensitive areas are avoided/ minimized. Preferred due to feasibility and lesser ROW problems.	• Complete avoidance of habitation areas. • Avoidance of Reserved Forest areas. • CPR are not impacted. • It does not pass through any protected area and monuments of archaeological importance. • All alignments will be easily approachable in dry and rainy seasons to enable maintenance throughout the year. • No major river crossing, crossing over 3 minor rivers. • Involves minimum tree felling
6	LILO of 132 kV S/C Kohima - Wokha Line at 220 kV New Kohima Sub-	Bay extension of 220/132 kV existing sub-station at New Kohima	9.218 km	

S. No.	Scope as per IEAR		Current Status with justification	Remarks
	Line	**Substation**		
	station – **0.5 km**			
Distribution Component				
1	33 kV line from tapping point of existing 33/11 kV Mokokchung - Mariani Line at Longtho Sub-station – **0.5 km**	Establishment of 33/11 kV Sub-station at Longtho (New)	Final route is 1.2 km and line length is increased by 0.7 km due to further optimization during ground truthing survey.	Meticulous realignment during ground truthing survey has reduced line length further.
2	33 kV line from 132/33 kV Zunheboto (new) to 33/11 kV Zunheboto South Point (new) Sub-station **– 6.6 km**	Establishment of 33/11 kV Sub-station at Zunheboto South Point (New)	Final route is 5.53 km and line length is reduced by around 1 km due to further optimization during ground truthing survey.	Meticulous realignment during ground truthing survey has reduced line length further.
3	33 kV line from 66 kV Mokokchung (existing) to 33/11 kV Mokokchung Town Power House (new) Sub-station – **8.7 km**	Establishment of 33/11 kV Sub-station at Mokokchung Power House (New)	Final route is 9 km and line length is increased by around 0.3 km due to further optimization during ground truthing survey.	Meticulous realignment during ground truthing survey has reduced line length further.
4	33 kV line from 66 kV Mokokchung (existing) to 33/11 kV Mokokchung Town Hospital Area (new) Sub-station – **7.42 km**	Establishment of 33/11 kV Sub-station at Mokokchung Town Hospital Area (New)	Final route is 3 km and line length is reduced by around 4.4 km due to further optimization during ground truthing survey.	Meticulous realignment during ground truthing survey has reduced line length further.
5	33 kV line from 132/33 kV Kohima (new) Sub-station to 33/11 kV Zhadima (new) Sub-station (*Within the 220/132/33 kV New Kohima Campus which is under construction by State Govt.*)	Establishment of 33/11 kV Sub-station at Zhadima (Chiephobozou) (New)	Final route is 0.54 km	
6	33 kV line from	Establishment of 33/11 kV Sub-	After detailed survey final route approved is of	• It does not affect any public utility services.

S. No.	Scope as per IEAR		Current Status with justification	Remarks
	Line	**Substation**		
	132/33 kV Pfutsero (new) to 33/11 kV Pfutsero (new) Sub-station (*Within the proposed 132/33 kV Campus of Pfutsero new substation.)*	station at Pfutsero (New)	length 3.6 km with total 25 poles. The final route avoids market area, habitation and a patch of dense forest.	• As far as possible agriculture fields have been avoided. • It does not pass through any protected area and monuments of archaeological importance
7	33 kV line from existing 132/66/33 kV Nagarjan Sub-station to new 33/11 kV Padampukhri (new) Sub-station - **4.34 km**	Bay extension of 132/66/33 kV Sub-station at Nagarjan Establishment of 33/11 kV Sub-station at Padampukhri (New)	Final line route is 6.15 km km and there is an increase of around 2 km so as to avoid human habitation and private property.	• Human habitation and private property have been completely avoided. • It does not pass through any protected area and monuments of archaeological importance
8	33 kV line from 33/11 Akuloto (existing) Sub-station to 33/11 kV Suruhuto (existing) Sub-station – **9.5 km**	Bay extension of 33/11 kV (Existing) Sub-station at Akuloto Bay extension of 33/11 kV (Existing) Sub-station at Suruhoto	Final line route is 23.29 km and there is an increase of around 14 km so that environment & social sensitive areas are avoided/ minimized. Preferred due to feasibility and lesser ROW problems.	• Complete avoidance of habitation areas. • Avoidance of Reserved Forest areas. • CPR are not impacted. • It does not pass through any protected area and monuments of archaeological importance. • Involves minimum tree felling
9	33 kV line from existing 33/11 kV Pughoboto Sub-station to existing 33/11 kV Torogonyu Sub-station – **9 km**	Bay extension of 33/11 kV (Existing) Sub-station at Pughoboto	Final route is 2.27 km and line length is reduced by around 7 km due to further optimization during ground truthing survey	Meticulous realignment during ground truthing survey has reduced line length further.

Source: Detailed Survey of POWERGRID/ Contractor

Table 4.2: Finalized Location of Transmission & Distribution Substation

S.No.	Name of Substation	Earlier Identified Land as per IEAR	Finalized Land (Actual)	Reason for Change
A	**Transmission Substation**			
1	132/33 KV at Longnak (New)	Changki Village located on Longnak- Mangkolemba road	Changki village located on Longnak - Mangkolemba road	Remain Unchanged
2	132/33 KV at Zunheboto (New)	Lizu Village around 4 km from Zunheboto town	Lizu Village around 4 Km from Zunheboto town	Remain Unchanged

S.No.	Name of Substation	Earlier Identified Land as per IEAR	Finalized Land (Actual)	Reason for Change
3	132/33 KV at Secretariat Complex Kohima (New)	Thizama village within the State police dept. Near the campus of Nagaland state Secretariat.	Tseisema village located near NH 2 (61) Road near Nagaland University	Changed due to space constraints
4	132/33 KV at Pfutsero (New)	Rukizu Colony Pfutsero owned by Phusachodumi Baptist Church trust	Pfutsero - Phek Bypass Road	Remain Unchanged
5	132/33 KV Mokokchung (State) (Extension)	Within existing campus of 132/33 KV Mokokchung S/S of DoP, Nagaland	Within existing campus of 132/33 KV Mokokchung S/S of DoP, Nagaland	Remain Unchanged
6	220/132 KV at Mokokchung (PGCIL) (Extension)	Within existing campus of 220 kV Mokokchung S/S of POWERGRID	Within existing campus of 220 KV Mokokchung S/S of POWERGRID.	Remain Unchanged
7	220/132/33 KV at New Kohima (Extension)	Within existing campus of 220/132kV New Kohima S/S of DoP, Nagaland	Within existing campus of 220/132/ KV New Kohima S/S of DoP, Nagaland	Remain Unchanged
8	132/33 KV at Wokha (Extension)	Within existing campus of 132/33 KV Wokha S/S of DoP, Nagaland	Within existing campus of 132/33 KV Wokha S/S of DoP, Nagaland	Remain Unchanged
A	**Distribution Substation**			
9	33/11 KV at Longtho (New)	Longtho village near Timber / Plywood factory adjacent to Mokokchung - Mariani PWD road	Longtho village near Timber / Plywood factory adjacent to Mokokchung - Mariani PWD road	Remain Unchanged
10	33/11 KV at Mokokchung Power House (New)	Within existing 33/11 KV Substation, Mokokchung	Within existing 33/11 KV Substation, Mokokchung	Remain Unchanged
11	33/11 KV at Mokokchung Hospital Area (New)	Imkongliba Memorial District Hospital Mokokchung	Imkongliba Memorial District Hospital Mokokchung	Remain Unchanged
12	33/11 KV at Zunheboto South Point (New)	Within existing campus of 66/33 KV Zunheboto Substation, Alahuto Colony	Within existing campus of 66/33 KV Zunheboto Substation, Alahuto Colony	Remain Unchanged
13	33/11 KV at Lalmati (Zubza) (New)	Within campus of Power Deptt, near SDO (Civil), Zubza Office	Within campus of Power Deptt, near SDO (Civil), Zubza Office	Slightly Changed 30 to 40 m
14	33/11 KV at Zhadima (Chiephobozou) (New)	Within existing 220/132 KV New Kohima (Zhadima) Campus at Chiephobozou	Within existing 220/132 KV New Kohima (Zhadima) Campus at Chiephobozou	Slightly Changed as per instruction of DoP
15	33/11 KV at Pfutsero (New)	Within the same plot identified for 132/33kV Pfutsero Substation	Adjacent plot of existing 33/11 Kv Pfutsero S/s of DoP, Nagaland	Slightly Changed as per instruction of DoP
16	33/11 KV at Tizit (New)	Within existing 66/33 KV substation at ADC Colony Tizit HQ	Within existing 66/33 KV substation at ADC Colony Tizit HQ	Remain Unchanged
17	33/11 KV at	Near the Ao Church,	Near the Ao Church,	Remain

S.No.	Name of Substation	Earlier Identified Land as per IEAR	Finalized Land (Actual)	Reason for Change
	Padampukhri (New)	Padampukhri. Approx. 1.6 Km from the Dimapur - Kohima PWD Road	Padampukhri. Approx. 1.6 Km from the Dimapur - Kohima PWD Road	Unchanged
18	33/11 KV Changtongya (Augmentation)	Within existing campus of 33/11 KV Changtongya Substation	Within existing campus of 33/11 KV Changtongya Substation	Remain Unchanged
19	33/11 KV Mangkolemba (Augmentation)	Within existing campus of 33/11 KV Mangkolemba Substation	Within existing campus of 33/11 KV Mangkolemba Substation	Remain Unchanged
20	33/11 KV Suruhuto (Augmentation)	Within existing campus of 33/11 KV Suruhuto Substation	Within existing campus of 33/11 KV Suruhuto Substation	Remain Unchanged
21	33/11 KV Wokha Power House (Augmentation)	Within existing campus of 33/11 KV Wokha Power House	Within existing campus of 33/11 KV Wokha Power House	Remain Unchanged
22	33/11 KV Chukitong (Augmentation)	Within existing campus of 33/11 KV Chukitong Substation	Within existing campus of 33/11 KV Chukitong Substation	Remain Unchanged
23	33/11 KV Tseminyu (Augmentation)	Within existing campus of 33/11 KV Tseminyu Substation	Within existing campus of 33/11 KV Tseminyu Substation	Remain Unchanged
24	33/11 KV Pughoboto (Augmentation)	Within existing campus of 33/11 KV Pughoboto Substation	Within existing campus of 33/11 KV Pughoboto Substation	Remain Unchanged
25	33/11 KV Botsa (Augmentation)	Within existing campus of 33/11 KV Botsa Substation	Within existing campus of 33/11 KV Botsa Substation	Remain Unchanged
26	33/11 KV ITI Kohima (Augmentation)	Within existing campus of 33/11 KV ITI Kohima Substation	Within existing campus of 33/11 KV ITI Kohima Substation	Remain Unchanged
27	33/11 KV Chakabama (Augmentation)	Within existing campus of 33/11 KV Chakabama Substation	Within existing campus of 33/11 KV Chakabama Substation	Remain Unchanged
28	33/11 KV Industrial Estate (Augmentation)	Within existing campus of 33/11 KV Industrial Estate Substation	Within existing campus of 33/11 KV Industrial Estate Substation	Remain Unchanged
29	33/11 KV Referral Hospital (Augmentation)	Within existing campus of 33/11 KV Referral Hospital Substation	Within existing campus of 33/11 KV Referral Hospital Substation	Remain Unchanged
30	132/66/33 KV Nagarjan (Augmentation)	Within existing campus of 132/66/33 KV Nagarjan Substation	Within existing campus of 132/66/33 KV Nagarjan Substation	Remain Unchanged
31	33/11 KV Akuloto (Augmentation)	Within existing campus of 33/11 KV Akuloto Substation	Within existing campus of 33/11 KV Akuloto Substation	Remain Unchanged

Source: Detailed Survey of POWERGRID/ Contractor

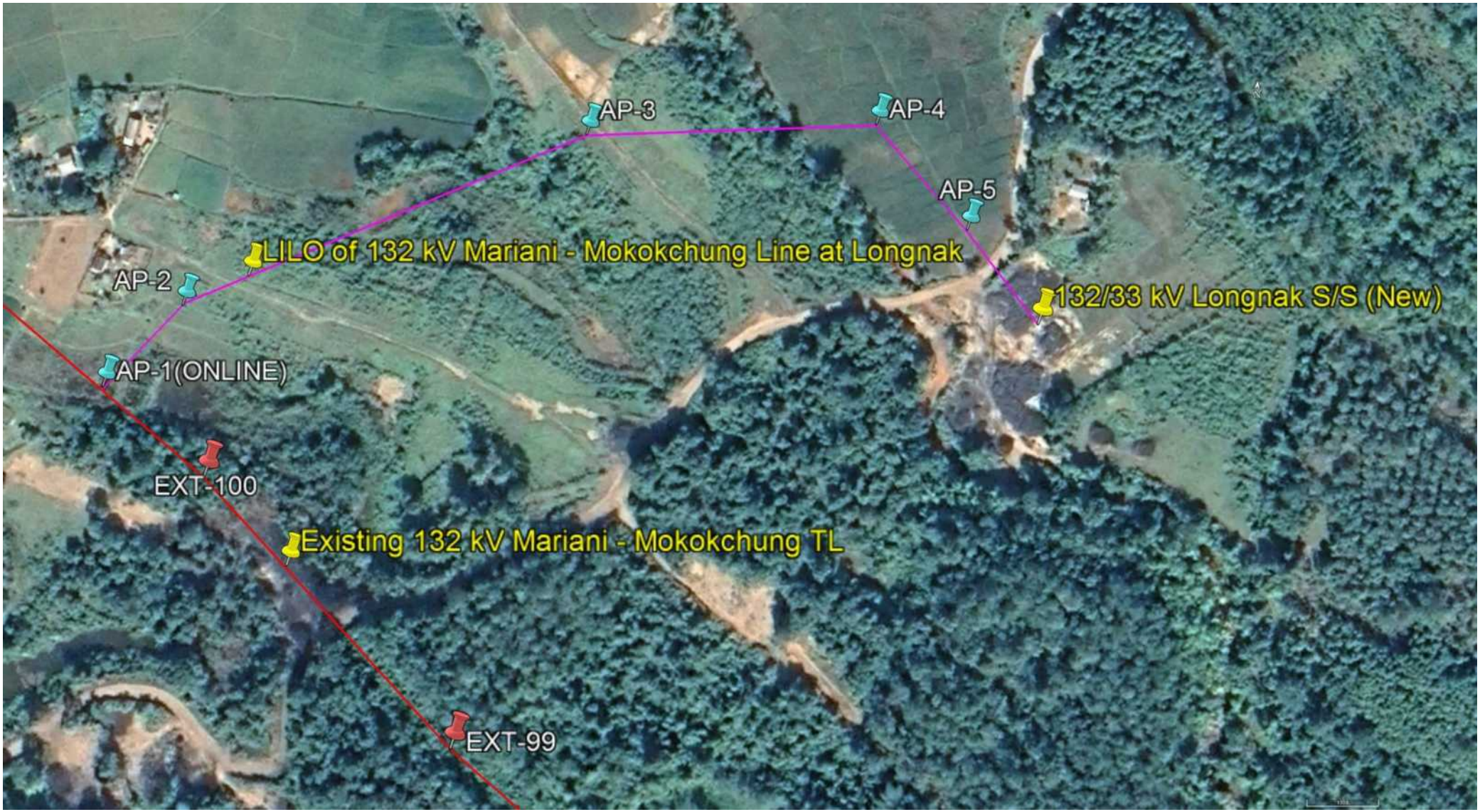


Figure 4.1: Satellite Imagery Showing Route of LILO of 132kV S/C Mokokchung-Mariani at Longnak

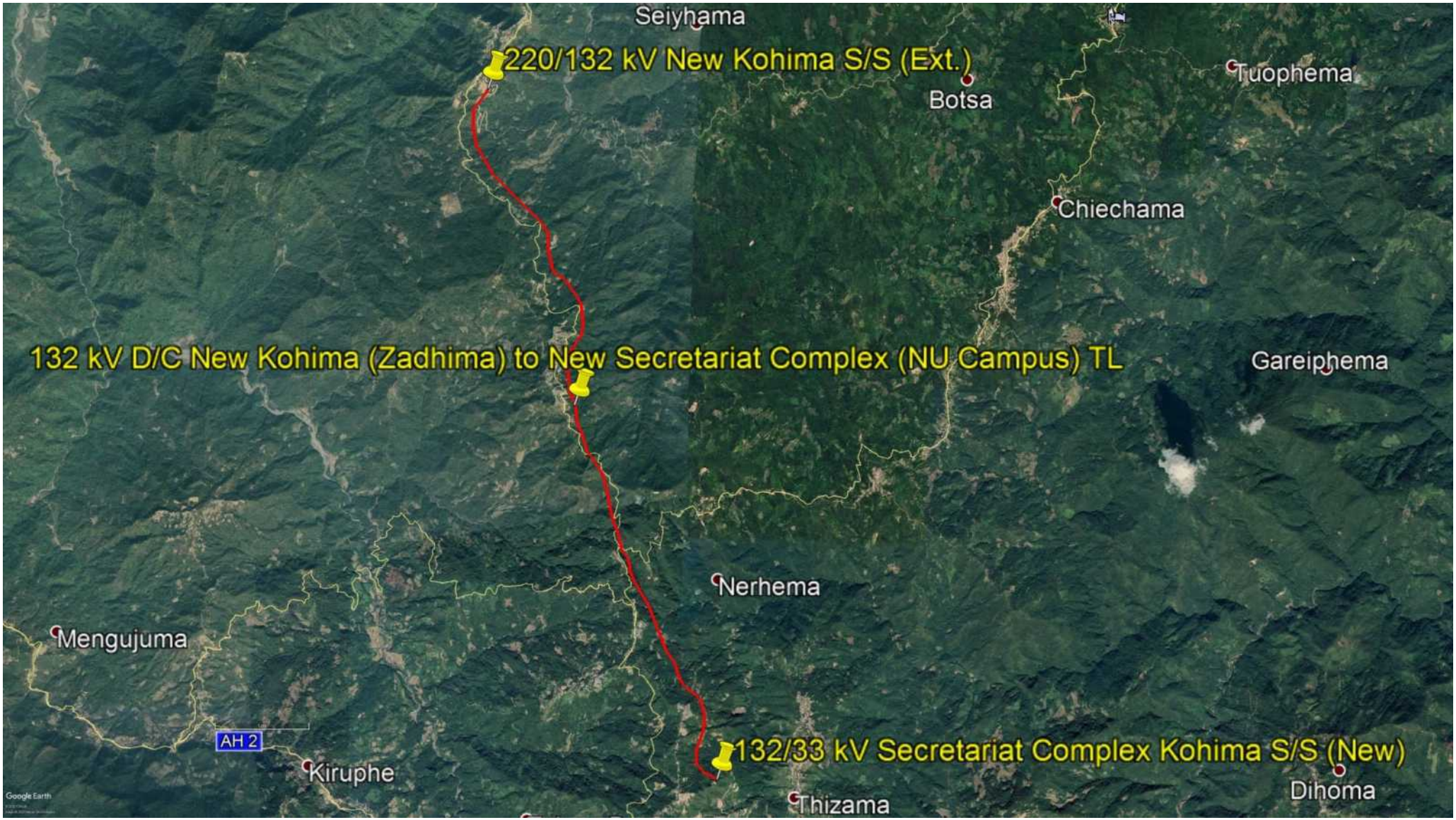


Figure 4.2: Satellite Imagery Showing Route of 132 KV D/C New Kohima (Zhadima) to New Secretariat Complex (NU Campus) Transmission Lines

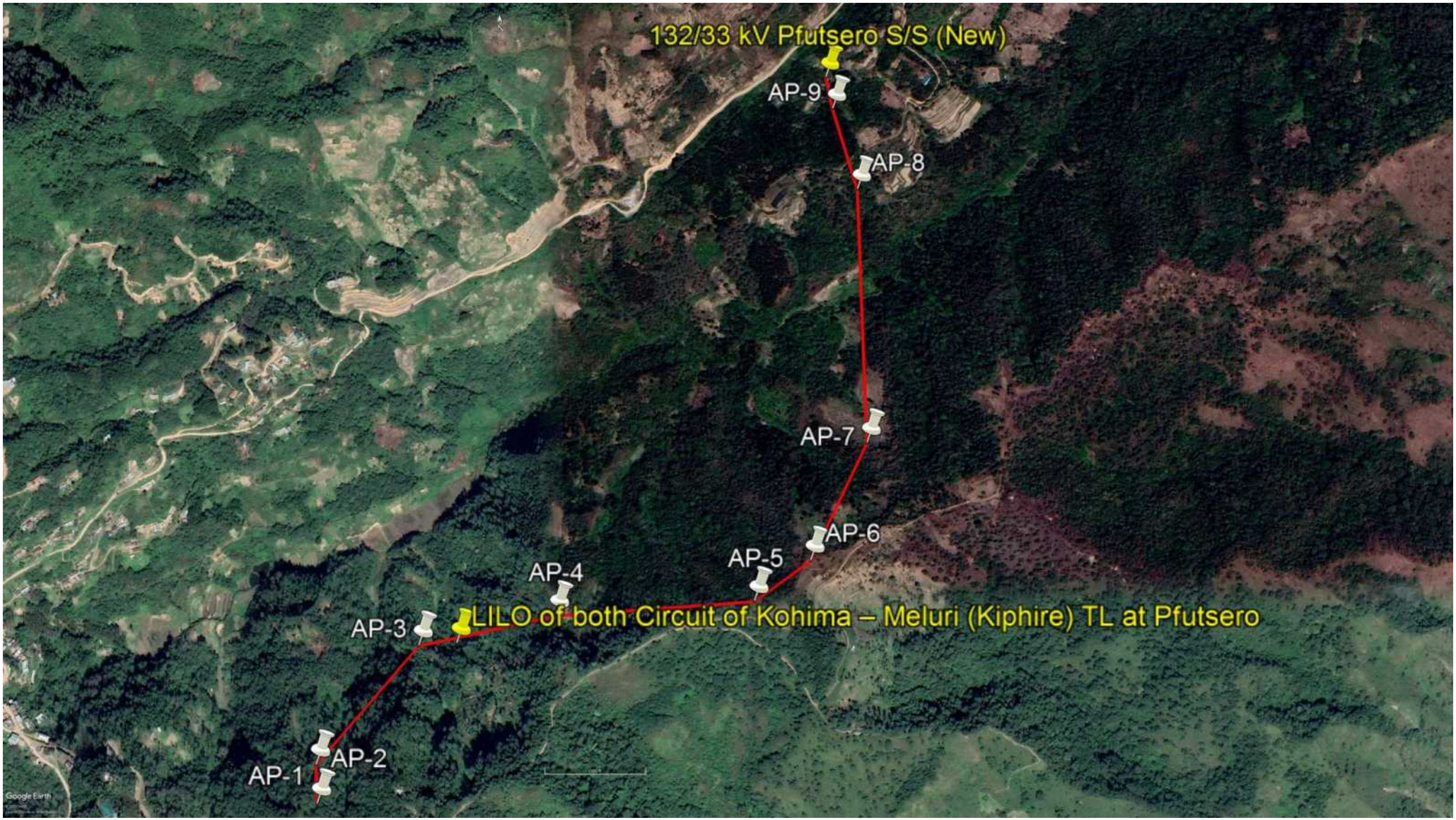


Figure 4.3: Satellite Imagery Showing Route of LILO of both ckts of 132kV D/C Kohima-Meluri (Kiphire) Line at Pfutsero Transmission Line

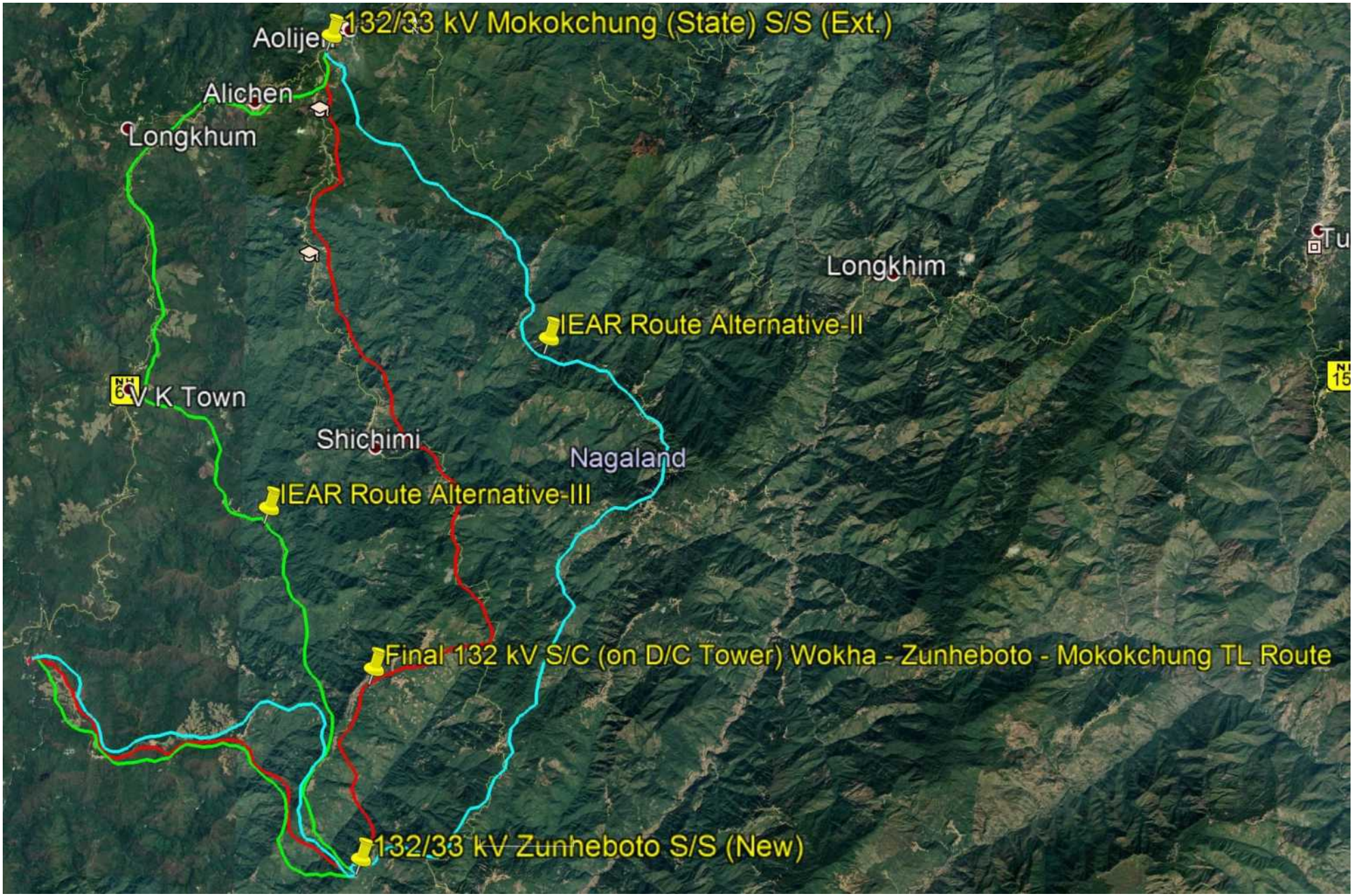


Figure 4.4: Satellite Imagery Showing Final and Alternative Routes of 132 kV S/C (on D/C tower) Wokha-Zunheboto-Mokokchung Transmission Line

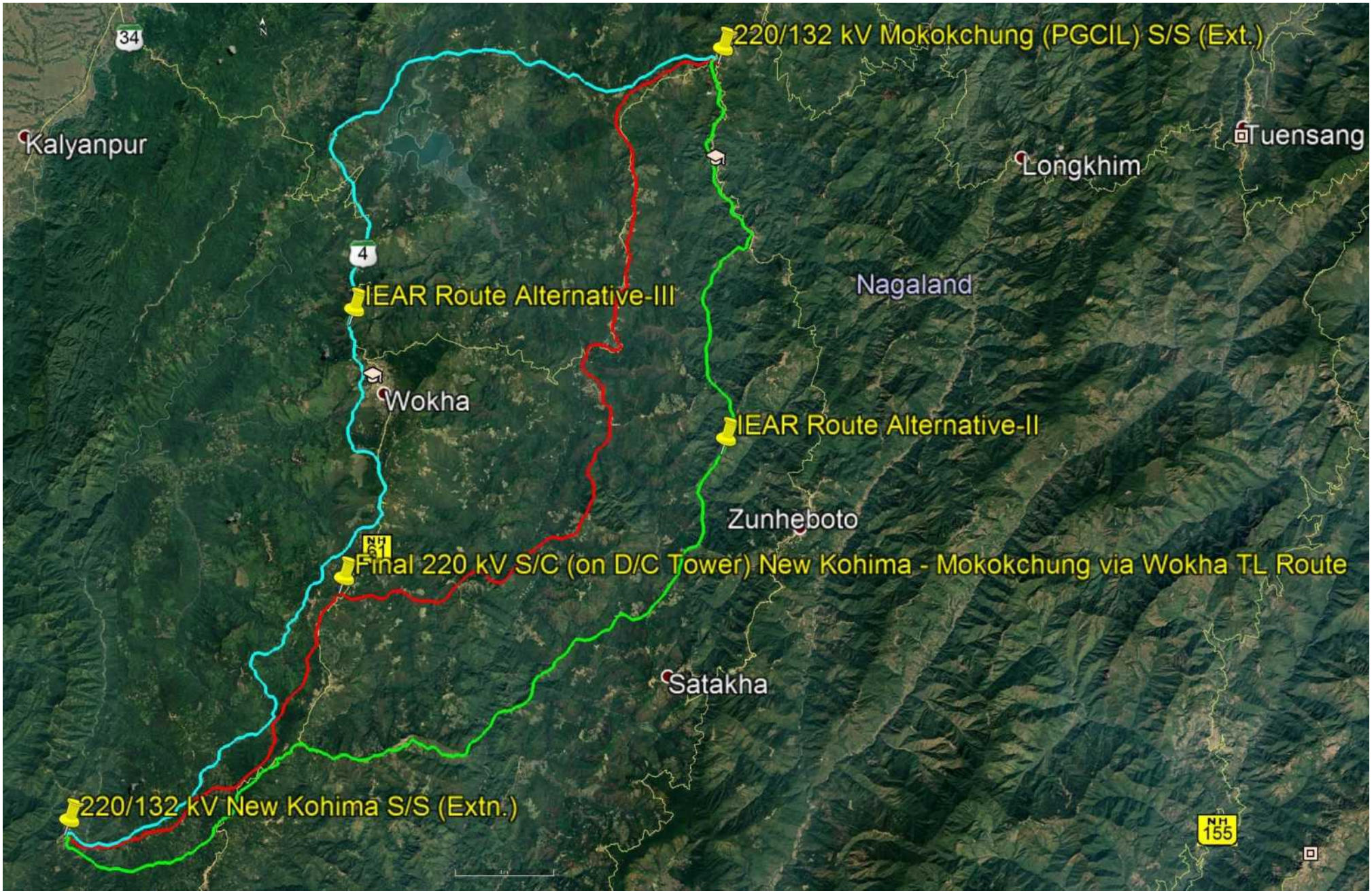


Figure 4.5: Satellite Imagery Showing Final and Alternative Route of 220 KV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha Transmission Line

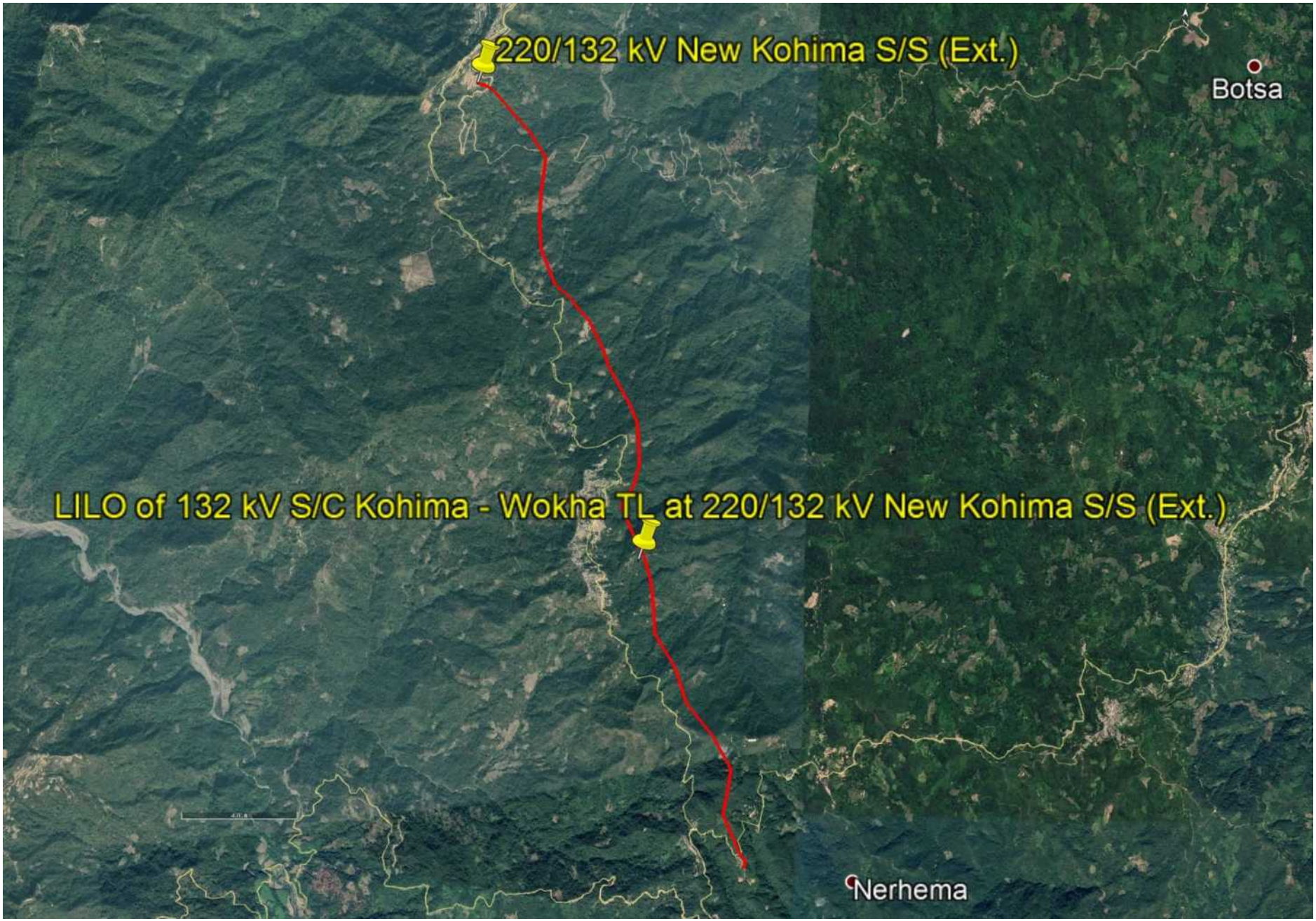


Figure 4.6: Satellite Imagery Showing Route of LILO of 132kV S/C Kohima-Wokha at New Kohima Transmission Line

Figure 4.7: Satellite Imagery Showing Route of Existing 33 kV Mokokchung - Mariani Line to Proposed 33/11 kV Longtho S/s Distribution Line

Figure 4.8: Satellite Imagery Showing Route of New 132/33kV Zunheboto S/S to New 33/11kV S/S Zunheboto South Point Distribution Line

Figure 4.9: Satellite Imagery Showing Route of Existing 66/33kV Mokokchung S/S to New 33/11kV S/S Mokokchung Town Power House and Existing 66/33kV Mokokchung S/S to New 33/11kV S/S Mokokchung Town Hospital Area Distribution Lines

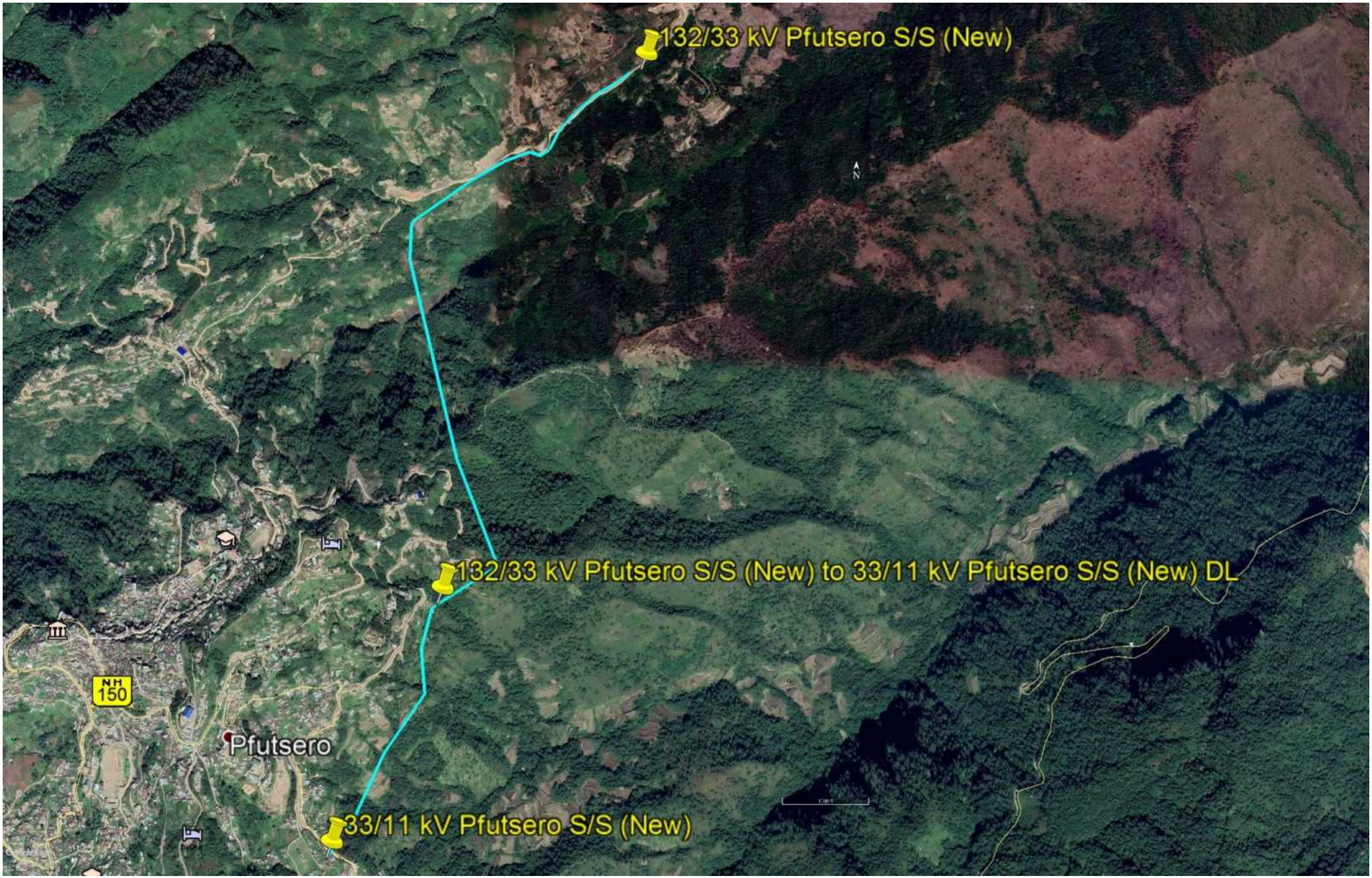


Figure 4.10: Satellite Imagery Showing Route of New 132/33kV Pfutsero S/S to New 33/11kV Pfutsero Distribution Line

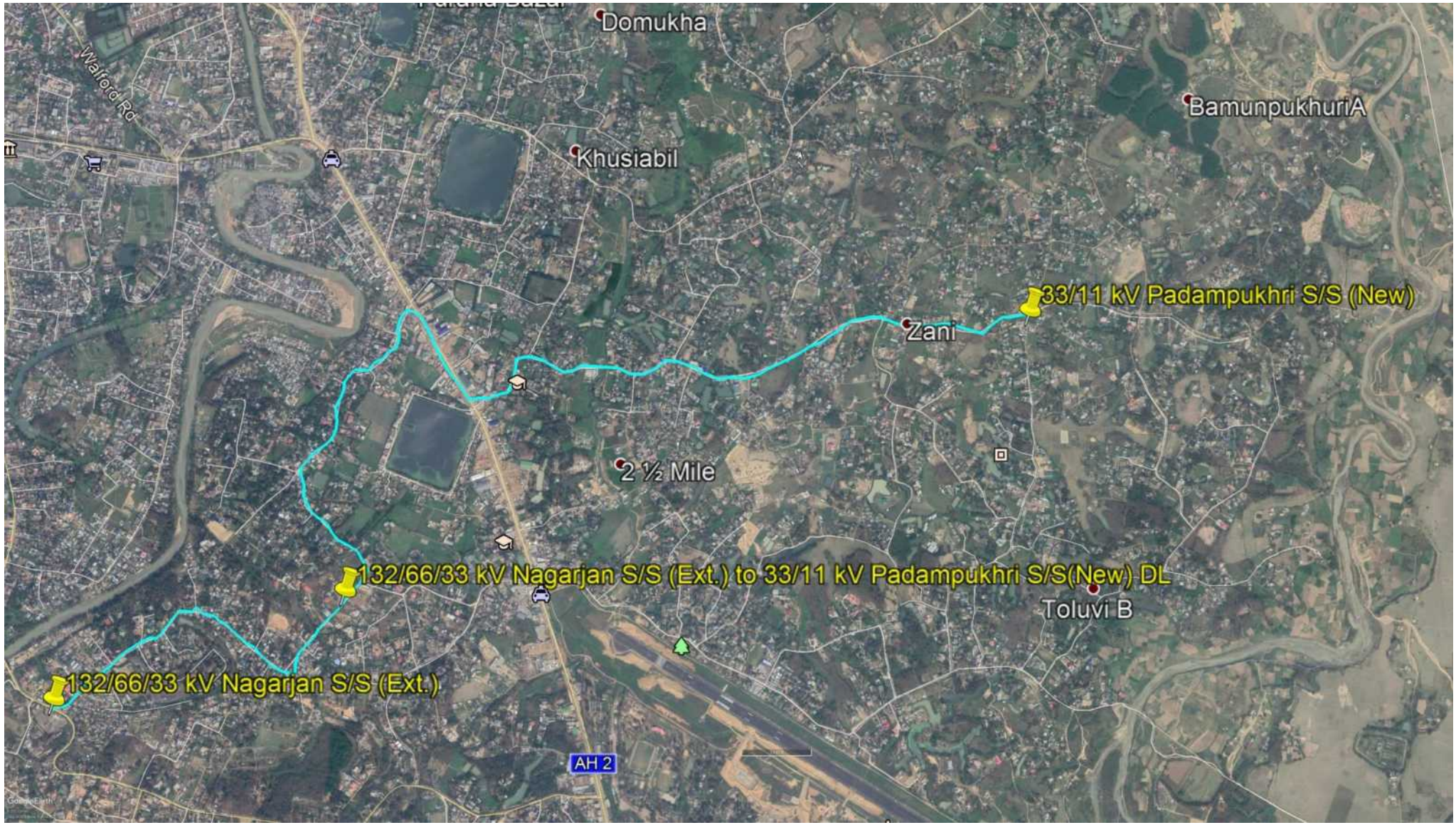


Figure 4.11: Satellite Imagery Showing Route of Existing 132/66/33kV Nagarjan S/S to New 33/11kV S/S Padam Pukhri Distribution Line

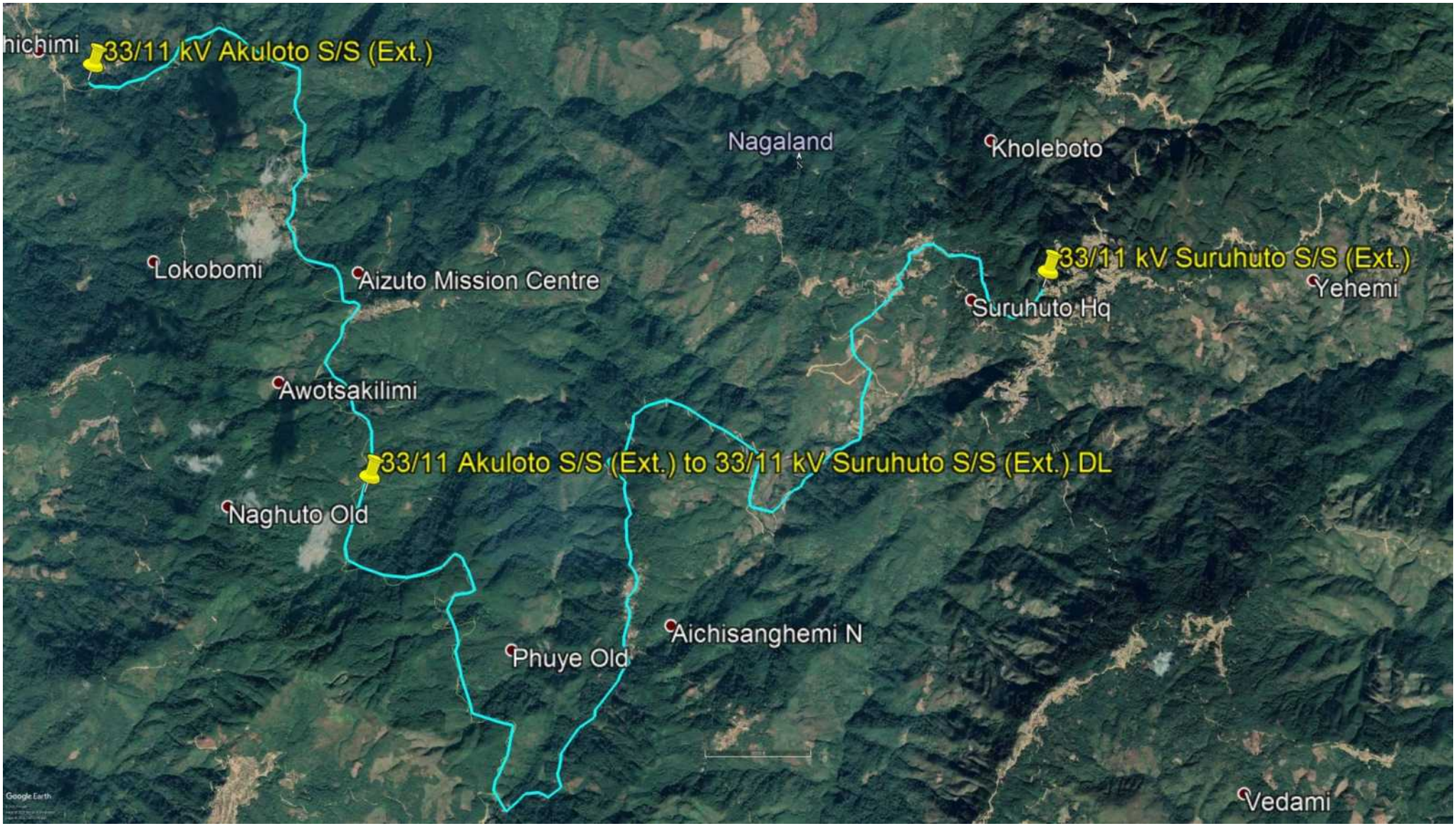


Figure 4.12: Satellite Imagery Showing Route of Existing 33/11kV Suruhuto S/S to Existing 33/11kV S/S Akuloto Distribution Line

Figure 4.13: Satellite Imagery Showing Route of Existing 33/11kV Pughoboto S/S to Existing 33/11kV S/S Torogonyu Distribution Line


132/33 kV Substation at Longnak (New)


132/33 kV Substation at Zunheboto (New)


132/33 kV Substation at Secretariat Complex (New)


132/33 kV Substation at Pfutsero (New)


132/33 kV Substation at Mokokchung (State) (Extension)


132/33 kV Substation at Wokha (Extension)


33/11 kV Substation at Longtho (New)


33/11 kV Substation at Mokokchung Power House (New)


33/11 kV Substation at Mokokchung Hospital Area (New)


33/11 kV Substation at Zunheboto South Point (New)


33/11 kV Substation at Lalmati (Zubza) (New)


33/11 kV Substation at Pfutsero (New)


33/11 kV Substation at Padampukhri (New)


33/11 kV Substation at Changtongya (Augmentation)


33/11 kV Substation at Chukitong (Augmentation)


33/11 kV Substation at Tseminyu (Augmentation)


33/11 kV Substation at Botsa (Augmentation)


33/11 kV Substation at ITI Kohima (Augmentation)


33/11 kV Substation at Chakabama (Augmentation)


33/11 kV Substation at Industrial Estate (Augmentation)


33/11 kV Substation at Nagarjan (Bay Extension)

4.3 MAJOR FEATURES OF FINAL ROUTE

4.3.1 Transmission Lines

Of the total 6 transmission lines, 5 lines are passing through hilly terrain and rest 1 line is passing through plains. These lines mostly pass through private plantation/ lands owned by village council and Govt. lands (**refer Figure 4.1-4.6**). The lines do not pass through any Railway crossings and Settlement. The lines route doesn't involve any notified forest land which would necessitate forest clearance under Forest (Conservation) Act, 1980. Besides all protected areas like National Parks, Wildlife Sanctuaries, Biosphere Reserve etc.; Natural habitats, IBAs, Sacred groves, Wetlands etc. have been completely avoided. It has been observed that there are some variations in final route length of lines from earlier routes so that environment & social sensitive areas are avoided/ minimized. However, decrease in total line length by 13.717 km for all lines (from earlier 177.05 km to 163.333 km) without any change in land use and other base line data, no additional impacts of any kind apart from earlier identified impacts in IEAR/EMP are anticipated. A total of around 547 towers are being/to be erected for all 6 proposed transmission lines having a total line length of 163.333 km.

4.3.1.1 LILO of 132 kV Mariani - Mokokchung Line at Longnak

The transmission line passes through plain paddy fields and private plantation/ lands owned by village council. The selected line does not pass through any National Highway, Power line, Railway crossings and Settlement. However, the line is crossing a ditch, village road, footpath and one stream, which do not require any special towers.

The line length of final route (**Table 4.1**) has been reduced by approx. 1.2 km i.e. from 2.0 km to 0.804 km due to change in tapping point from existing 132 kV Mariani - Mokokchung TL. Since there is a significant reduction in line

length it is expected that the resultant environmental footprints will be further reduced. Moreover, in order to avoid tower in private plantation area and therefore minimizing tree cutting, tower AP-3 is scheduled at a distance of 226 m from tower AP-2 and tower AP-4 is scheduled at a distance of 114 m from tower AP-3 (**Figure 4.14**). The line has a total 5 towers without any National Highway (NH), railways and major river crossings. The types of towers used are double circuit (DC and DD) towers. All the tower locations are easily accessible through existing road to carryout construction and maintenance activity and construction of new approach road is not required. Details of tower schedule of final route alignment describing important features of line route are placed as **Annexure II**.

Figure 4.14: Major Features en route of LILO of 132kV S/C Mokokchung-Mariani at Longnak

4.3.1.2 132 kV D/C New Kohima (Zadhima) to New Secretariat Complex (NU Campus)

The transmission line passes through hilly terrain, comprises of agricultural field, private plantation/ lands owned by village council and Govt. land. Major crossing en route of the line are National Highway between tower 29 and tower 30, Proposed 400 kV D/C Imphal to Kohima TL between tower 31 and tower 31AO, Proposed 132 kV S/C Kohima – Wokha TL between tower 35 and tower 36, 33kV lines, nalas, unmetalled roads, metaled roads, village roads and footpaths.

The line length of final route (**Table 4.1**) has been increased by approx. 7 km i.e. from 6.55 km to 13.97 km due to change in sub-station from Thizama

village to Tseisema village as there was space constraints at Thizama village, also, so that environment & social sensitive areas are avoided/ minimized (refer **Figure 4.15** to **Figure 4.18**). Though there is an increase in line length, no additional impacts of any kind apart from earlier identified impacts in IEAR/EMP are anticipated. Moreover, environment & social safeguard issues which have been taken care off are: -

- Habitation areas along the route (villages namely Ziezou, Zhadima, Phehza, Chieswama) have been completely avoided
- Reserved Forest areas have been completely avoided
- It is ensured that common property resources (CPR) are not impacted.
- Any areas/monuments of archaeological importance are also not encountered along the route.
- The tree cutting has also been minimized in valley portions along the route.

The line has a total 48 angle towers. Since the terrain is hilly, leg extension is being utilized in towers to minimize/avoid benching/ revetment and to provide great stability. Out of the total 48 angle towers, 14 towers are provided with leg extension. In addition to that retaining wall has been proposed AP-08 and AP-18 so as to eliminate the chances of soil erosion. The types of towers used are double circuit (DB, DC and DD) towers. All the tower locations are easily accessible through existing road to carryout construction and maintenance activity and construction of new approach road is not required. Details of tower schedule of final route alignment describing important features of line route are placed as **Annexure II**.

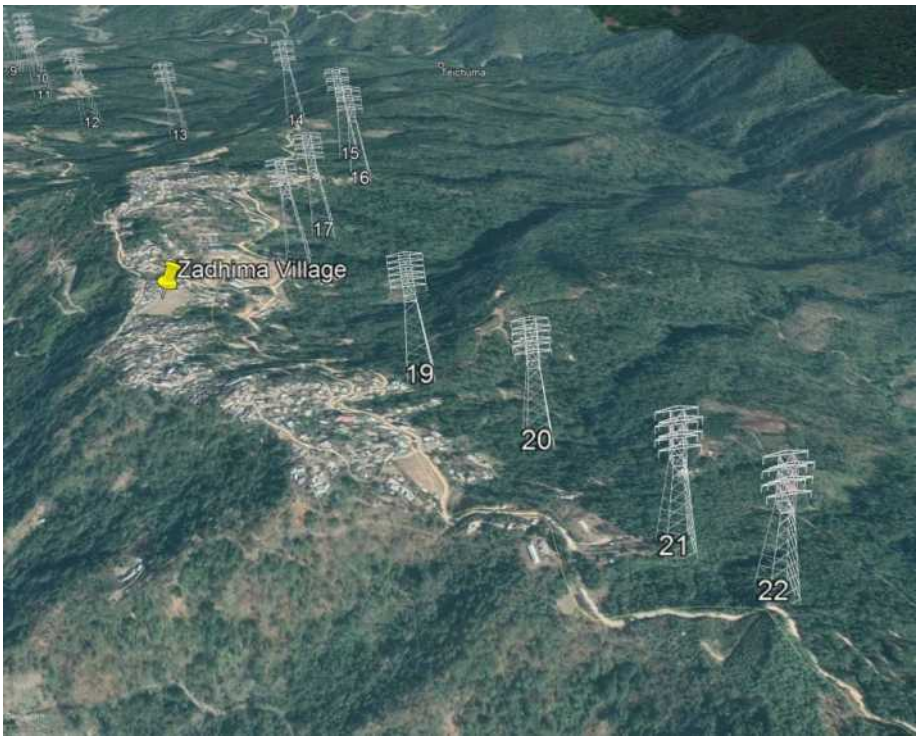


Figure 4.15: Avoidance of Habitation Area in Zadhima Village

Figure 4.16: Avoidance of Habitation Area in Phenza Village

Figure 4.17: Avoidance of Habitation Area in Chieswama Village

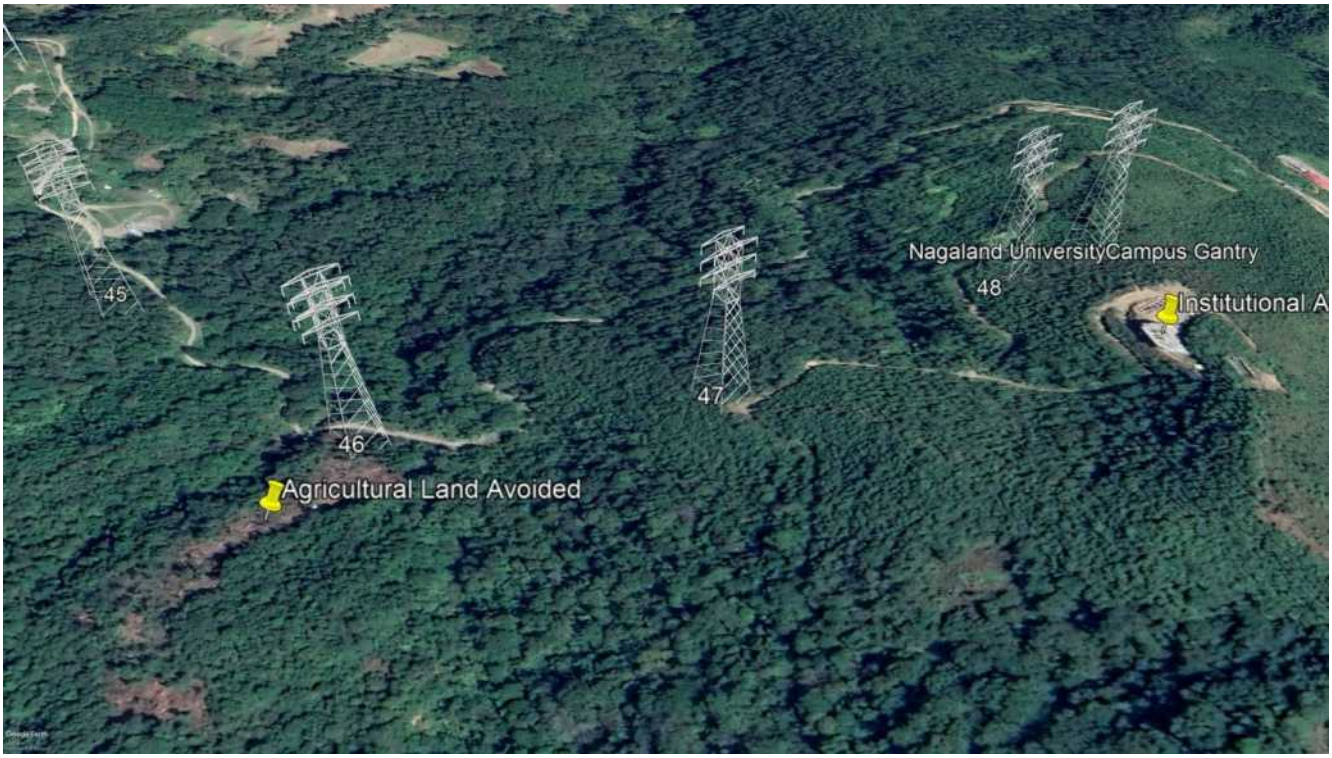


Figure 4.18: Avoidance of Agricultural Land and Institutional Area

4.3.1.3 LILO of both Circuit of Kohima – Meluri (Kiphire) Line at Pfutsero

The transmission line passes through hilly private plantation/ lands owned by village council. Major crossing en route of the line are National Highway between tower 90 of already existing 132 kV Kohima – Meluri (Kiphire) line and tower 01, 11 kV line between tower 3 and tower 4, nala between tower 7 and tower 8, and village road at 3 location.

The line length of final route (**Table 4.1**) has been reduced by approx. 0.6 km i.e. from 3.0 km to 2.411 km due to further optimization during ground truthing survey. Since there is a slight reduction in line length it is expected that the resultant environmental footprints will be further reduced. Moreover, in order to minimize tree cutting, span length has been increased in valley between tower 7 and tower 8 (refer **Figure 4.19**). The line has a total 10 towers. The types of towers used are double circuit (DB, DC and DD) towers. Since the terrain is hilly, leg extension is being utilized in towers to minimize/avoid benching/ revetment and to provide great stability. Out of the total 10 towers, 7 towers are provided with leg extension. In addition to that retaining wall has been proposed for 6 towers so as to eliminate the chances of soil erosion. All the tower locations are easily accessible through existing road to carryout construction and maintenance activity and construction of new approach road is not required. Details of tower schedule of final route alignment describing important features of line route are placed as **Annexure II.**

Figure 4.19: Increase in Length of Span Between Tower 07 and Tower 08

4.3.1.4 132 kV S/C (on D/C Tower) Wokha - Zunheboto - Mokokchung Line

The transmission line passes through hilly agricultural land, private plantation/ lands owned by village council and Govt. land. Major crossing en route of the line are National Highway 702A, twice between tower 46 and tower 47, twice between tower 51 and tower 52, twice between tower 56 and tower 57, between tower 58 and tower 59, between tower 62 and tower 63, twice between tower 63 and tower 64, between tower 68 and tower 69; Proposed 220 kV D/C New Kohima to Mokokchung TL between tower 11 and tower 12; 66/33/11 kV lines; LT lines; nalas; unmetalled roads; metaled road; village roads; rain cuts; ponds; sheds and footpaths/ foot tracks.

The line length of final route (**Table 4.1**) has been reduced by approx. 30 km i.e. from 80.0 km to 50.293 km due to further optimization during ground truthing survey considering construction difficulties and RoW issues. Since there is a significant reduction in line length it is expected that the resultant environmental footprints will be further reduced. Moreover, environment & social safeguard issues which have been taken care off are: -

- Habitation areas along the route (villages namely Philimi, Rotomi, Akuhaito, Emlomi, Litsami, Lizu New, Yesholtomi, Asukhuto, Atoizu, Kitsakita, Aotsakilimi, Lokobomi, Akuluto, Lumthsami, Alaphumi, Lumami, Zaphumi New & Old, Shitsumi, Sumi-Settsu, Settsu, Aolijen) have been completely avoided

- Reserved Forest areas have been completely avoided
- It is ensured that common property resources (CPR) are not impacted.
- Any areas/monuments of archaeological importance are also not encountered along the route.
- The tree cutting has also been minimized in valley portions along the route.

The line has a total 166 towers. Since the terrain is hilly, leg extension is being utilized in towers to minimize/avoid benching/ revetment and to provide great stability. The types of towers used are double circuit (DB, DC and DD) towers. Out of the total 166 towers, 101 towers are provided with leg extension. To carryout construction and maintenance activity, construction of new approach road is not required. Details of tower schedule of final route alignment describing important features of line route are placed as **Annexure II.**

4.3.1.5 220 kV S/C (on D/C Tower) New Kohima - Mokokchung via Wokha Line

The transmission line passes through hilly agricultural land, private plantation/ lands owned by village council and Govt. land. Major crossing en route of the line are National Highway 2 at several locations; Proposed 132 kV D/C Wokha to Zunheboto TL between tower 190 and tower 191; 66/33/11 kV lines; LT lines; Doyang river between tower 152 and tower 154, between tower 201 and tower 202; Tulo river between tower 176 and tower 177; nalas; drains; unmetalled roads; metaled road; village roads; rain cuts; ponds; rubber, tea & coffee garden; sheds and footpaths/ foot tracks.

The line length of final route (**Table 4.1**) has been increased by approx. 1.5 km, which is very negligible considering the change in total length of line i.e. from 85.0 km to 86.637 km. The line length has been increased so that environment & social sensitive areas are avoided/ minimized and the route was preferred due to feasibility and lesser ROW problems (refer **Figure 4.20** and **Figure 4.21**). Though there is an increase in line length, no additional impacts of any kind apart from earlier identified impacts in IEAR/EMP are anticipated. Moreover, environment & social safeguard issues which have been taken care off are: -

- Habitation areas of 23 villages (namely Zhadima, Tetzama, Tsiemekhuma, Botsa, Terogunye, Phenwehyu, Zunpha, Tseminyu, Tesophenyunew, Sishunu, Gokhunyu, Asukiqa, Kitami, Council Hall, Sana old, Phlimi, Doyang, V.K.Town, Sasanu, Lohgkhum, Alchcn, Sehsu) along the route have been completely avoided.
- Reserved Forest areas have been completely avoided

- It is ensured that common property resources (CPR) are not impacted.
- Any areas/monuments of archaeological importance are also not encountered along the route.
- The tree cutting has also been minimized in valley portions along the route.

The line has a total 285 towers. Since the terrain is hilly, leg extension is being utilized in towers to minimize/avoid benching/ revetment and to provide great stability. The stretches where TL is crossing river, DC towers are being used instead DB towers as single span limit is crossed, in addition, cross-arm strengthening has been suggested. The types of towers used are double circuit (DC and DD) towers. Out of the total 285 towers, 223 towers are provided with leg extension. In addition to that, exact no. of retaining walls to be proposed so as to eliminate the chances of soil erosion is being assessed. All alignments are easily approachable in dry and rainy seasons to enable maintenance throughout the year. To carryout construction and maintenance activity, construction of new approach road is not required. Details of tower schedule of final route alignment describing important features of line route are placed as **Annexure II**.

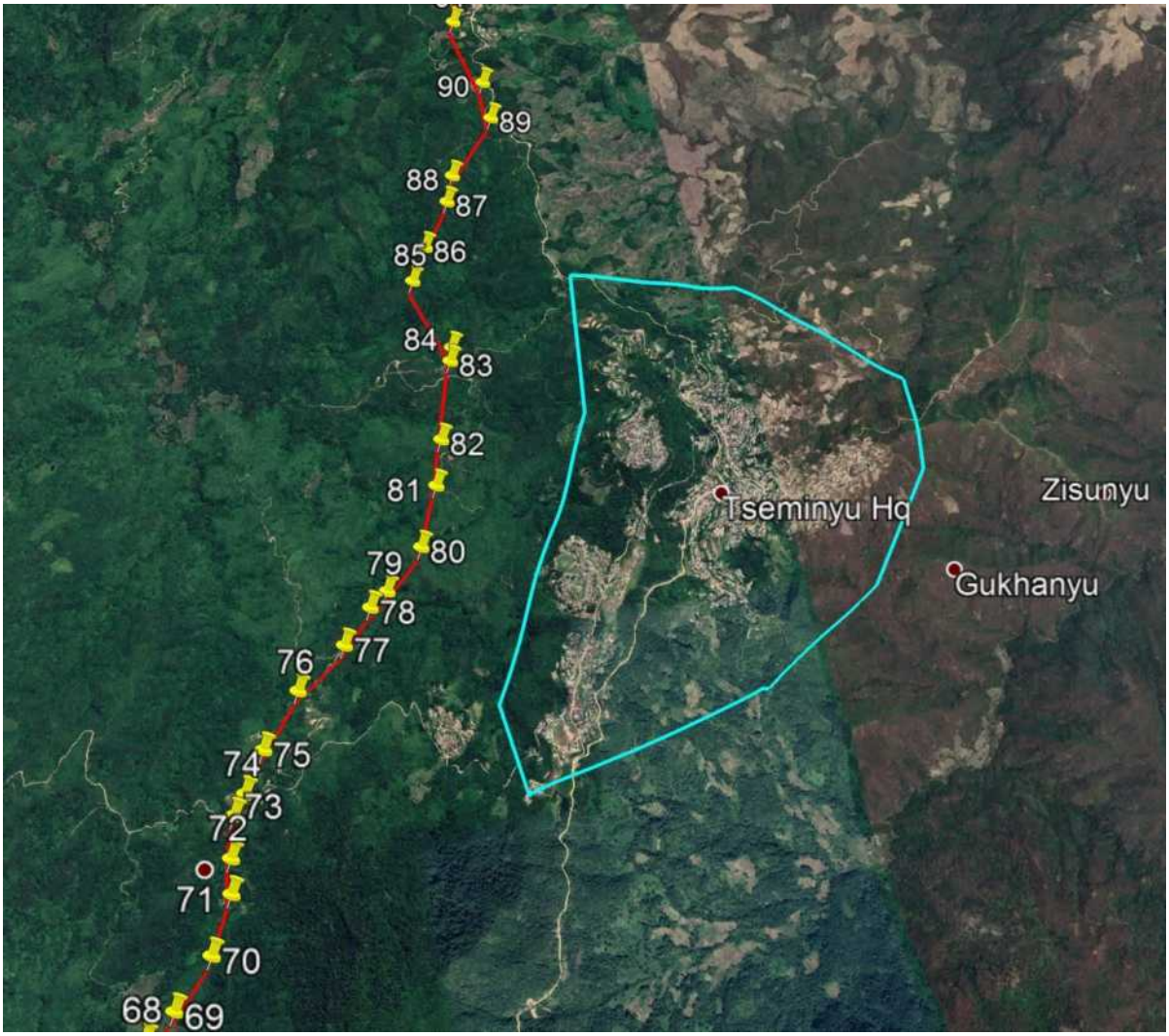


Figure 4.20: Avoidance of Habitation in Tseminyu Village

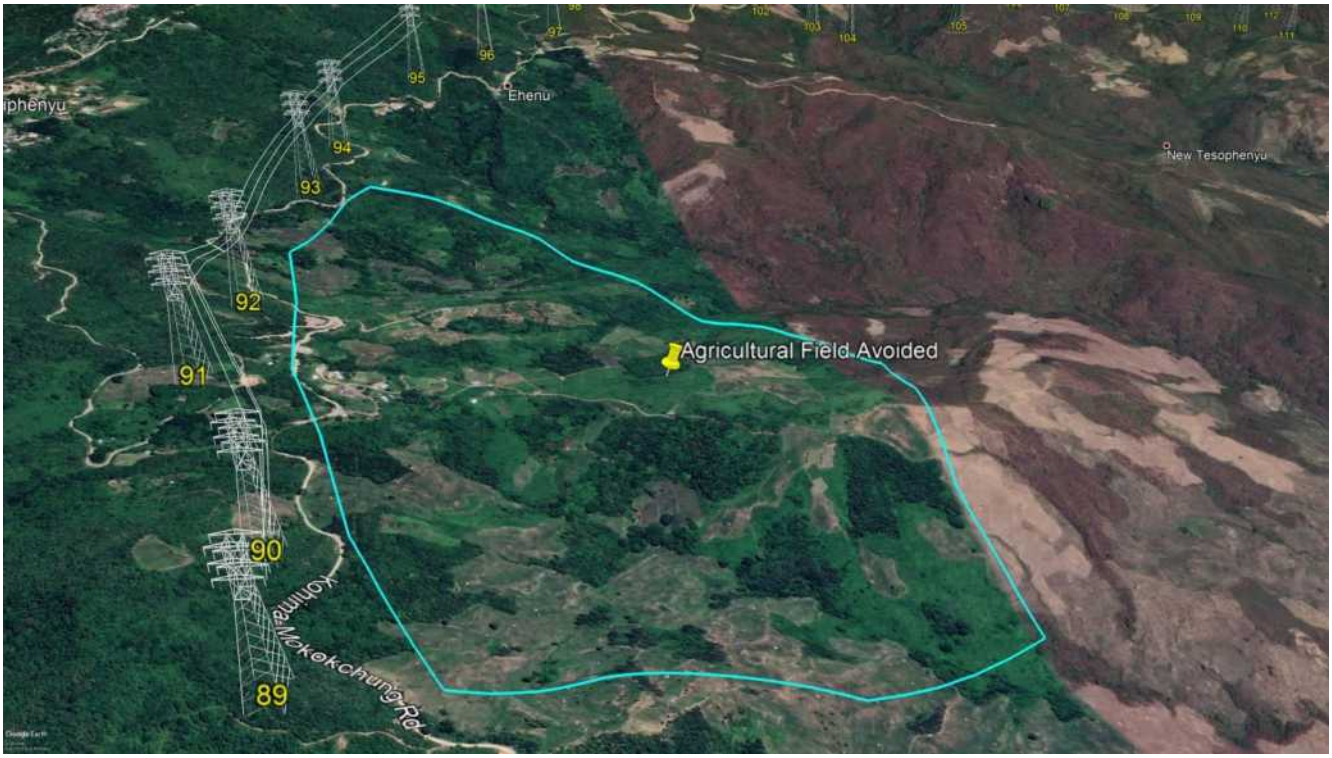


Figure 4.21: Avoidance of Agricultural Field

4.3.1.6 LILO of 132 kV S/C Kohima - Wokha Line at 220 kV New Kohima Sub-station

The transmission line passes through hilly agricultural land, private plantation/ lands owned by village council and Govt. land. The selected line does not pass through any National Highway, Power line, Railway crossings and Settlement. However, the line is crossing unmetaled roads, nalas and foot track/ footpath, which do not require any special towers. The line route doesn't involve any notified forest land which would necessitate forest clearance under Forest (Conservation) Act, 1980. Besides all protected areas like National Parks, Wildlife Sanctuaries, Biosphere Reserve etc.; Natural habitats, IBAs, Sacred groves, Wetlands etc. have been completely avoided.

The line length of final route (**Table 4.1**) has been increased by approx. 8.7 km i.e. from 0.5 km to 9.218 km. The line length has been increased so that environment & social sensitive areas are avoided/ minimized and the route was preferred due to feasibility and lesser ROW problems. Though there is an increase in line length, no additional impacts of any kind apart from earlier identified impacts in IEAR/EMP are anticipated. Moreover, environment & social safeguard issues which have been taken care off are: -

- Habitation areas along the route have been completely avoided.
- Reserved Forest areas have been completely avoided
- It is ensured that common property resources (CPR) are not impacted.
- Any areas/monuments of archaeological importance are also not encountered along the route.

- The tree cutting has also been minimized in valley portions along the route.

The line has a total 33 towers. Since the terrain is hilly, leg extension is being utilized in towers to minimize/avoid benching/ revetment and to provide great stability. The types of towers used are double circuit (DB, DC and DD) towers. Out of the total 33 towers, 14 towers are provided with leg extension. All alignments are easily approachable in dry and rainy seasons to enable maintenance throughout the year. All the tower locations are easily accessible through existing road to carryout construction and maintenance activity and construction of new approach road is not required. Details of tower schedule of final route alignment describing important features of line route are placed as **Annexure II.**

4.3.2 Distribution Lines

About 80% of the lines are passing through hilly terrain and 20% through plains i.e. out of the total 9 distribution lines, 7 are in hilly terrain and rest 2 are in plains. These lines mostly pass through private plantation and Govt. lands along existing roads and do not involve any reserve/protected forest land (**refer Figure 4.7- 4.13**). It has been observed that there are some variations in final route length of lines from earlier routes so that environment & social sensitive areas are avoided/ minimized. However, considering that distribution line has minimum environmental footprints and increase in total line length by 8.52 km for all lines (from earlier 46.06 km to 54.58 km) without any change in land use and other base line data, no additional impacts of any kind apart from earlier identified impacts in IEAR/EMP are anticipated. A total of around 848 poles are being/to be erected for all 9 proposed distribution lines having a total line length of 54.58 km.

4.3.2.1 33 kV line from tapping point of existing 33/11 kV Mokokchung - Mariani Line at Longtho Sub-station

The line passes through plain terrain comprising of Govt. land. The selected line does not pass through any National Highway, Railway crossings and Settlement. However, the line is crossing a 11 kV line between pole 1 and pole 2, between pole 4/1 and pole 5 and between pole 12 and pole 13; Chering river between pole 4 and pole 4/1; nala; village road; foot track and shed.

The line length of final route (**Table 4.1**) has been increased by 0.7 km i.e. from 0.5 km to 1.2 km due to further optimization during ground truthing survey. The line length is increased so that environment & social sensitive areas are avoided/ minimized. Moreover, in order to cross Chering river, pole 5/0 is scheduled at a distance of 135 m from pole 4 (refer **Figure 4.22**). It may

be noted that no special provision is envisaged in DL or pole in terms of river crossing. The line has a total 44 poles. The types of poles used are Single Pole (**SP**), Double Pole (**DP**) and Four Pole (**FP**). All the pole locations are easily accessible through existing road to carryout construction and maintenance activity and construction of new approach road is not required.

Figure 4.22: Increase in Length of Span Between Pole 4 and Pole 5 over Chering River

4.3.2.2 33 kV line from 132/33 kV Zunheboto (new) to 33/11 kV Zunheboto South Point (new) Sub-station

The line passes through hilly terrain, comprises of private plantation/ lands owned by village council and Govt. land. The selected line does not pass through any Railway crossings and Settlement. However, the line is crossing National Highway between pole 89 and pole 90; 11 kV line between pole 22 and pole 23, between pole 35 and pole 36 and between pole 44 and pole 45; village road and foot track.

The line length of final route (**Table 4.1**) has been reduced by approx. 1 km i.e. from 6.6 km to 5.53 km due to further optimization during ground truthing survey. Since there is a reduction in line length it is expected that the resultant environmental footprints will be further reduced. The line has a total 93 poles. The types of poles used are Double Circuit Double Pole (**DC DP**) and Double Circuit Four Pole (**DC FP**). All the pole locations are easily accessible through existing road to carryout construction and maintenance activity and construction of new approach road is not required.

4.3.2.3 33 kV line from 66 kV Mokokchung (existing) to 33/11 kV Mokokchung Town Power House (new) Sub-station

The line passes through hilly terrain, comprises of agricultural land, private plantation/ lands owned by village council and Govt. land. The selected line does not pass through any Railway crossings and Settlement. However, the line is crossing National Highway between pole 133 and pole 134; 33 kV line between pole 138 and pole 139 and between pole 144 and pole 145; 11 kV line between pole 96 and pole 97, between pole 130 and pole 131, between pole 133 and pole 134 and between pole 145 and pole 146; nalas; village road, metaled roads; footpath and LT line.

The line length of final route (**Table 4.1**) has been negligible increased by approx. 0.3 km i.e. from 8.7 km to 9 km due to further optimization during ground truthing survey. Since there is a negligible increase in line length it is expected that the resultant environmental footprints will not increase. The line has a total 55 poles without any railways and major river crossings. The types of poles used are SP, DP and FP. All the pole locations are easily accessible through existing road to carryout construction and maintenance activity and construction of new approach road is not required.

4.3.2.4 33 kV line from 66 kV Mokokchung (existing) to 33/11 kV Mokokchung Town Hospital (new) Sub-station

The line passes through hilly terrain, comprises of private plantation/ lands owned by village council and Govt. land. The selected line does not pass through any Railway crossings and Settlement. However, the line is crossing National Highway; 33/11 kV line; nalas; village road, metaled roads and LT line at several locations.

The line length of final route (**Table 4.1**) has been reduced by approx. 4.4 km i.e. from 7.42 km to 3 km due to further optimization during ground truthing survey. Since there is a significant reduction in line length it is expected that the resultant environmental footprints will be further reduced. The line has a total 132 poles without any railways and major river crossings. The types of poles used are SP, DP, FP, Double Circuit Single Pole (**DC SP**), DC DP and DC FP. All the pole locations are easily accessible through existing road to carryout construction and maintenance activity and construction of new approach road is not required.

4.3.2.5 33 kV line from 132/33 kV Pfutsero (new) to 33/11 kV Pfutsero (New) Sub-station

The line passes through hilly terrain, comprises of private plantation/ lands owned by village council. The selected line does not pass through any National Highway, Power line, Railway crossings and Settlement. However, the line is crossing a ditch, village road, footpath and one stream, which do not require any special towers.

The line length of final route (**Table 4.1**) is 3.6 km. The final route avoids market area, habitation and a patch of dense forest. In order to avoid pole in private plantation area and therefore minimizing tree cutting, pole 13 is scheduled at a distance of 713 m from tower pole 12 (refer **Figure 4.23**). Market area has been avoided from pole 18 to pole 21 and human habitation has been avoided from pole 1 to pole 12 (refer **Figure 4.24**). The line has a total 25 poles without any National Highway (NH), railways and major river crossings. The types of poles used are DC DP and DC FP. All the pole locations are easily accessible through existing road to carryout construction and maintenance activity and construction of new approach road is not required.

Figure 4.23: Increase in Length of Span Between Pole 12 and Pole 13

Figure 4.24: Avoidance of Habitation Area at Pfutsero

4.3.2.6 33 kV line from existing 132/66/33 kV Nagarjan Sub-station to new 33/11 kV Padampukhri Sub-station

The line passes through plain terrain, comprises of private plantation/ lands owned by village council and Govt. land. The selected line does not pass through any Railway crossings and Settlement. However, the line travels along NH 129A from pole 90 to 98; from existing 66 kV Nagarjan sub-station to pole 89 it travels along the existing road in Nagarjan area and from pole 90 to proposed new 33/11 kV Padampukhri substation in Padampukhri area. The line does not require any special towers.

The line length of final route (**Table 4.1**) has been increased by approx. 2 km i.e. from 4.34 km to 6.15 km so as to avoid human habitation and private property (refer **Figure 4.25** to **Figure 4.27**). Though there is a significant increase in line length it is expected that the resultant environmental and social footprints will be nil as it travels along existing road and no felling of tree will required, only lopping of tree branches will suffice for ROW clearance. The line has a total 192 poles without any railways and major river crossings. The types of poles used are SP, DP and FP. All the pole locations are easily accessible through existing road to carryout construction and maintenance activity and construction of new approach road is not required.

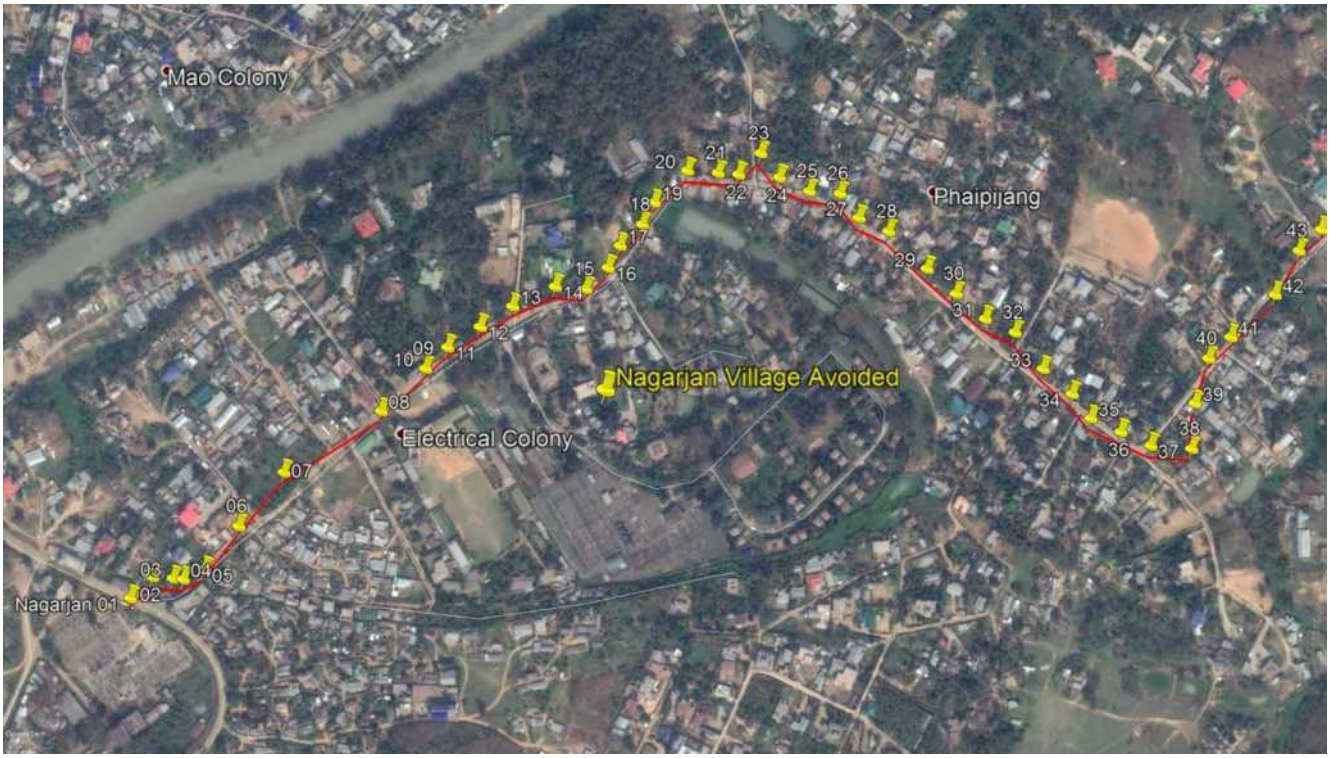


Figure 4.25: Route along the existing Road to Avoid Habitation Area at Nagarjan

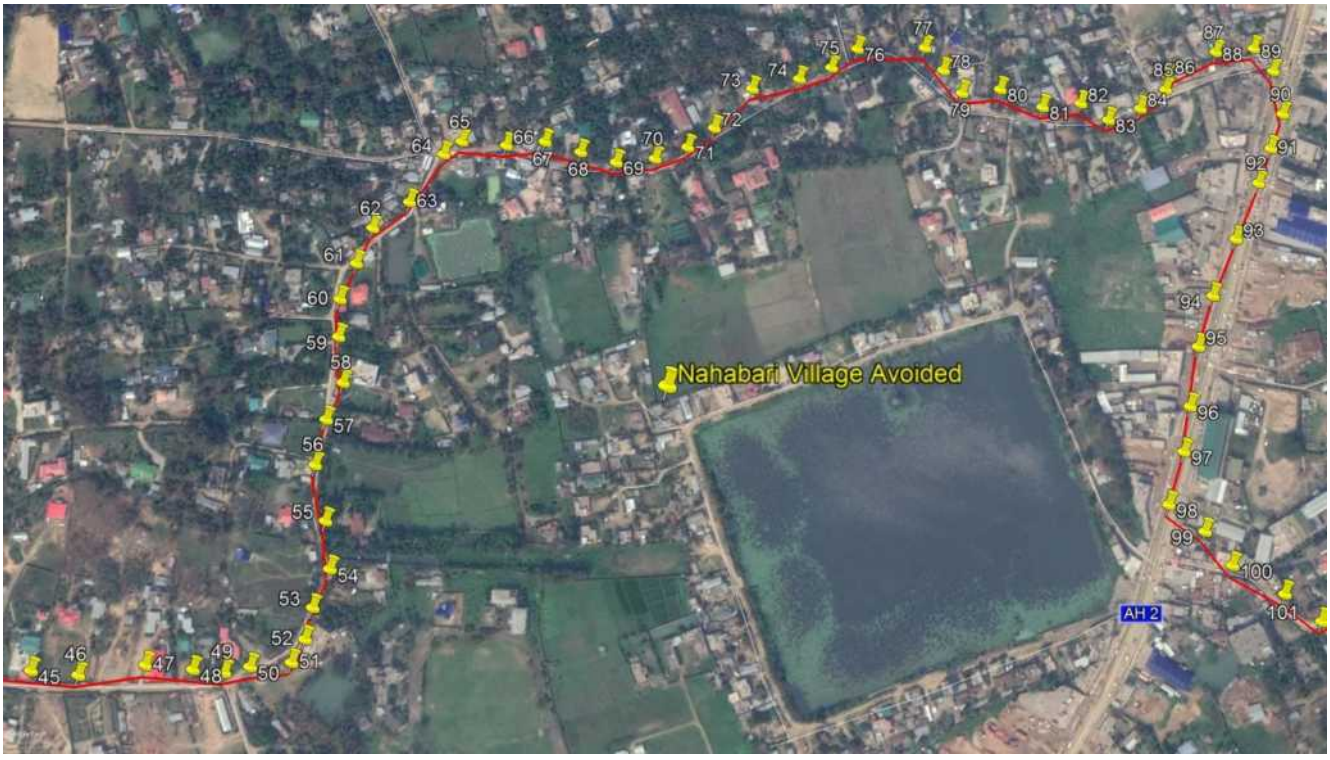


Figure 4.26: Route along the existing Road to Avoid Habitation Area at Naharbari

Figure 4.27: Route along the existing Road to Avoid Habitation Area at Padampukhri

4.3.2.7 33 kV line from 33/11 Akuloto (existing) Sub-station to 33/11 kV Suruhuto (existing) Sub-station

The line passes through hilly terrain, comprises of agricultural land, private plantation/ lands owned by village council and Govt. land. The selected line does not pass through any Railway crossings and Settlement. However, the line is crossing National Highway 702A; 33/11 kV line; nalas; village road, metaled roads, hut, tea garden and LT line at several locations.

The line length of final route (**Table 4.1**) has been increased by approx. 14 km i.e. from 9.5 km to 23.29 km so that environment & social sensitive areas are avoided/ minimized. This route has been preferred due to feasibility and lesser ROW problems. This is the only line which is more than 10 km in length as it travels along the village road and National Highway 702A. The line has a total 252 poles (though *checking of the survey going on due to excessive number of poles/ km*) without any railways and major river crossings. The types of poles used are SP, DP and FP. All the pole locations are easily accessible through existing road to carryout construction and maintenance activity and construction of new approach road is not required.

4.3.2.8 33 kV line from existing 33/11 kV Pughoboto Sub-station to existing 33/11 kV Torogonyu Sub-station

The line passes through hilly terrain, comprises of agricultural land and private plantation/ lands owned by village council. The selected line does not pass through any Railway crossings and Settlement. However, the line is crossing

National Highway 2 at several locations; 33 kV line between pole 38 and pole 39; village road; LT line; foot track and metaled road.

The line length of final route (**Table 4.1**) has been reduced by approx. 7 km i.e. from 9 km to 2.27 km due to further optimization during ground truthing survey. Since there is a significant reduction in line length it is expected that the resultant environmental footprints will be further reduced. Moreover, in order to avoid tower in private plantation area and therefore minimizing tree cutting, pole 10 is scheduled at a distance of 163 m from pole 9. The line has a total 42 poles without any railways and major river crossings. The types of poles used are SP, DP and FP. All the pole locations are easily accessible through existing road to carryout construction and maintenance activity and construction of new approach road is not required.

4.4 PROJECT IMPACTS

Based on the project details and the baseline environmental status, potential impacts due to the construction/ bay extension of sub-stations and along the final route of transmission and distribution lines have been assessed.

4.4.1 Impact of Transmission & Distribution Lines

The project does not require any private land acquisition for construction of transmission/distribution lines. Therefore, no physical displacement is foreseen in the project. However, there are some social impacts due to construction of lines/placing of towers & poles which are temporary in nature i.e. impacts in terms of loss of standing crops/trees/structures in the RoW, which lasts during construction phase only. The construction phase itself is very limited. Detailed survey has been carried out for transmission/distribution line to estimate/ arrive at impacts.

4.4.1.1 Type and Use of Land within Corridor Right of Way

The line corridor will pass through mixed land uses which are generally agricultural land, private plantation, government land etc. The calculations are based on detailed survey/ investigation carried out along the route of transmission/distribution lines and considering the total line length of the line and its right of way. The total line length is 217.91 km which will impact an estimated of 1463.25 acre of land. These include 19.11 km of line passing through agricultural land (137.82 acre of agricultural land), 186.72 km of private plantation (1261.28 acre of private plantation land) and 11.99 km of government land (61.16 acre of government/ barren land). A brief description about the type and use of land in the corridor is given in **Table 4.3**.

Table 4.3: Type and Use of Land within Corridor of RoW

S. No.	Name of Line	RoW Width (m)	Agricultural Land		Private Plantation		Forest Land		Govt. Land		Total	
			Length (km)	Area (acre)	Length (km)	Area (acre)	Length (km)	Area (acre)	Length (km)	Area (acre)	Length (km)	Area (acre)
A	**Transmission Lines**											
1	132 KV D/C New Kohima (Zhadima) to New Secretariat Complex (NU campus)	27	1.5	10.01	11.97	79.86	Nil	Nil	0.5	3.34	**13.97**	**93.20**
2	220 KV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha	35	8.637	74.70	76	657.28	Nil	Nil	2	17.30	**86.637**	**749.27**
3	132 kV S/C (on D/C tower) Wokha-Zunheboto-Mokokchung	27	5	33.36	42.993	286.83	Nil	Nil	2.3	15.34	**50.293**	**335.54**
4	LILO of 132kV S/C Mokokchung-Mariani at Longnak	27	Nil	Nil	0.804	5.36	Nil	Nil	Nil	Nil	**0.804**	**5.36**
5	LILO of both ckts of 132kV D/C Kohima-Meluri (Kiphire) line at Pfutsero	27	Nil	Nil	2.411	16.09	Nil	Nil	Nil	Nil	**2.411**	**16.09**
6	LILO of 132kV S/C Kohima-Wokha at new Kohima	27	1.7	11.34	7	46.70	Nil	Nil	0.518	3.46	**9.218**	**61.50**
	Sub Total		**16.837**	**129.40**	**141.18**	**1092.12**	**Nil**	**Nil**	**5.318**	**39.43**	**163.333**	**1260.96**
B	**Distribution Lines**											
7	Existing 33 kV Mok -Mariani line to prop. 33/11 kV Longtho S/s	15	Nil	Nil	Nil	Nil	Nil	Nil	1.2	4.45	**1.2**	**4.45**
8	Existing 66/33kV Mokokchung S/s to New 33/11kV s/s Mokokchung Town Power House	15	1	3.71	7	25.95	Nil	Nil	1	3.71	**9**	**33.36**
9	Existing 66/33kV Mokokchung S/s to New 33/11kV s/s Mokokchung Town Hospital Area	15	Nil	Nil	2.5	9.27	Nil	Nil	0.5	1.85	**3**	**11.12**
10	New 132/33kV Zunheboto S/s to New 33/11kV s/s Zunheboto South Point	15	Nil	Nil	5	18.53	Nil	Nil	0.53	1.96	**5.53**	**20.50**
11	Existing 33/11kV Suruhuto S/s to Exist. 33/11kV s/s Akuloto	15	1	3.71	20	74.13	Nil	Nil	2.29	8.49	**23.29**	**86.32**
12	Existing 33/11kV Pughoboto S/s to Exist. 33/11kV s/s Torogonyu	15	0.27	1.00	2	7.41	Nil	Nil	Nil	Nil	**2.27**	**8.41**
13	132/33kV Kohima (New) SS to 33/11kV	15	Nil	Nil	0.54	2.00	Nil	Nil	Nil	Nil	**0.54**	**2.00**

S. No.	Name of Line	RoW Width (m)	Agricultural Land		Private Plantation		Forest Land		Govt. Land		Total	
			Length (km)	Area (acre)	Length (km)	Area (acre)	Length (km)	Area (acre)	Length (km)	Area (acre)	Length (km)	Area (acre)
	Zhadima											
14	New 132/33kV Pfutsero SS to New 33/11kV Pfutsero	15	Nil	Nil	3.6	13.34	Nil	Nil	Nil	Nil	**3.6**	**13.34**
15	Existing 132/66/33kV Nagarjan s/s to New 33/11kV s/s Padam Pukhri	15	Nil	Nil	5	18.53	Nil	Nil	1.15	4.26	**6.15**	**22.79**
	Sub Total		**2.27**	**8.41**	**45.64**	**169.16**	**Nil**	**Nil**	**6.67**	**24.722**	**54.58**	**202.3**
	TOTAL		**19.11**	**137.82**	**186.82**	**1261.28**	**0.00**	**0.00**	**11.99**	**64.16**	**217.91**	**1463.25**

Source: Detailed Survey of POWERGRID/ Contractor

4.4.1.2 Impact on Soil & Surface Geology

In plain areas impact on soil & geology is almost negligible as the excavated pit material is stacked properly and back filled as well as used for resurfacing the area. On hill slopes where soil is disturbed and prone to erosion is suitably protected by revetment, breast walls, and proper drainage. Besides extensive leg /chimney extension is being used to avoid benching or cutting of slopes to minimize the impact on slope stability. In all there are 542 towers proposed under 5 transmission lines to be constructed in hilly terrain. Of these 542 towers, around 66% of the towers i.e. 359 are being provided with leg extension/ chimney extension.

4.4.1.3 Impact on Land for Tower Base & Pole

As per the assessment carried out in Compensation Plan for Temporary Damages (CPTD) by PGCIL, the land requirement for erection of tower legs is very small i.e. for each leg of tower actual construction is done on a small square area with side length ranging from 0.20 to 0.30 meter depending on the types of tower. Four such square pieces of land will be required to place the legs of tower. The area that becomes unavailable because of the erection of tower legs for an average 132 kV D/c transmission tower ranges from 0.16-0.36 sq m of land. Thus, the actual impact is restricted to 4 legs of the tower and agriculture can continue as clearly depicted in the **Figure 4.28**. In case of 33 kV distribution line area that becomes unavailable because of the erection of pole is insignificant as approx. 1 sq. ft. land area is occupied for one pole (refer **Figure 4.29**). Due diligence confirms that land is either agricultural or barren, and current land use is not altered and resumed after construction.

As already explained, the impact of transmission line is restricted to 4 legs of the tower and agriculture can continue after construction activity is over. The average land area will be unavailable for agriculture after erection of one 220kV/132 kV T/L tower and one pole for 33 kV D/L is approx. 0.25 sq m & 0.092 sq m, respectively. Based on above, total land loss for construction 86.637 km of 220kV transmission line, construction of 76.696 km of 132 kV transmission line and 54.58 km of 33 kV distribution line proposed under the present scheme is estimated 0.053 acre. However, compensation toward loss land shall be provided to APs which is part of RoW compensation. Details of land loss for tower base & pole are given in **Table 4.4**.

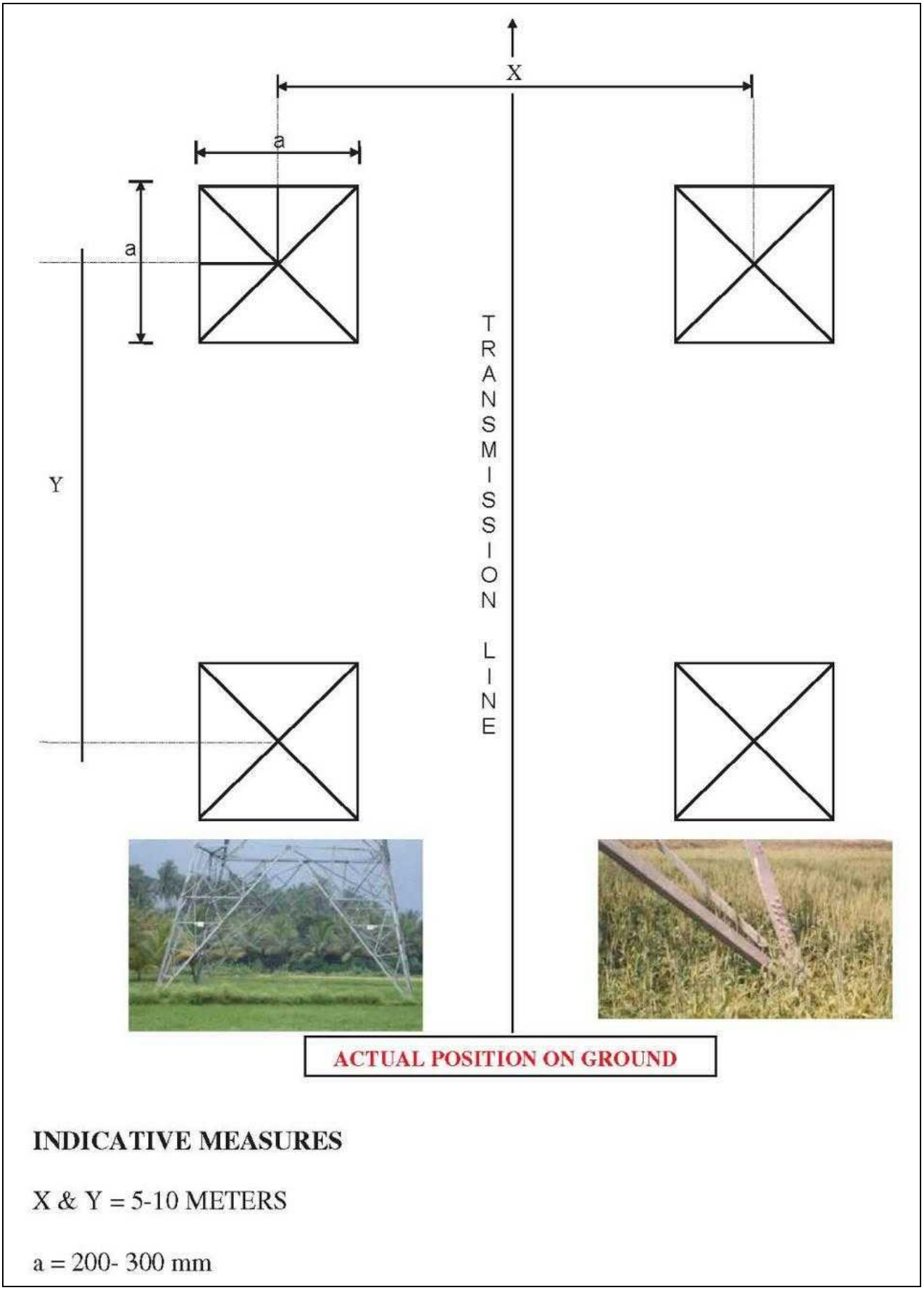


Figure 4.28: Typical Plan of Transmission Line Tower Footing

Figure 4.29: 33 kV Lines (Single & H Pole) Depicting Base Area Impact

Table 4.4: Estimation of Actual Loss of Land for Tower Base & Pole

S. No.	Name of Line	Line Length (Kms.)	Total Tower/ Pole (Nos.)	Land loss per tower/ pole base (sq m)	Total land loss area for tower & pole base (sq m)
A	**Transmission Lines**				
1	132 KV D/C New Kohima (Zhadima) to New Secretariat Complex (NU campus)	13.97	48	0.25	12
2	220 KV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha	86.637	285	0.25	71.25
3	132 kV S/C (on D/C tower) Wokha-Zunheboto-Mokokchung	50.293	166	0.25	41.5
4	LILO of 132kV S/C Mokokchung-Mariani at Longnak	0.804	5	0.25	1.25
5	LILO of both ckts of 132kV D/C Kohima-Meluri (Kiphire) line at Pfutsero	2.411	10	0.25	2.5
6	LILO of 132kV S/C Kohima-Wokha at new Kohima	9.218	33	0.25	8.25
	TOTAL - A	**163.333**	**547**		**136.75 ≅ 0.034 acre**
B	**Distribution Lines**				
7	Existing 33 kV Mok -Mariani line to prop. 33/11 kV Longtho S/s	1.2	44	0.092	4.048
8	Existing 66/33kV Mokokchung S/s to New 33/11kV s/s Mokokchung Town Power House	9	55	0.092	5.06
9	Existing 66/33kV Mokokchung S/s to New 33/11kV s/s Mokokchung Town Hospital Area	3	132	0.092	12.144
10	New 132/33kV Zunheboto S/s to New 33/11kV s/s Zunheboto South Point	5.53	93	0.092	8.56
11	Existing 33/11kV Suruhuto S/s to Exist. 33/11kV s/s Akuloto	23.29	252	0.092	23.184
12	Existing 33/11kV Pughoboto S/s to Exist. 33/11kV s/s Torogonyu	2.27	42	0.092	3.864
13	132/33kV Kohima (New) SS to 33/11kV Zhadima	0.54	13	0.092	1.196
14	New 132/33kV Pfutsero SS to New 33/11kV Pfutsero	3.6	25	0.092	2.3
15	Existing 132/66/33kV Nagarjan s/s to New 33/11kV s/s Padam Pukhri	6.15	192	0.092	17.67
	TOTAL - B	**54.58**	**848**		**78.026 ≅ 0.019 acre**
	TOTAL A+B	**217.913**	**1395**		**214.776 ≅ 0.053 acre**

Source: Detailed Survey of POWERGRID/ Contractor

4.4.1.4 Impact on Crop Area (RoW Corridor & Tower/Pole)

Construction of line in crop season is avoided as far as possible. In case when installation of towers/poles impacts on agricultural activity, detailed assessment/survey is conducted looking at existing crops, general crop patterns, seasonal particulars, nature and extent of yield. This data is compiled and analysed to study the extent and nature of impact.

For the temporary loss of crops, only agricultural land and private plantation land are considered for estimation. The damages are not done in complete RoW of line (35m for 220kV D/c & 27 m for 132 kV D/c) but mostly restricted to tip to tip of the conductor and tower base area where average affected width/corridor would be limited to 27 & 20 meter (maximum). In 33 kV distribution lines, damages are minimal (mostly near bi-pole/quad-pole structure) however, 10 m corridor is considered for accessing the damages. Moreover, all efforts are made to reduce the damages to crops and to minimize the impacts whatsoever. One of the reasons is that schedules of construction activities are undertaken in lean season or post-harvest periods. Assets of any sorts will not be acquired but during construction, only temporary damages will occur. Based on the above estimation, the total land considered for crop damage for transmission/distribution line corridor and tower/pole foundation for the entire subproject is 1056.99 acre. Details of estimated impacted area for crop damages are given in **Table 4.5**.

4.4.1.5 Impact on Trees

Construction of line in fruit bearing season is avoided as far as possible. Tree compensation is calculated on the basis of tree enumeration, tree species and an estimate of the compensation will be calculated on the basis of 8 years yield (assessed by revenue/horticulture department).

Total numbers of trees likely to be affected due to construction of 163.333 km of 220kV/132 kV line and for 54.58 km of 33 kV distribution line is approx. 16096 nos., out of which 14104 are private trees and 1996 trees in govt. land. Additionally, 5100 nos. bamboo trees are also likely to be affected. The major species to be affected are Bamboo (*Bambusa balcooa*), Orange tree (*Citrus x sinensis*), Banana (*Musa acuminata*), Tiksung (*Tectona grandis*) & Gooseberry (Phyllanthus *emblica*). As per the conservation status by IUCN 2020.1, all the species falls under LC category. Details on number of trees for each line are given in **Table 4.6**.

Table 4.5: Estimation on Loss of Land for Crop Damage due to Overhead Lines

S. No.	Name of Line	Width Considered for Estimation of Loss of Crops and other impacts (m)	Total Agricultural Land (km)	Total Private Plantation (km)	Total Line Length Considered for Crop Compensation (km)	Total Land Area considered for Crop Compensation (acre)
A	**Transmission Lines**					
1	132 KV D/C New Kohima (Zhadima) to New Secretariat Complex (NU campus)	20	1.5	11.97	13.47	66.57
2	220 KV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha	27	8.637	76	84.637	564.66
3	132 kV S/C (on D/C tower) Wokha-Zunheboto-Mokokchung	20	5	45.293	50.293	248.54
4	LILO of 132kV S/C Mokokchung-Mariani at Longnak	20	Nil	0.804	0.804	3.97
5	LILO of both ckts of 132kV D/C Kohima-Meluri (Kiphire) line at Pfutsero	20	Nil	2.41	2.41	11.91
6	LILO of 132kV S/C Kohima-Wokha at new Kohima	20	1.7	7	8.7	42.99
	TOTAL - A		**16.83**	**143.48**	**160.31**	**938.64**
B	**Distribution Lines**					
7	Existing 33 kV Mok -Mariani line to prop. 33/11 kV Longtho S/s	10	Nil	Nil	Nil	Nil
8	LILO of Existing 33kV Mok -Mariani line at Exist. 33/11 kV Longnak S/s	10	Nil	Nil	Nil	Nil
9	Existing 66/33kV Mokokchung S/s to New 33/11kV s/s Mokokchung Town Power House	10	1	7	8	19.76
10	Existing 66/33kV Mokokchung S/s to New 33/11kV s/s Mokokchung Town Hospital Area	10	Nil	2.5	2.5	6.18
11	New 132/33kV Zunheboto S/s to New 33/11kV s/s Zunheboto South Point	10	Nil	5	5	12.35
12	Existing 33/11kV Suruhuto S/s to Exist. 33/11kV s/s Akuloto	10	1	20	21	51.89
13	Existing 33/11kV Pughoboto S/s to Exist. 33/11kV s/s Torogonyu	10	0.27	2	2.27	5.60
14	132/33kV Kohima (New) SS to 33/11kV Zhadima	10	Nil	0.54	0.54	1.33
15	New 132/33kV Pfutsero SS to New 33/11kV Pfutsero	10	Nil	3.6	3.6	8.89
16	Existing 132/66/33kV Nagarjan s/s to New 33/11kV s/s Padam Pukhri	10	Nil	5	5	12.35
	TOTAL - B		**2.27**	**45.64**	**47.91**	**118.35**

Source: Detailed Survey of POWERGRID/ Contractor

Table 4.6: Loss of Trees

S. No.	Name of Line	Trees in Private Area (No.)	Trees in Govt. Area (No.)	Total Trees (No.)
A	**Transmission Lines**			
1	132 KV D/C New Kohima (Zhadima) to New Secretariat Complex (NU campus)	1304+400 Bamboo	280+100 Bamboo	1584+500 Bamboo
2	220 KV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha	5000+2200 Bamboo	700+380 Bamboo	5700+2580 Bamboo
3	132 kV S/C (on D/C tower) Wokha-Zunheboto-Mokokchung	4400+1200 Bamboo	580+300 Bamboo	4980+1500 Bamboo
4	LILO of 132kV S/C Mokokchung-Mariani at Longnak	140	10	150
5	LILO of both ckts of 132kV D/C Kohima-Meluri (Kiphire) line at Pfutsero	300	20	320
6	LILO of 132kV S/C Kohima-Wokha at new Kohima	1000+200 Bamboo	152+70 Bamboo	1152+270 Bamboo
	TOTAL - A	**12144+4000 Bamboo**	**1742+850 Bamboo**	**13886+4850 Bamboo**
B	**Distribution Lines**			
7	Existing 33 kV Mok -Mariani line to prop. 33/11 kV Longtho S/s	20	10	30
8	LILO of Existing 33kV Mok -Mariani line at Exist. 33/11 kV Longnak S/s	20	10	30
9	Existing 66/33kV Mokokchung S/s to New 33/11kV s/s Mokokchung Town Power House	250	30	280
10	Existing 66/33kV Mokokchung S/s to New 33/11kV s/s Mokokchung Town Hospital Area	90	10	100
11	New 132/33kV Zunheboto S/s to New 33/11kV s/s Zunheboto South Point	250	30	280
12	Existing 33/11kV Suruhuto S/s to Exist. 33/11kV s/s Akuloto	920+200 Bamboo	100+50 Bamboo	1020+250 Bamboo
13	Existing 33/11kV Pughoboto S/s to Exist. 33/11kV s/s Torogonyu	70	NIL	70
14	132/33kV Kohima (New) SS to 33/11kV Zhadima	30	NIL	30
15	New 132/33kV Pfutsero SS to New 33/11kV Pfutsero	160	10	170
16	Existing 132/66/33kV Nagarjan s/s to New 33/11kV s/s Padam Pukhri	150	50	200
	TOTAL - B	**1960+200 Bamboo**	**250+50 Bamboo**	**2210+250 Bamboo**
	TOTAL A+B	**14104+4200 Bamboo**	**1992+900 Bamboo**	**16096+5100 Bamboo**

Source: Detailed Survey of POWERGRID/ Contractor

4.4.1.6 Impact on Other Assets (Small Shed in Agriculture Fields)

It has been observed during survey that approximately 10 numbers of small structures exist along the right of way of proposed transmission lines. No such structures exist along the right of way of distribution lines. These are small storage sheds/huts which are mostly temporary structure associated with the

agricultural fields. People do not use these small structures/sheds for residential purpose and they use it as storage of agricultural purpose only. Details on impacts on small structures are given in **Table 4.7**.

Table 4.7: Loss of Other Assets

S. No.	Name of Line	No. of Storage Sheds/ Huts
A	**Transmission Lines**	
1	132 KV D/C New Kohima (Zhadima) to New Secretariat Complex (NU campus)	8
2	220 KV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha	2
3	132 kV S/C (on D/C tower) Wokha-Zunheboto-Mokokchung	0
4	LILO of 132kV S/C Mokokchung-Mariani at Longnak	0
5	LILO of both ckts of 132kV D/C Kohima-Meluri (Kiphire) line at Pfutsero	0
6	LILO of 132kV S/C Kohima-Wokha at new Kohima	0
	TOTAL	**10**

Source: Detailed Survey of POWERGRID/ Contractor

4.4.1.7 Other Damages

Other damages like bunds, water bodies, fish ponds, approach paths, drainage and irrigation canals etc. are at best avoided. However, if damaged, the Revenue Department assesses the cost of damage as per State Govt. norms. The total estimate is submitted for approval to the competent authority. Payments are made to owners in the presence of local revenue authorities or village head/ Sarpanch and respective acknowledgements are obtained and POWERGRID/ DPN pays the compensation. Hindrances to power, telecom carrier & communication lines etc. shall be paid as per Govt. norms.

4.4.2 Impact Due to Construction of New Substation and Bay Extension

The project component consists of establishment/ bay extension of eight 132/33 kV sub-stations i.e. at Longnak, New Secretariat Complex Kohima, Pfutsero and Zunheboto and twenty three 33/11 kV sub-stations However, only in case of 5 substations, fresh lands were secured through private purchased on negotiated rates based on “willing buyer-willing seller basis”. For remaining new sub-stations and bay extensions of the EHV and DMS substations land is already available with DPN. Since involuntary acquisition is involved, R&R will not be an issue in the instant project. The details are provided in **Table 1.6** of Chapter 1.

The other environmental impacts that impact environment due to construction/ bay extension of sub-station are uncontrolled silt runoff, nuisance to nearby area, inadequate resurfacing for erosion control, inadequate disposition of borrow area, workers health/ safety. All these impacts and their management are discussed in detail in Chapter 5.

Another impact is construction of access road. Access to all the new/ existing sub-stations will be along existing roads or village paths; minor improvements to paths may be made where necessary, but no major construction of roads, except, 132/33 kV sub-stations at Zunheboto, Secretariat Complex and Pfutsero where approach road of 2 km, 300 m and 200 m respectively is proposed/ under implementation will be necessary during construction.

The approach road at Secretariat Complex and Pfutsero is proposed/ being constructed on already acquired land for the construction of sub-station. The approach road of 2 km for 132/33 kV Zunheboto sub-station is proposed from Lizo old village to sub-station. Presently, it is an existing foot path only on community land, being used by villagers for movement from their home to agricultural field. Since the approach road will be utilized during construction phase only, whereas for villagers it will be a permanent upgradation of their footpath to road, therefore, villagers have given their consent for this expansion. In many areas such improvement in the access road is highly appreciated by the local population. Since none of these segments require any additional land and thus have insignificant environmental and social impacts, these would fall in low risk category as per E & S screening criteria.

However, Construction of road may lead to soil erosion, increase the airborne dust particles, nuisance to nearby area, require land for temporary accessibility etc. Impacts due to road construction and its management are discussed in detail in Chapter 5.

4.4.3 Impact on Indigenous People

Government of India, under Article 342 of the Constitution, considers the following characteristics to define indigenous peoples [Scheduled Tribes (ST)]:

i. tribes' primitive traits;
ii. distinctive culture;
iii. shyness with the public at large;
iv. geographical isolation; and
v. social and economic backwardness before notifying them as a Scheduled Tribe.

Essentially, indigenous people have a social and cultural identity distinct from the 'mainstream' society that makes them vulnerable to being overlooked or marginalized in the development processes. STs, who have no modern means of subsistence, with distinctive culture and are characterized by socio-economic backwardness, could be identified as Indigenous Peoples. Indigenous people are also characterized by cultural continuity. Constitution of India identifies schedule areas which are predominately inhabited by such people.

The State of Nagaland is pre-dominantly a tribal state with > 89% population, inhabited by 16 major tribes under the umbrella term of the 'Naga', and along with a number of sub-tribes. Accordingly, special provision has extended to the State under Article 371 A of the Constitution of India which provides "no act of parliament in respect of religious and social practices of the Naga, Naga customary laws and procedures, administration of civil and criminal justices involving decisions according to Naga customary law and ownership and transfer of land and its resources shall apply to the state of Nagaland, unless Legislative Assembly of the state, by a resolution, so decides.

Since, the project under NERPSIP is envisaged for economic uplifting of the NE region, hence, no indigenous population will be negatively impacted in the project area. However, It may be noted that all social issues shall be dealt separately in accordance with the provisions of Social Management Framework (SMF, A-C) placed in the Further, It may be noted that all social issues shall be dealt separately in accordance with the provisions of Social Management Framework (SMF, A-C), placed in the ESPPF of DPN".

4.4.4 Summary of Impacts

Based on the above analysis of final route of transmission and distribution lines and location of EHV and DMS sub-stations, the summarized environmental & social impact matrix is presented below in **Table 4.8**.

Table 4.8: Summary of Impacts

S. No.	PARAMETERS	EXTENT OF IMPACT
1. A.	**Total Line length -** (TL -163.333 km, DL- 54.58 km)	The TL length has reduced by approx. 14 km, while the DL length has increased by approx. 8.5 km. Due to significant reduction in final route of 220/ 132kV line length, it is expected that resultant environmental footprints will be less as envisaged earlier. Though final route length of DL has increased, still no additional impacts of any kind apart from earlier identified impacts in IEAR/ EMP are anticipated as there is no change in land use and other base line data. Moreover, changes in the final route length have been made so as to avoid/ minimize environment & social sensitive areas. As compared to IEAR, no additional impacts are anticipated.
B.	**Terrain:** Plain area- 0.804 km (TL)+ 7.35 km (DL); Hilly area- 162.529 km (TL)+ 47.23 (DL)	Almost entire (approx. 96%) of lines are passing through hilly area and remaining approx. 4% through plains Similarly, around 80% of sub-stations to be constructed/ augmented are in hilly areas and the remaining 20% are in plains. Hence, provisions for revetment, breast walls, and proper drainage etc. have been made. Besides extensive leg /chimney extension is being used to avoid benching or cutting of slopes to minimize the impact on slope stability.
2.	Forest land traversed (km)	No notified forest. Only private plantation of approx. 190 km of total line length having vegetation encountered. It is estimated that maximum 16906 trees and 5100 bamboo will be felled. Further, in hilly area due to additional height gain of towers and availability of adequate clearance tree felling will be further minimized.

3.	Forest type	NA
4.	Forest density	NA
5.	Rare/endangered flora	No rare/endangered flora found in project area.
6.	Rare/ endangered fauna	No rare/endangered flora found in project area.
7.	Migrating Wildlife/ breeding ground	NA
8.	National Park / sanctuaries	No protected areas involved
9.	Wet land traversed	None
10.	Soil erodibility	Low
11.	Historical / Cultural monuments	None
12.	Total Affected Persons (APs)	As per assessment carried out under CPTD, total APs are 1149, of which 568 are due to TLs and 581 are due to DLs. All APs will be compensated as per the Govt. norms.
13.	Relocation of villagers	None
14.	Area of actual land loss under Tower Base	Total 0.053 acre of actual loss of land will be taking place under tower/ pole base, of which 0.034 will be under tower base and 0.019 under tower. This loss is temporary in nature i.e. during construction time only. APs will be compensated for actual land loss.
15.	Affected Structures	10 small sheds being used for agricultural purpose shall be affected due to TLs. APs will be compensated for affected structures.
16.	Temporary Damage to Crop	Total 1056.99 acre of area has been estimated to come under temporary damage to crop. This loss is temporary in nature i.e. during construction time only. APs will be compensated for actual land loss.
17.	Loss/ Hindrance to Public Utilities	Negligible, restricted to construction phase only.

Chapter 5 POTENTIAL ENVIRONMENTAL IMPACTS, EVALUATION AND ITS MANAGEMENT

5.1 INTRODUCTION

Environmental impacts of Transmission & Distribution (T & D) projects are not far reaching and are mostly localized to RoW (refer **Table 5.1**). However, T & D projects have some effects on natural and socio-culture resources. All possible measures have been taken during the finalization of route alignment as described in the earlier chapter for the proposed transmission/distribution system, however, due to the peculiarity of terrain where project is being implemented, some environmental impacts may be there. The explanations in brief with regard to possible environmental impact and measures taken to minimize the same are given in ensuing paragraph.

Table 5.1: RoW Width & Clearance between Conductors and Trees

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

5.2 IMPACT DUE TO PROJECT LOCATION AND DESIGN

5.2.1 Resettlement

Land is required for
a) erection of towers/ pole for transmission and distribution lines and
b) construction of substations.

As explained in previous chapter during line routing stage itself all measures have been undertaken by IA to avoid settlements such as cities, villages etc. in line with the guiding principle of avoidance as per ESPPF. During detail survey modern techniques/tools like GIS, GPS, and aerial photography were utilized to further optimization the final route alignment avoiding human habitation and other ecological and socially sensitive areas. Moreover, the project does not require any resettlement of villagers as no land is acquired for tower/pole foundation as per existing law.

The present project involves construction of 3 new 132/33 kV sub-stations at Longnak, Pfutsero and Zunheboto; one new 33/11 kV sub-stations at Padam Pukhri and Capacity augmentation of one existing 33/11 kV sub-station at

Wokha Power House for which fresh lands have been secured through private purchase on willing–buyer and willing-seller basis on negotiated/market rate. A total of 25.49 acre land has been secured for these sub-stations from 15 private persons who willing sold their land. Apart from this, for the construction of new 132/33 kV sub-station at New Secretariat and 33/11 kV sub-stations at Longtho, Zunheboto South Point, Mokokchung Power House, Mokokchung Town Hospital Area, Zhadima (Chiephobozou), Pfutsero, Tizit and Lalmati (Zubza), 6.91 acre of Govt. land has been provided by DPN. In addition, the augmentation/extension work at sub-stations are being undertaken in the already existing DPN sub-stations premise and no acquisition of fresh land was required for this purpose. Since, no involuntary acquisition was involved and fresh lands were secured only through private purchase there is no R & R and resettlement issues.

5.2.2 Land Value Depreciation

It is evident that electric power being an enabler sector acts as a catalyst for the growth and development of areas having accessibility to it. Based on past experience land prices are generally expected to rise in the areas receiving power. In the present project, transmission lines pass through agriculture fields, private plantation area and govt. land (mostly uninhabited and scrub land), where the land-use is not going to change in foreseeable future. Therefore, the value of land is not adversely affected to a significant degree. Moreover, distribution lines are primarily intended to provide power supply to populated area which boost the economic status as well as land price of the area, thus, outweighing possible negative impacts, if any.

5.2.3 Historical/Cultural Monuments/Value

Final routes of transmission and distribution line and sites for construction of new sub-stations don't involve any monuments of historical or cultural significance.

5.2.4 Encroachment into Precious Ecological Areas

In accordance with the policy of route selection, IA/Utility have taken all precautions right from the planning stage itself to avoid routing of line through forest, protected areas like national park, wildlife sanctuary, biosphere reserve/ biodiversity hotspot and other ecological sensitive areas. In the instant scheme, forest area covered under Forest (Conservation) Act, 1980 has been completely avoided with careful selection of route alignment, therefore, provisions of the Forest (Conservation) Act, 1980 shall not prevail. However, in case of felling of trees in non-designated forest areas i.e. areas under the control of individual/community/village councils, mitigation measures as referred in ESPPF shall be undertaken. The mitigation measure as suggested in ESPPF for minimizing adverse impact on forests in non-designated forest areas states that DPN/IA shall provide fund for

compensatory afforestation for planting 3 trees for every tree to be felled subject to availability of land. Accordingly, provision of Rs. 177 lakhs (@ 1 lakh/km) has been kept in budget towards voluntary afforestation program in the ratio of 1:3. The estimated no. of tree to be felled are 16096, additionally 5100 bamboo trees are also likely to be affected. In addition, suitable management measures like minimizing RoW requirement, use of tall or extended tower (3-9 m) etc., wherever feasible, is being undertaken to minimize the loss of vegetation.

5.2.5 Encroachment into Other Valuable Lands

The final route of transmission and distribution line passes through agricultural land (approximately 9%), most through private plantation (approximately 87%) and the remaining approximately 4% passes through government land. As per existing law, land for tower/pole & right of way is not acquired and ownership of land remains with the owner and agricultural activities are allowed to continue after construction activity. However, as per existing laws, compensation for all damages (tree/crop) are paid to the individual land owner. Additionally, land compensation @100% land value for tower base is also paid to land owner as per prevailing practices. In case of 33 kV distribution line, area that becomes unavailable because of the erection of pole is insignificant as approximately one sq. ft. land area is occupied for one pole. As already mentioned in Table 4.4, total land loss area for 848 poles is only 0.019 acre, therefore, land value for pole base is not considered for land compensation.

In the instant case, all the 547 tower locations are falling either on private land or community land or government land. Since the tower locations are falling under various villages of 6 districts, No Objection Certificates (NoC) from concerned land owner/ Headman /Village Council are being obtained as per the progress of work **(Annexure III** highlights the NoCs already obtained**)**. The agriculture, horticulture departments have been approached to determine the rates of compensation for the paddy fields and rubber/ tea/ coffee respectively. Similarly, for land compensation, the land rate has been fixed by District Collector/ ADCs. In line with the compensation procedures laid down in ESPPF & CPTD, compensation towards damage to tree/crop and land diminution value have been paid to affected persons after assessment of actual damage based on market rate and verification by concerned revenue authorities. A sample case of compensation payment including notice to land owner, assessment and verification by revenue authority and payment to affected person etc. is enclosed as **Annexure IV**.

The status of crop & tree compensation and land compensation for tower base and corridor plan up to March 2020 has been given in **Table 5.2** and **Table 5.3** respectively.

Table 5.2: Status of Crop & Tree Compensation

Name of the Line		220 kV S/C New Kohima-Wokha-Mokokchung	132 kV D/C Kohima-New Sec. Complex	132 kV S/C Wokha-Zunheboto-Mokokchung	LILO132 kV S/C Mokokchung-Mariani	LILO 132kV S/c Kohima-Wokha	LILO 132 kV D/c Kohima-Meluri	Total
Affected Persons (APs) issued with notice (No.)		95	21	0	5	14	10	**145**
Compensation already paid to APs (No.)		53	16	0	5	0	0	**74**
Compensation for APs under progress (No.)		42	5	0	0	14	10	**71**
Affected Land Area (ha)		0.668	0.148	0	0.038	0.121	0.038	**1.013**
Compensation Paid for crop damages (Rs. Lakhs)	Foundation	0	0	0	0	0	0	0
	Erection	0	0	0	0	0	0	0
	Stringing	0	0	0	0	0	0	0
Total Tree Affected (No.)		2349	283	0	43	944	0	**3619**
Compensation Paid for Tree damages (Rs. in Lakh)	Foundation	6.75	1.05	0	0.07	0.00	0.00	**7.87**
	Erection	0	0	0	0	0	0	0
	Stringing	0	0	0	0	0	0	0
No. of Pending cases/ non-eligible cases with details thereof (e.g. Govt land/title disputes/ any other reasons)		NIL						

Table 5.3: Status of Land Compensation for Tower Base and Corridor

Name of the Line	220 kV S/C New Kohima-Wokha-Mokokchung	132 kV D/C Kohima-New Sec. Complex	132 kV S/C Wokha-Zunheboto-Mokokchung	LILO132 kV S/C Mokokchung-Mariani	LILO 132kV S/c Kohima-Wokha	LILO 132 kV D/c Kohima-Meluri	Total
Total Foundation Completed (No.)	73	23	10	5	14	8	**133**
Total Affected Persons for Tower Foundation (No.)	95	25	12	5	14	10	**166**
Compensation already paid to Affected Persons (No.)	53	16	0	5	0	10	**84**
Compensation for APs under progress (No.)	42	5	10	0	14	0	**71**
Total Compensation paid for Tower	68.40	14.40	0	21.25	0	10.09	**114.14**

Name of the Line	**220 kV S/C New Kohima-Wokha-Mokokchung**	**132 kV D/C Kohima-New Sec. Complex**	**132 kV S/C Wokha-Zunheboto-Mokokchung**	**LILO132 kV S/C Mokokchung-Mariani**	**LILO 132kV S/c Kohima-Wokha**	**LILO 132 kV D/c Kohima-Meluri**	**Total**
Base (Rs. in lakh)							
Total Stringing Completed (km)	0	0	0	0	0	0	**0**
Total Affected Persons in RoW Corridor (No.)	Not Applicable as State Govt. has not adopted MoP guidelines						
Compensation already paid to Affected Persons in RoW Corridor (No.)							
Compensation for APs for RoW Corridor under progress (No.)							
Total Compensation paid for RoW Corridor (Rs. in lakh)							
No. of Pending cases/non-eligible cases with details thereof (e.g. Govt land/ title disputes/ any other reasons	NIL						

5.2.6 Interference with other Utilities and Traffic

As per regulations, it is mandatory for IA/Utility 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 lines. The transmission and distribution lines do not interfere with telecommunication towers. Further, railway lines and aviation routes are not present in the project locations. It is therefore not required to avail clearances from Department of Railways, Department of Telecommunications, and the Ministry of Aviation.

As regard inference with traffic, it is to may be noted that National Highway-61 (NH-61) and National Highway-39 (NH-39) are the main roads which connect various subproject areas including the sub-station sites through various state roads, district roads and village roads. Traffic on NH-39 is comparatively more than traffic on NH-61. However, as expected that execution of the projects covered in this report has not resulted in any steep rise in traffic volume. Further, the present project requires very less vehicular movement and that too restricted to construction period only. Hence, no steep rise in traffic volume is anticipated/ observed.

5.2.7 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. The transmission & distribution lines proposed under this scheme don't involve any tower/ pole to be placed in river bed which could interfere with existing drainage patterns. Further, to avoid any interfere, DC towers are being used instead DB tower as single span limit is crossed in the stretches where TL/ DL is crossing river, cross-arm strengthening has been suggested. Also, as mentioned in previous chapter, use of leg extension is being made in towers to minimize/avoid benching/ revetment, to minimize/ avoid chances of soil erosion, to minimize/ avoid sedimentation of river, to provide great stability. Another measure already suggested in EMP and in place is to avoid dumping of fill materials in sensitive drainage area. In case of substations, all drainage channels along or inside substations are being trained and connected to main or existing drainage to avoid any erosion due to uncontrolled flow of water. Same can be observed from the photographs placed below.

Protection/ Boundary Wall along the Irrigation Canal and Stream

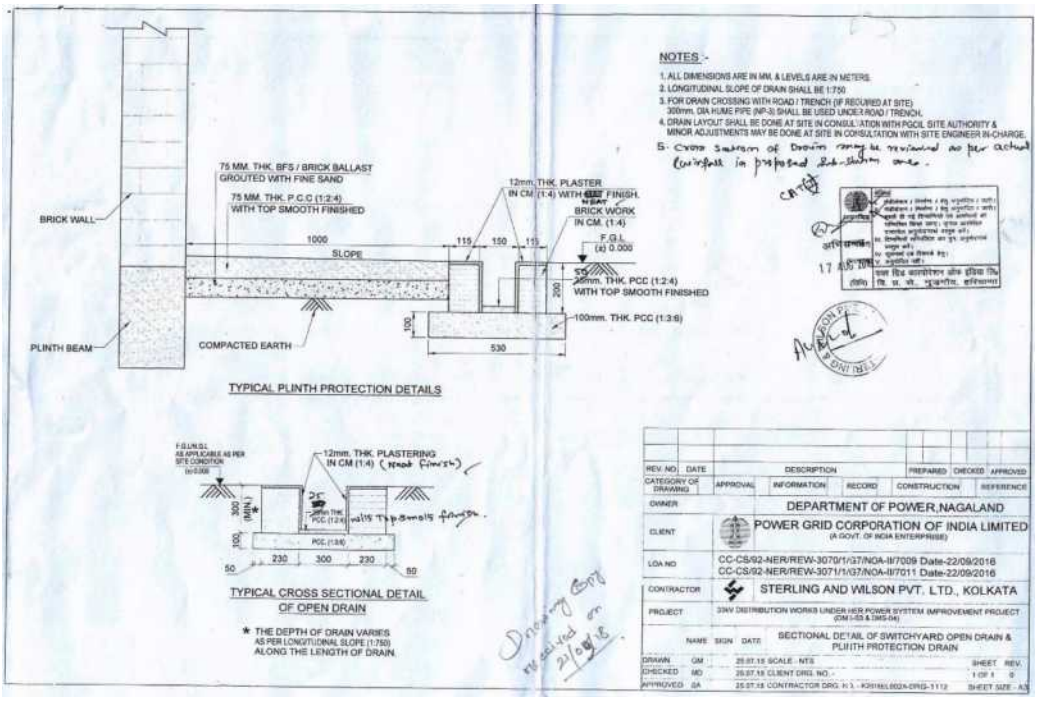
5.3 ENVIRONMENTAL PROBLEMS DUE TO DESIGN

5.3.1 Escape of Polluting Materials

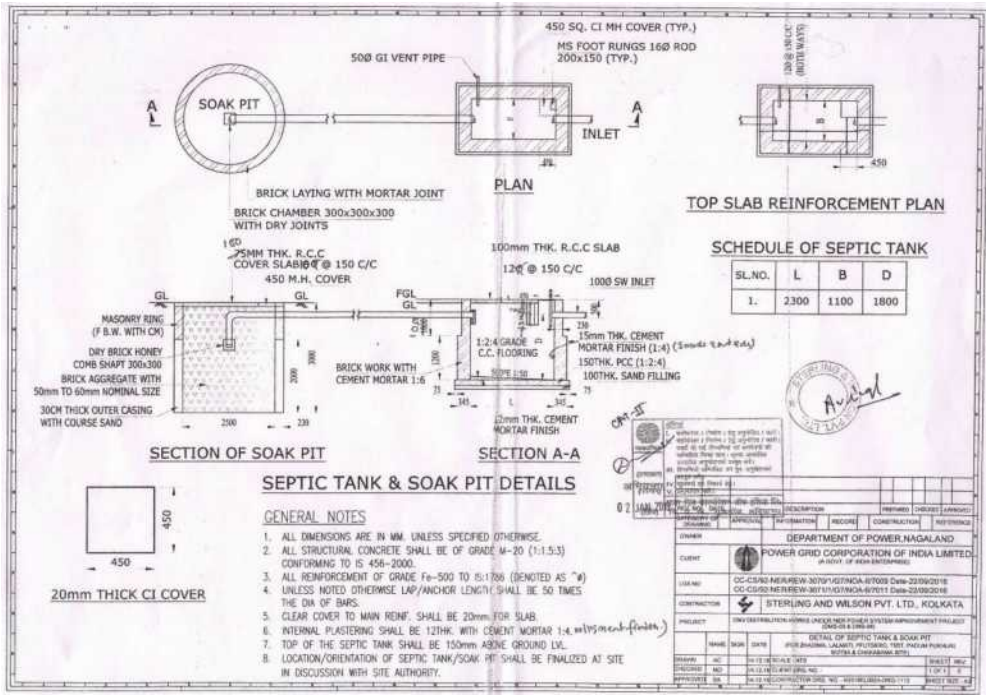
The equipment installed on lines and substations are static in nature and do not generate any fumes or waste materials. However, detailed specification with respect to equipment design and substation drainage and sewage design has been included in tender document to avoid any incidence of land and water contamination. Transformers have been designed with oil spill containment systems having sump of capacity of 200% of oil volume of largest transformer, and purpose-built oil, lubricant and fuel storage system, complete with spill cleanup equipment. Substations include drainage and sewage disposal systems to avoid offsite land and water pollution. Apart from this, solid waste like packing materials, cables, aluminum conductor, sand, aggregate material, cements and steel generated during construction is carefully handled and removed from the sites periodically to avoid any contamination. Same can be figured out with the help of photographs placed below. Also, the system helps in avoiding accidents through contamination, spills and fire.

Drainage and Sewage system within the Lalmati (Zubza) Substation

Arrangement to avoid contamination and accidents



Sectional Detail of Switchyard Open Drain & Plinth Protection Drain



Details of Soak Pit & Septic Tank

5.3.2 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 are taken to avoid such incidence. In the present project, the route line routes and substations are not located close to the vicinity of oil/gas pipelines or other installations with potential fire/ explosion hazard. Apart from this, automatic tripping mechanism for transmission/distribution and substations are being installed so that line gets disconnected in fraction of seconds to prevent fire hazards. Also, fire wall between transformers are being constructed to prevent fire from spreading. Firefighting instruments including fire extinguishers are kept in appropriate place for immediate action in case of any fire hazard.

The only substation which is surrounded by residential area is 33/11 kV New Lalmati substation. It may be noted that sub-stations are being constructed on the land provided by DPN after considering all the risks and after following ESPPF. Lalmati was an existing sub-station, however, it is being considered as new as it was totally dismantled before construction. Measures taken at Lalmati substation to avoid any such hazard are construction of fire wall between transformers and the boundary wall of the substation is high as compared to other substations. Apart from Lalmati substation there is no sub-station that needs such additional attention.

Fire Wall at ITI, Kohima

Fire Wall at Padampukhri

5.3.3 Erosion Hazards due to Inadequate Provision for Resurfacing of Exposed Area

Construction of 220/132kV 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 m^3 of excavated material from each tower. In case of 220/132/33 kV substation foundation, excavation of soil to the tune of 7500 m^3 is required

depending on site condition. Similarly, in case of 33 kV line, soil excavation is limited to 0.72 m^3 for each pole, and for 33/11 kV sub-station, excavation of around 2000 m^3 is required. It has been worked out that a total of approximately 1,07,678 m^3 (547x108 + 4x7500 + 848x0.72 + 9x2000) of excavated materials gets generated for construction of 547 nos. of tower, 4 nos. of 220/132 kV substations, 848 nos. of poles and 9 nos. of 33/11 KV substations proposed under present scheme. However, all the soil excavated for tower/pole footings and substations construction are optimally (about 80-90%) utilized for backfilling and the remaining soil being spread evenly and compacted. Top soil disturbed during the development of sites are used to restore the surface of the platform. Infertile and rocky material are dumped at carefully selected dumping areas and used as fill for substation/ and tower/pole foundations. Hence, possibility of erosion of exposed area due to construction activity is negligible.

5.3.4 Environmental Aesthetics

Since spacing between the towers/poles in case of 220/132 kV transmission & 33 kV distribution lines is approximately 300 meters and 100 meters, respectively, these don't affect the visual aesthetics of the localities particularly when it is ensured to route the lines as far away from the localities as possible. DPN takes up plantation of trees to buffer the visual effect around its substations and to provide better living conditions. Wherever DPN feels it appropriate, discussions are 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 are painted grey or green to merge with the background.

5.3.5 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. Transformers with maximum noise emitting level of 75 dB and DG set with proper enclosures are part of equipment specification/ design criteria. Some noise is unavoidable during construction phase like noise produced by concrete mixing equipment and excavators which are temporary and only in day time. However, regular monitoring by IA/Contractors and due maintenance of equipment are ensured to keep the noise level well within the prescribed limit. Further, 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.

5.3.6 Blockage of Wildlife Passage/ Impact on Avifauna

The proposed transmission & distribution lines are not passing through any forest area, wildlife area. Since there is no protected area or demarcated/ documented migration path of wildlife like elephant corridor existing near to subproject locations, hence, possibility of any disturbance to wildlife is not imminent.

Avian hazards mostly encountered in bird sanctuaries area, IBAs and fly path of migratory bird predominantly related to nesting site. Since in the instant case due to routing of line away from such areas, bird hit/electrocution is not anticipated. Although the incidence of avian hazards is rare due to the distance between the conductors, however, as an additional measure to prevent any avian hazards, bird guards/ anti perch devices are part of BoQ and also integral part of tower design (drawing attached as **Annexure V**).

5.4 ENVIRONMENTAL PROBLEMS DURING CONSTRUCTION PHASE

5.4.1 Uncontrolled Silt Runoff

Majority of tower/pole locations are on hilly terrain; therefore, tower/ poles have been positioned on hilltops and where ever positioning of tower on hill top is not possible leg extension is being utilized so as to minimize/ avoid benching/ revetment and to provide great stability. Retaining walls are also being constructed to eliminate the chances of silt runoff/ soil erosion. Out of total 542 towers being/ to be erected approx. 66% (359 no.) are with leg extension. The excavated material has been backfilled and any remaining earth, if any have been spread around the base and compacted. In case of distribution lines all the excavated soil is backfilled and compacted after erection of tubular poles.

In case of sub-station, existing one are located on flat land and adjacent to existing road and new ones are also being constructed on flat land after site clearing and leveling. It is also being ensured that new sub-stations are close to existing road and construction of approach road is avoided as far as possible, however, in some cases i.e. 132/33 kV sub-stations at Zunheboto, Secretariat Complex and Pfutsero approach road of 2 km, 300 m and 200 m respectively is proposed/ under implementation.

As already explained, during construction limited quantity of excavated material is generated from tower/pole foundations and sub-station foundation. However, adequate measures have been taken to store excavated materials properly for refilling after construction is over. Further, excavation in the hilly areas is avoided in rainy days. Hence, uncontrolled silt run off is not

anticipated. However, during construction, precautions are being taken by contractors, boundary/ retaining/ breast walls are being constructed to avoid any such runoff of excavated material from the construction sites. Moreover, sub-stations are being constructed above the high flood level (HFL) by raising the foundation pad, therefore, are not prone to flooding/ erosive losses of soil.

So far there are no instances with potential of erosion during construction of above said lines. Similarly, there are no instances of erosion/losses of soils into adjoining area as all the overburden are being backfilled within the substation boundary walls and properly managed. The substations are not located in the vicinity of water bodies or ecologically sensitive areas. Refilling and levelling of excavated material at substations and tower foundation & erection works have been demonstrated with the help of following photographs taken during the field visit.

Earth cutting and Levelling at 132/33kV Secretariat Complex Kohima

Surplus Earth labelling at Lalmati S/S


Refilling and leveling of excavated material at Chiephobozou Substation


Cutting and leveling of excavated material at Zunheboto Substation


Refilling and leveling of excavated material at Longleng DMS and Pfutsero Substations


Refilling and leveling of excavated material after tower foundation and erection work


Refilling and leveling of excavated material after tower foundation and erection work

5.4.2 Nuisance to Nearby Properties

During site selection due care is taken to keep the transmission & distribution lines and substations away from settlements. Further, all the construction activities are 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. The construction activities are normally undertaken in lean period and post harvesting to avoid/minimize such impact. All construction sites of new sub-station are prohibited for general public both due to its separation/demarcation by boundary wall and also due to statutory provisions. Hence, any adverse impact arising during the construction of substation is temporary i.e. will last during construction phase only, and limited to the boundaries of proposed substation only and neither impacts nearby habitat/property nor health & safety of neighboring community.

132/33 kV Wokha S/S Boundary Wall & Gate

33/11 kV Padampukhri S/S B. Wall & Gate

33/11 kV Chiephobozou S/S Boundary Wall

33/11 kV ITI, Kohima S/S Gate

33/11 kV Lalmati (Zubza) S/S Boundary Wall

132/33 kV Longnak S/S Boundary Wall

33/11 kV Pfutsero S/S Boundary Wall

33/11 kV Chukitong S/S Boundary Wall

5.4.3 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, except, 132/33 kV sub-stations at Zunheboto, Secretariat Complex and Pfutsero where approach road of 2 km, 300 m and 200 m respectively is proposed/ under implementation will be necessary either during construction.

The approach road at Secretariat Complex and Pfutsero is proposed/ being constructed on already acquired land for the construction of sub-station therefore, neither it will interfere with utilities and traffic and block the access way nor compensation for any damage to crop or field will be paid to the owner. The approach road of 2 km for 132/33 kV Zunheboto sub-station is proposed from Lizo old village to sub-station. Presently, it is existing foot path only being used by villagers for movement from their home to agricultural field. Since it is a foot path which leads to nothing but agricultural field therefore, interfere with utilities and traffic and block the access way is not at all expected. In many areas such improvement in the access road is highly appreciated by the local population. Moreover, since none of these segments require any additional land and thus have insignificant environmental and social impacts, these would fall in low risk category as per E & S screening criteria.

The transmission and distribution lines do not interfere with telecommunication towers. Further, railway lines and aviation routes are not present in the project locations. Therefore, interfere with utilities and block the access way in this regard is also not at all expected. As and when a transmission line crosses any road, the short span angle (DT) towers are located at a distance 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.

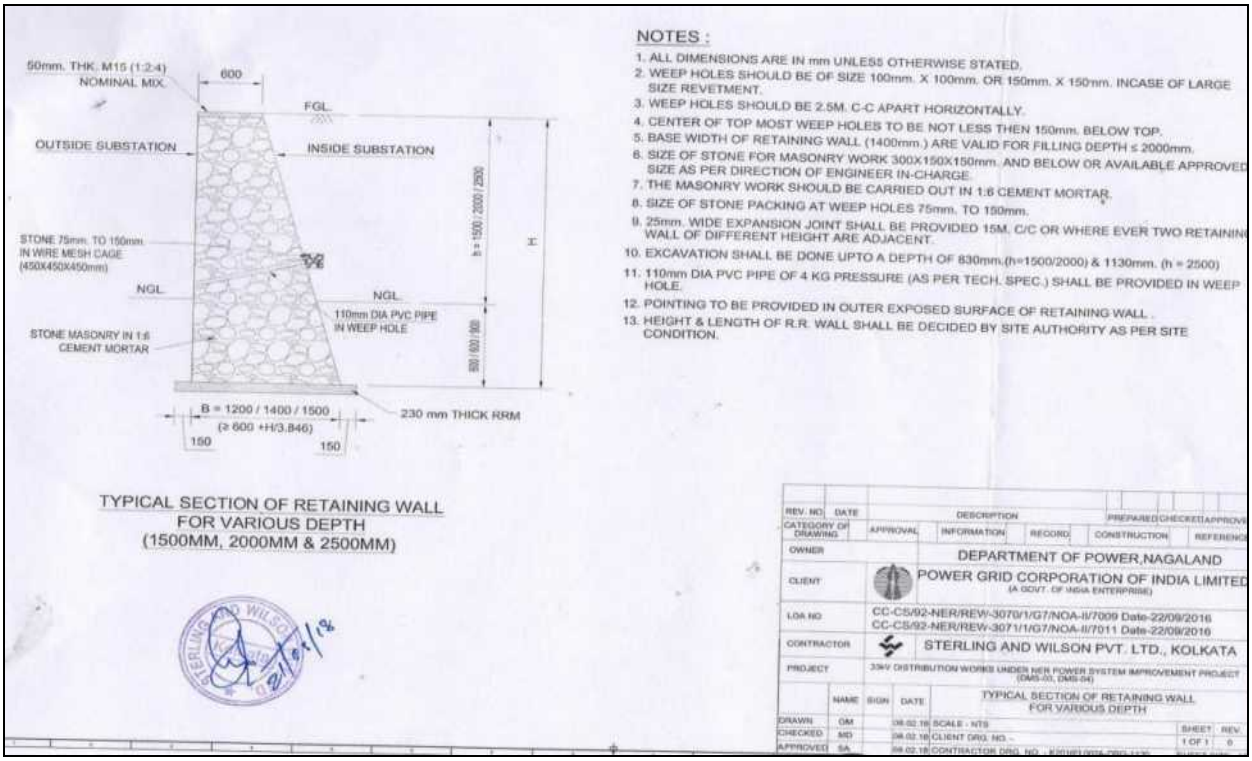
5.4.4 Inadequate Resurfacing for Erosion Control

As explained earlier, majority of tower/pole locations hilly terrain, therefore, tower/ poles have been positioned on hilltops and where ever positioning of tower on hill top is not possible leg extension is being utilized so as to minimize/ avoid benching/ revetment and to provide great stability. Retaining walls are also being constructed to eliminate the chances of silt runoff/ soil erosion. However, till date no instances with potential of erosion observed during construction of above said lines. Further, construction is generally undertaken in dry/non- monsoon period.

Similarly, existing sub-stations are located on flat land but new sub-stations are being constructed on flat land after site clearing and leveling. Further, due to undulating terrain and for slope protection, retaining / RRM walls have been planned/ being implemented as erosion protection measure in the sub-stations mentioned in **Table 5.4**. Typical section of retaining wall for various depth is shown as figure below.

Table 5.4: Details of Slope Protection Measures

S. No.	Location	Measure Type	Purpose of Measure	Present Status
1	Establishment of 132/33 kV Sub-station at Zunheboto (New)	RCC Retaining Wall	To avoid landslide/ soil erosion	Yet to start
2	Establishment of 132/33 kV Sub-station at Secretariat Complex Kohima (New)	RCC Retaining Wall	To avoid landslide/ soil erosion	Completed up to 42 m length and 2.2 m height
3	Establishment of 132/33 kV Sub-station at Pfutsero (New)	RCC Retaining Wall	To avoid landslide/ soil erosion	Under Progress
4	Bay extension of 132/33 kV Sub-station at Wokha	RRM Wall	To avoid landslide/ soil erosion	Completed. (13.3 m + 9.6 m length)
5	Bay extension of 132/33 kV Sub-station at Mokokchung (State Owned)	RRM Wall	To avoid landslide/ soil erosion	Completed up to 8 m
6	Establishment of 33/11 kV Sub-station at Pfutsero (New)	RRM Wall	To avoid landslide/ soil erosion	Under construction (approx. 40m)
7	Capacity augmentation of 33/11 kV (Existing) Sub-station at Botsa	RRM Wall	To avoid landslide/ soil erosion	Completed (approx. 18m)
8	Capacity augmentation of 33/11 kV (Existing) Sub-station at Chakabama	RRM Wall	To avoid landslide/ soil erosion	Completed (approx. 12m)
9	Mostly in all sub-stations	Stone Pitching	To retain the soil	Shall be provided



Typical Section of Retaining Wall for Various Depth

For tower/ pole and sub-station located on flat terrain, problem of soil erosion is not envisaged. Few such instances have been demonstrated with the help of following photographs.


Pole erection work from Nagarjan to Padampukhri


Pole erection work from Zunheboto South Point to Zunheboto


Tower Foundation work at Pfutsero

Tower Erection work at Longnak

Tower Foundation at Mokokchung


RCC Retaining Wall at 132/33kV New Secretariat Complex Sub-station


RRM Wall at 132/33kV Wokha Sub-station


RRM Wall at 132/33 kV Mokokchung Sub-station

RRM Wall at 33/11 kV Pfutsero S/S

RRM Wall 33/11 kV Botsa S/S


RRM Wall at 33/11 kV Chakabama S/S

During field visit, it was observed that:

- At few construction sites, there is a possibility of erosion along the slopes getting triggered by excaved soils dumped without protection/ retaining wall. Tseminyu DMS Site has been left unattended after excavation work without any protection around the construction site.
- Similarly, at DMS Mokokchung Hospital area, excavated soil mass has blocked a seasonal drain,

However, IA staff/ engineers assured that as per approved design protection wall will be constructed all along the boundary of DMS at the right bank of nala.


Approach Road 133/33 kV Sub Station Sec. Complex, Kohima

Tseminyu DMS Site

Mokokchung Hospital Area DMS Site

Also, it was observed that during construction at 132/33 kV Lognak substation site, huge number of boulders were excavated. (Refer photographs shown below). Such quantity of boulders was not anticipated during planning stage. The contractor has sought advice from IA regarding the disposal of these boulders. Since the quantity of boulders excavated are much more than the required quantity for filling within sub-station therefore, a suitable disposal site needs to be identified and provided to contractor in order to ensure systematic disposal of excavated boulders.

Unexpected excavation of boulders from 132/33 kV Lognak substation site

5.4.5 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. In the instant project also, the excavated material is disposed off in the same sub-station premises only. However, a quantity of 1066.215 m^3 earth/ soil is required in 33/11 kV Padampukhri sub-station for which borrow area is yet to be finalized. If found suitable i.e. physical and financially viable than surplus boulders to be disposed off at 132/33 kV Longnak sub-station can be utilized at 33/11 kV Padampukhri sub-station.

5.4.6 Protection of Worker's Health/Safety

All health & safety issues and their management aspects are integral part of project/contract specific safety plan **(Annexure VI)**, which is also part of contract conditions. 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 being 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 Rs 1.0 lakh for each injury and is deducted from the contractor's payment and paid to the deceased/affected family **(Annexure VII)**.

Additionally, work and safety regulations, workmen's compensation, insurance are adequately covered under the General Conditions of Contract (GCC), a part of bidding documents. The project authority ensures that all contractors are operating with valid labor license as per provision under section – 12(1) of the Contract Labour (Regulation & Abolition) Act, 1970 and also certified under Section- 7(3) of the Building and Other Construction Workers (Regulation of Employment and Condition of Service) Act, 1996 from Ministry of Labour & Employment. Besides, the contractors have obtained requisite insurance policy as per provisions of Employee Compensation Act, 1923 for its employed workforce. Sample copy of labor license and insurance policy for workers is attached as **Annexure VIII**.

During construction work, safety guidelines/checklists including work permits and safety precautions are being strictly followed which are also regularly monitored by site in-charge. Sample copy of filled checklist is enclosed as **Annexure IX**.

Efforts are being made to hire labourers locally to the extent possible, else same have been outsourced. The workers have been provided with PPEs such as boots and helmets. Mock drills such as fire safety, first aid etc. are conducted periodically to enhance the preparedness level of the workforce. Safety induction & awareness programme including HIV/AID are also conducted at every active site. Safety film for transmission project in local language is shown to workers for better awareness. Proper drinking water has also been provided. First aid boxes and provisions for treatment in case of emergencies were arranged locally/ nearby towns.

Protection of Workers Health and Safety at various construction sites


Lalmati (Zubza) Substation


Secretariat Complex Substation

Mokokchung (State) Substation

Longtho Substation


Wokha Substation

Longnak Substation

Padampukhri Substation

Labour Camps at various Construction Sites

Chiephobozou Substation

Chukitong Substation

Longnak Substation

Secretariat Complex Substation

Zunheboto Substation

Health and Saftey Training

Tool box talk at Padampukhri S/s

Toll Box talk at Lalmati S/s

Toll Box Talk at Pfutsero S/s

Firefighting Training at Dimapur

Training on Emergency preparedness Training on material handling

Chiepobouzo S/s on 05.06.2018 World Environment Day Celebration

Medical Health Check-up at Botsa S/s

Medical Health Check-up at Lalmati S/s

First Aid talk at Lalmati S/s

Training on Height Work

General Safety training at ITI Kohima S/s

Training on Excavation & Material Handling at (Lalmati/Zubza) S/s

SAFETY INDUCTION TRAINING

220 kV S/C on D/C Tower New Kohima – Mokokchung T/L

Longtho S/S

132 kV line at Zhadima

NATIONAL SAFETY WEEK CELEBRATION

CBIS TRAINING

During site visit, it was observed that at some sites, condition of labour camps needs to be improved. It was observed at Chukitong site that labour camps are also being used for storing cement bags and other construction material which can cause serious respiratory problems to the labours. At Secretariat Complex and Longnak sites, lack of awareness regarding cleanliness of surrounding and lack of mechanism of disposal of solid waste was observed. Following photographs have been taken to highlight same.

At all construction sites, supervisors/ engineers of contractor as well as IA staff were seen without any PPEs during construction and monitoring of the works. During consultation with labours and IA staff it was observed that workers at the site were not aware about their health and safety during construction. Also, it was observed at few places that labours avoid usage of PPEs as they consider it as hindrance in smooth conduction of construction activities. Labours were not aware about availability of first aid box at construction site. Similarly, records of labours' health checkup were missing at most of the sites. These are due to the lack of induction and training programme as committed in Health and Safety Plan. IA staff and contractor informed that the group of labours/ gangs gets change frequently therefore it becomes difficult to impart with induction and training at regular basis as well provide with PPEs. Following photographs taken during the field visit demonstrate lack of use of PPEs at work sites.



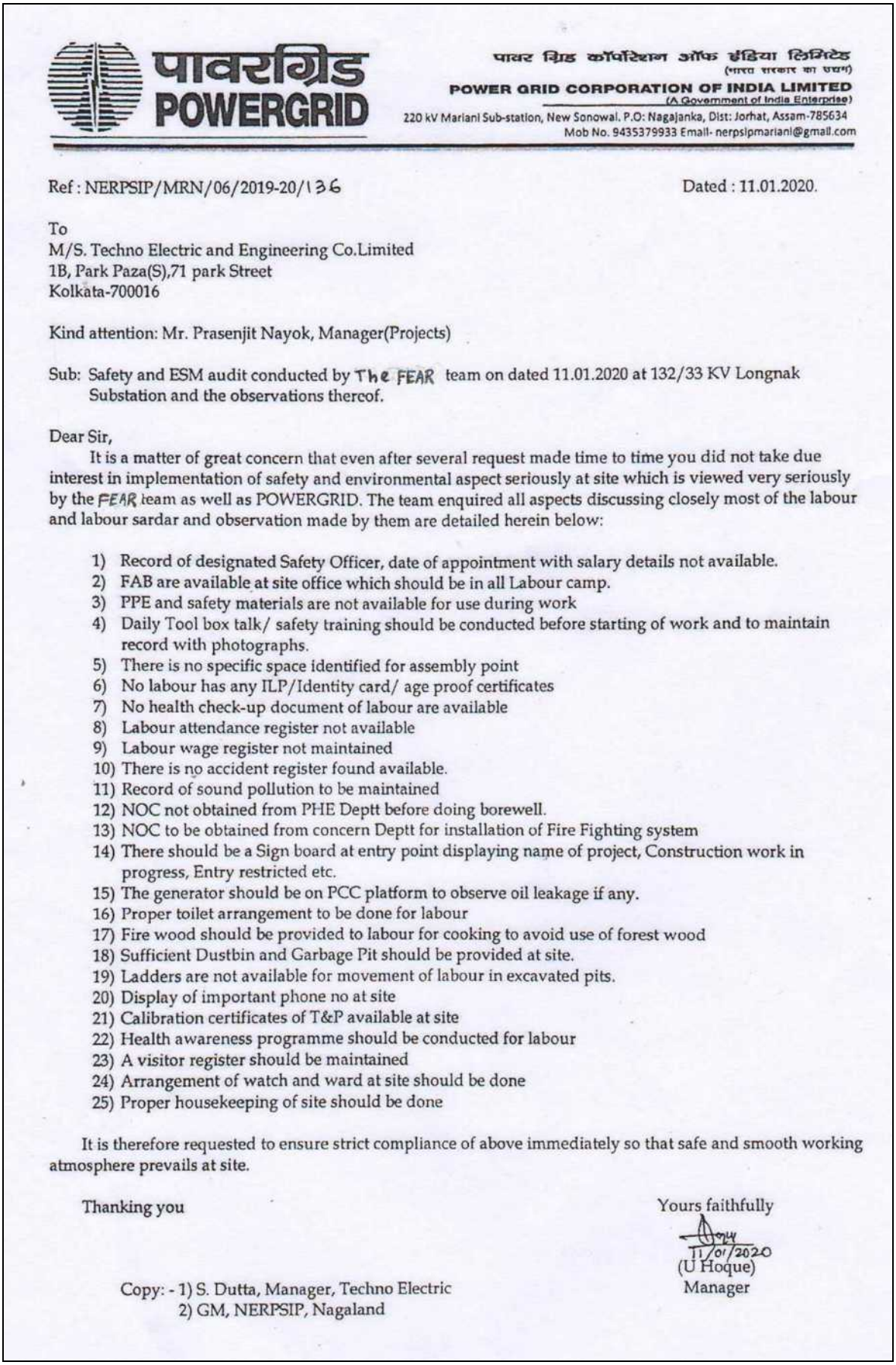



Lack of use of PPEs

Safety Plan (**Annexure VI**), an action plan to mitigate and manage such issues already forms an integral part of agreement/ contract conditions signed by the respective contractors. It is the duty of safety officer/ site in-charge/ IA to ensure that safety plan is being strictly followed to avoid any untoward incidence. The IA on their part carries out routine safety check/ audits, informs the contractor and seeks their compliance on the same.

Similarly, based upon the field visit for the FEAR study and observations pertaining to safety related and other aspects made by the team, IA issued letter and sought clarifications from concerned contractor as reproduced below. It was observed that safety plan signed and submitted by contractor is

sufficient enough to avoid any untoward incidence and thus, any other additional action plan to mitigate and manage such issues may not be needed.



पावरग्रिड
POWERGRID

पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)
220 kV Mariani Sub-station, New Sonowal. P.O: Nagajanka, Dist: Jorhat, Assam-785634
Mob No. 9435379933 Email- nerpsipmariani@gmail.com

Ref : NERPSIP/MRN/06/2019-20/136 Dated : 11.01.2020.

To
M/S. Techno Electric and Engineering Co.Limited
1B, Park Paza(S),71 park Street
Kolkata-700016

Kind attention: Mr. Prasenjit Nayok, Manager(Projects)

Sub: Safety and ESM audit conducted by The FEAR team on dated 11.01.2020 at 132/33 KV Longnak Substation and the observations thereof.

Dear Sir,

It is a matter of great concern that even after several request made time to time you did not take due interest in implementation of safety and environmental aspect seriously at site which is viewed very seriously by the FEAR team as well as POWERGRID. The team enquired all aspects discussing closely most of the labour and labour sardar and observation made by them are detailed herein below:

1) Record of designated Safety Officer, date of appointment with salary details not available.
2) FAB are available at site office which should be in all Labour camp.
3) PPE and safety materials are not available for use during work
4) Daily Tool box talk/ safety training should be conducted before starting of work and to maintain record with photographs.
5) There is no specific space identified for assembly point
6) No labour has any ILP/Identity card/ age proof certificates
7) No health check-up document of labour are available
8) Labour attendance register not available
9) Labour wage register not maintained
10) There is no accident register found available.
11) Record of sound pollution to be maintained
12) NOC not obtained from PHE Deptt before doing borewell.
13) NOC to be obtained from concern Deptt for installation of Fire Fighting system
14) There should be a Sign board at entry point displaying name of project, Construction work in progress, Entry restricted etc.
15) The generator should be on PCC platform to observe oil leakage if any.
16) Proper toilet arrangement to be done for labour
17) Fire wood should be provided to labour for cooking to avoid use of forest wood
18) Sufficient Dustbin and Garbage Pit should be provided at site.
19) Ladders are not available for movement of labour in excavated pits.
20) Display of important phone no at site
21) Calibration certificates of T&P available at site
22) Health awareness programme should be conducted for labour
23) A visitor register should be maintained
24) Arrangement of watch and ward at site should be done
25) Proper housekeeping of site should be done

It is therefore requested to ensure strict compliance of above immediately so that safe and smooth working atmosphere prevails at site.

Thanking you

Yours faithfully
11/01/2020
(U Hoque)
Manager

Copy: - 1) S. Dutta, Manager, Techno Electric
2) GM, NERPSIP, Nagaland

Typical Letters/notices being issued by IA to Contractors

5.5 ENVIRONMENTAL PROBLEMS RESULTING FROM OPERATION

5.5.1 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 is 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. Monthly monitoring reports are generated and appraised to Management, including a report of corrective action taken and a schedule for future action.

DPN follows the best international practices while designing its system to maintain acceptable prescribed Electro Magnetic Field (EMF) level. The ICNIRP guideline for acceptable EMF level for the general public (up to 24 hours a day) is a maximum exposure level of 1,000 mG or 100μT. Further, because of health and safety issues such as fire safety, safe voltages on metallic parts of buildings, and safety clearances to avoid flashover, the transmission lines do not pass directly over any residential properties and as such the potential for EMF effects to occur is further diminished.

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, their use in electrical equipment 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, DPN has discontinued procurement of electrical equipment 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.

5.6 CRITICAL ENVIRONMENTAL REVIEW CRITERIA

5.6.1 Loss of Irreplaceable Resources

In the instant project none of the project elements encroach upon any forest area, protected areas, and ecologically sensitive areas hence, the problem of losing natural resources is not anticipated.

5.6.2 Accelerated Use of Resources for Short-term Gains

The subprojects are not making use of any natural resources occurring in the area during construction and are not utilizing the same during maintenance phases. The construction material such as tower members, cement etc. are being sourced from factories while the excavated soil is being reused for backfilling to restore the surface. During construction of transmission line, very small quantity of water is required which is met from nearby existing source or through tankers. 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 substations under the present scheme has been made to conserve precious water resources and enhance the ground water level. The aggregates used for construction are already available within sub-station area due to cutting, thus no new borrow area will be created. 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.

5.6.3 Endangering of Species

As described earlier, no endangered species of flora and fauna exist in the subprojects area is getting affected and considering aerial nature of transmission and distribution project, there is no possibility of endangering/ causing extinction of any species.

5.6.4 Promoting Undesirable Rural-to Urban Migration

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

5.7 PUBLIC CONSULTATION

Public consultation/ information dissemination is a continuous process starting with the project conception and continues during project implementation and even during O&M stage. Public is informed about the project at every stage of execution. During survey, DPN & POWERGRID site officials met people and informed 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, were consulted. Apart from this, Public consultation using different technique like Public Meeting, Small Group Meeting, informal Meeting have been carried out during different activities of project cycle. During such consultation, the public is 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 DPN approach to minimizing and solving them;
- Trees and crop compensation process.

In the instant project also, many group meetings were organized (informally and formally) by IA & DPN in all villages where the interventions are happening. These meetings were attended by Village Panchayat members, senior/respected person of village, interested villagers/general public and representatives from DPN & IA. To ensure maximum participation, prior intimation in local language was given and such notices were also displayed at prominent places/panchayat office etc. During consultations/interaction processes with people of the localized areas, DPN field staffs explained benefit of the project, impacts of transmission line, payment of compensation for damaged of crops, trees, huts etc. as per The Indian Electricity Act, 2003 and The Indian Telegraph Act, 1885 and measures to avoid public utilities such as schools, hospital etc. People more or less welcomed the construction of the proposed project. Various issues inter alia raised by the people during public consultation and informal group meetings are as follows;

- To involve village headman during survey work/finalization of line corridor;
- To engage local people in various works associated with construction of line and if required proper training may be provided to engage them.
- To provide flexibility in disbursement of compensation;
- Direct payment of compensation to affected land owners and expeditious disbursement of compensation.

Also, during site visits, consultations were conducted with various stake holders belonging to community and affected people. Target group included contractor, contractor's labor, IA & DPN Staff and villagers as well as Municipal Corporation, Pfutsero. These consultations were carried out to capture the views of stakeholders about the project plan, design and layout of

the project, environmental and social impacts, compensation process, benefits or drawback of the project etc.

It needs to be emphasized that public consultation was kept restricted due to the apprehensions of IA and contractors for security and other law & order related issues which were communicated and advised to field team at onset of field surveys itself and hence limited stakeholder consultations have been carried out. However, it was ensured that consultations representatively covered most stakeholders involved.

Major findings of the consultations are summarized below:

- People are well aware about the project, its various components and confirmed that IA & DPN informs about the project at every stage of execution.
- Considering that the state of electricity supply in the state is very weak, people welcomed the project as it will not only improve overall power supply situation but will also improve reliability, quality, security and enhancement of power supply of the state.
- People confirmed that IA & DPN are taking every step possible to avoid/ minimize the environmental and social impacts along the route of transmission lines and at site of sub stations.
- People confirmed that community reserves, sacred groves and community conserved areas are completely avoided while finalizing the route of lines.
- People also confirmed that their common property resources such as cemetery, school, community hall, habitation areas etc. have been completely avoided while finalizing the route of lines.
- People informed that staff of IA/ contractor are easily approachable and are very open to address their grievances. As a result, no written grievance has been received till date.
- People are very much happy with the rate of compensation being given to them and they are being involved in the process of deciding the rate of compensation.
- People confirmed that there is no disturbance of any sort to their life/ livelihood due to the construction or various other activities being carried out under the project.
- Stakeholder at Longnak informed that due to the construction of new substation, a small irrigation channel from nearby nala to their agricultural field was getting affected. However, on their request, IA assured that not only construction activities avoid disturbance to irrigation channel; it also ensures to train the channel.

- Stakeholder at Old Lizo village near Zunheboto informed that they welcomed the proposal of IA to upgrade the existing footpath to approach road. This upgradation will provide them with better accessibility to their agricultural fields.
- No cases of conflict between migrant and local population has been reported till date.
- Execution of project work provides opportunities to local contractors to get involved in construction, fabrication, transportation etc. activities.
- Most of the sub-contracts are awarded/ being awarded to local peoples.
- Contractor prefer and engage local peoples for skilled and unskilled works
- Local villagers rented out their buildings to contractor and IA for temporary offices and staff quarters in local that helps in income generation
- Wherever possible contractor and IA purchase daily need requirements for local vendors and shopkeepers that helps in economic upliftment of the area
- The contractor labor informed that they have been provided with PPEs such as boots and helmets.
- Mock drills such as fire safety, first aid etc. are conducted periodically to enhance the preparedness level. Safety induction & awareness programme including HIV/AID are also conducted. Safety film for transmission project in local language is shown for better awareness.
- Migrant labors confirmed that they have been provided with camps and all basic facilities such as food, fuel, proper drinking water etc. They also confirmed that they do not source fuel wood from the forest areas.
- First aid boxes and provisions for treatment in case of emergencies are arranged locally/ nearby towns.
- It was revealed that contractor and IA work with close coordination with village heads and community to avoid any misunderstanding during work

Details of public consultation meetings carried out during site visit and public consultation using different technique like Public Meeting, Small Group Meeting, informal Meeting undertaken by IA & DPN including minutes of meeting, list of participants and photographs are enclosed as **Annexure X**.

5.8 COMPLIANCE OF EMP

The IA has a continuous monitoring mechanism of the project w.r.t. compliance of the mandatory requirements as stipulated in the IEAR. As many

provisions of EMP related to construction contractor, EMP has been made integral part of contract document for its proper implementation by contractor/sub-contractor. Thus, the adherence to the clauses by the contractor is regularly monitored especially in respect of various implementation E & S measures including health and safety aspects. As part of the present study, mitigation measures as stipulated in the IEAR have been critically assessed/evaluated for compliance through physical inspection, verification of record/ documents/ drawing, interaction with project officials/contractor/ villagers/construction workers and PRA etc. Based on above, a detailed compliance status w.r.t. each identified impacts enlisted in EMP have been prepared and is presented in **Table 5.5**.

Table 5.5: Environment Monitoring Plan

Cl. No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Compliance Status
Pre-Construction				
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.	Complied with. Route alignment criterion is part of survey contract wherein all statutory Electrical clearances as stipulated under CEA's regulations, 2010 (Measures related to safety & electric supply) are considered/ ensured.
2	Equipment specifications and design parameters	Release of chemicals and gases in receptors (air, water, land)	PCBs not used in substation transformers or other project facilities or equipment.	Complied with. Part of technical specification of transformer. PCB is not used or non-detectable level (i.e. less than 2mg/kg) as per IEC 61619 or ASTM D4059
			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	Complied with. CFC free equipment is part of tender specifications
3	Transmission/ Distribution line design	Exposure to electromagnetic interference	Line design to comply with the limits of electromagnetic interference from overhead power lines	Complied with. DPN follows the best international practices while designing its system to maintain acceptable prescribed Electro Magnetic Field (EMF) level. The ICNIRP guideline for acceptable EMF level for the general public (up to 24 hours a day) is a maximum exposure level of 1,000 mG or 100μT.
4	Substation location and design	Exposure to noise	Design of plant enclosures to comply with noise regulations.	Complied with. Transformers with maximum noise emitting level of 75 dB specified in tender specifications. Sound proof enclosures used for D.G sets

Cl. No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Compliance Status
		Social inequities	Careful selection of site to avoid encroachment of socially, culturally and archaeological sensitive areas (i. g. sacred groves, graveyard, religious worship place, monuments etc.)	Complied with. No encroachment of any socially sensitive areas due to proposed substations.
5	Location of overhead line towers/poles/ laying of underground distribution line & alignment and design	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	Complied with. Part of detailed alignment survey and design. No tower/pole located in water bodies.
		Social inequities	Careful route selection to avoid existing settlements and sensitive locations	Complied with. Part of detailed tower/pole alignment survey design.
			Minimise impact on agricultural land	Complied with. Though major section of proposed lines are routed through agricultural land in order to avoid impact on environmentally/ socially sensitive areas, efforts such as scheduling of construction lean/ post-harvest period, consultation with local authorities/ autonomous councils etc. are being made to minimize impacts on agricultural land/produce to the extent possible
			Careful selection of site and route alignment to avoid encroachment of socially, culturally and archaeological sensitive areas (i. e. sacred groves, graveyard, religious worship place, monuments etc.)	Complied with. All settlements & ecologically sensitive areas avoided.
6	Involuntary acquisition or permanent land acquisition for substation.	Social inequities	Compensation and R&R measures as per provision of RFCTLARRA, 2013	Since no involuntary acquisition of land is involved, there is no R&R issue.
7	Line through protected area/	Loss of precious	Avoid siting into such areas by careful site	Complied with.

Cl. No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Compliance Status
	precious ecological area	ecological values/ damage to precious species	and alignment selection (National Parks, Wildlife Sanctuary, Biosphere Reserves/ Biodiversity Hotspots)	Part of detailed siting and alignment survey/design. All such areas are avoided
			Minimize the need by using RoW wherever possible	
8	Line through identified Elephant corridor / Migratory bird	Damage to the Wildlife/ Birds and also to line	Study of earmarked elephant corridors to avoid such corridors, Adequate ground clearance, Fault clearing by Circuit Breaker, Barbed wire wrapping on towers, reduced spans etc., if applicable	Not Applicable as there are no wildlife corridors
			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., if applicable	Complied with. Bird guard/ anti perch devices are part of BoQ and also integral part of tower design.
9	Line through forestland	Deforestation and loss of biodiversity, edge effect	Avoid siting of line by careful site and alignment selection	Complied with. As part of detailed siting and alignment survey, forest areas have been completely avoided.
			Minimise the need by using existing towers, tall towers and RoW, wherever possible	Complied with. Tower extensions of 3-9 m have been provided to reduce tree felling, wherever needed
			Measures to avoid invasion of alien species	Invasion of alien species not anticipated
			Obtain statutory clearances from the Government	Not applicable as there is no involvement of forest land
			Consultation with autonomous councils wherever required	Complied with.
10	Lines through farmland	Loss of agricultural production/ change in cropping pattern	Use existing tower or footings wherever possible	Not applicable
			Avoid siting new towers on farmland wherever feasible	Complied with. Part of detailed sitting and alignment survey. Though it is unavoidable but efforts have

Cl. No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Compliance Status
				been made to minimized the impact/loss of production
11	Noise related	Nuisance to neighbouring properties	Substations sited and designed to ensure noise will not be a nuisance	Complied with. Part of detailed equipment design. Substations are appropriately sited and away from settlement area. Transformers with maximum noise emitting level of 75 dB and DG set with proper enclosures are part of equipment specification/ design criteria.
12	Interference with drainage patterns/Irrigation channels	Flooding hazards/ loss of agricultural production	Appropriate sitting of towers to avoid channel interference	Complied with. Part of detailed alignment survey, Interference with drainage patterns/ irrigation channels not anticipated
13	Escape of polluting materials	Environmental pollution	Transformers designed with oil spill containment systems, and purpose-built oil, lubricant and fuel storage system, complete with spill cleanup equipment.	Complied with. Part of detailed equipment design /drawings. Designed with oil spill containment systems having sump of capacity of 200% of oil volume of largest transformer
			Substations to include drainage and sewage disposal systems to avoid offsite land and water pollution.	Complied with. Proper drainage and sewage system are part of detailed substation layout and design /drawings based on site condition.
14	Equipment submerged under flood	Contamination of receptors	Substations constructed above the high flood level (HFL) by raising the foundation pad	Complied with. Part of detailed substation layout and design /drawings. All substations are being constructed above HFL.
15	Explosions /Fire	Hazards to life	Design of substations to include modern firefighting equipment	Complied with. Part of detailed substation layout and design /drawings. Compliance assured by site manager
			Provision of firefighting equipment to be located close to transformers	Complied with. Part of detailed substation layout and design /drawings. Compliance assured by site

Cl. No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Compliance Status
				manager
Construction				
16	Equipment layout and installation	Noise and vibrations	Construction techniques and machinery selection seeking to minimize ground disturbance.	Complied with (Refer Section 5.3.5). Noise produced by concrete mixing equipment and excavators are temporary and confined to day time only. No ground disturbance observed.
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).	Complied with (Refer Section 5.2.5). Excavations not done during monsoon which is the cropping period. However, full compensation as per assessment of revenue authorities are being paid to land owner/ farmer by IA/DPN in case of inevitable damages. Till date no grievance has been received in this regard
18	Mechanized construction	Noise, vibration and operator safety, efficient operation	Construction equipment to be well maintained.	Complied with (Refer Section 5.3.5). Some noise is unavoidable during day time but no noise at night as no work is being undertaken at night. Noise levels' measurements are done regularly by IA & Construction contractor. Noise level measured during site visits to all active sites found to be within permissible limits (<75 dB).
		Noise, vibration, equipment wear and	Turning off plant not in use.	Complied with.

Cl. No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Compliance Status
		tear		
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.	Complied with. Existing roads and tracks are being used for construction and maintenance. However, only road widening works is needed from Old Lizo village to New 132/33 kV Substation Zunheboto. Water sprinkling will be done whenever required.
		Increased land requirement for temporary accessibility	New access ways restricted to a single carriageway width within the RoW.	Complied with. Most of the tower locations are easily accessible through existing roads/ paths. All substations sites are located close to existing road. However, only road widening works is needed from Old Lizo village to New 132/33 kV Substation Zunheboto.
20	Construction activities	Safety of local villagers	Coordination with local communities for construction schedules, Barricading the construction area and spreading awareness among locals	Complied with (Refer Section 5.4.2). Excavated areas are barricaded and restriction to enter work site during construction strictly followed at most of the sites.
		Local traffic obstruction	Coordination with local authority/ requisite permission for smooth flow of traffic	Complied with. Most of the tower/pole locations are in farm/barren land. Hence, no traffic obstruction is witnessed. For substation location, smooth traffic flow is ensured by project authorities/contractor in close co-ordination with local authorities wherever

Cl. No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Compliance Status
				necessary.
21	Temporary blockage of utilities	Overflows, reduced discharge	Measure in place to avoid dumping of fill materials in sensitive drainage area	Complied with (Refer Section 5.3.5). No dumping is observed. All overburden is managed optimally by reutilizing it as fill materials. However, a seasonal nala is being blocked during construction of 33/11 kV S/s at Mokokchung Hospital Area as a repercussion of dumping. However, IA assured that as proposed in design, a retaining wall will be constructed along the S/s boundary at the right bank of nala.
22	Site clearance	Vegetation	Marking of vegetation to be removed prior to clearance, and strict control on clearing activities to ensure minimal clearance.	Prior to undertaking clearance, marking has been undertaken to ensure minimal removal of vegetation during detailed survey. Minimum trees will be felled for construction of T&D network and new DMS and Transmission S/s. (Refer Section 4.6.4)
			No use of herbicides and pesticides	Not Applicable
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.	The work is yet to start. To be complied during stringing work to maintain safe electrical clearance as per applicable norms (CEA's regulations, 2010 (Measures related to safety & electric supply)).
		Loss of vegetation and deforestation	Trees that can survive pruning to comply should be pruned instead of cleared.	
			Felled trees and other cleared or pruned vegetation to be disposed of as authorized by the statutory bodies.	Felled trees are handed over to land owner. IA/DPN have no role in storage or disposal of felled trees/wood

Cl. No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Compliance Status
24	Wood/ vegetation harvesting	Loss of vegetation and deforestation	Construction workers prohibited from harvesting wood in the project area during their employment, (apart from locally employed staff continuing current legal activities)	Not fully complied with. Cooking Gas/ fuel wood is being provided by the Contractor. However, workers use felled trees/shrubs also.
25	Surplus earthwork/soil	Runoff to cause water pollution, solid waste disposal	Soil excavated from tower footings/ substation foundation disposed of by placement along roadsides, or at nearby house blocks if requested by landowners	Complied with (Refer Section 5.4.1). Soil backfilled and excess spread out evenly and compacted. Excavated soil was properly stored and no dumping observed in visited sites/ location.
26	Substation construction	Loss of soil	Loss of soil is not a major issue as excavated soil will be mostly reused for filling. However, in case of requirement of excess soil 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	Complied with (Refer Section 5.4.1 & 5.4.4). Excavated soil used optimally for backfilling and distribution within the substations' boundary is adequate. No additional requirements of soil observed for any substations.
		Water pollution	Construction activities involving significant ground disturbance (i.e. substation land forming) not undertaken during the monsoon season	Complied with No construction during monsoons. No seepage or water pollution observed
27	Site clearance	Vegetation	Tree clearances for easement establishment to only involve cutting trees off at ground level or pruning as appropriate, with tree stumps and roots left in place and ground cover left undisturbed	Complied with/to be complied
28	Substation foundation/ Tower erection disposal of surplus earthwork/fill	Waste disposal	Excessfill from substation/tower foundation excavation disposed of next to roads or around houses, in agreement with the local	Complied/ to be complied (Refer Section 5.4.1 & 5.4.4)

Cl. No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Compliance Status
			community or landowner	Excavated soil optimally used. Backfilling and spreading of excess soil within substation area assured by project authorities.
29	Storage of chemicals and materials	Contamination of receptors (land, water, air)	Fuel and other hazardous materials securely stored above high flood level.	Proper compliance to be ensured. To be stored in designated area inside the premise at most sites.
30	Construction schedules	Noise nuisance to neighbouring properties	Construction activities only undertaken during the day and local communities informed of the construction schedule.	Complied with Construction in day time only
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.	Complied with (Refer Section 5.4.6). However, there is scope for further improvement in improving the living conditions of workers
32	Influx of migratory workers	Conflict with local population to share local resources	Using local workers for appropriate asks	Complied with (Refer Section 5.4.6). Local workforces have been given preference based on skill levels.
33	Lines through farmland	Loss of agricultural productivity	Use existing access roads wherever possible	Complied with. Observation already provided at Clause no 19 above. Repair/restoration done immediately wherever required. Till date no grievance has been received in this regard.
			Ensure existing irrigation facilities are maintained in working condition	
			Protect /preserve tops soil and reinstate after construction completed	
			Repair /reinstate damaged bunds etc. after construction completed	
		Social inequities	Land owners/ Farmers compensated for any temporary loss of productive land as per	Compensation for land and damage to crop/tree etc. is being paid to land owner

Cl. No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Compliance Status
			existing regulation.	after assessment by revenue authorities. It is suggested that project authorities expedite process for early payment
34	Uncontrolled erosion/silt runoff	Soil loss, downstream siltation	Need for access tracks minimised, use of existing roads.	Complied with (Refer Section 5.4.1). Observation already provided at Clause no 19 above. Construction during monsoon avoided as far as possible.
			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	
35	Nuisance to nearby properties	Losses to neighbouring land uses/ values	Contract clauses specifying careful construction practices.	Complied with (Refer Section 5.4.2). Good construction practices with proper scheduling of construction activities observed in all active sites. No major deviation with respect to contract conditions by the contractor found/reported
			As much as possible existing access ways will be used	
			Productive land will be reinstated following completion of construction	
		Social inequities	Compensation will be paid for loss of production, if any.	Observation already provided at Clause no 34 above.
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 ongoing construction activities	Observation already provided at Clause no 21 above.
37	Equipment submerged under flood	Contamination of receptors (land, water)	Equipment stored at secure place above the high flood level (HFL)	Complied with Substations are constructed above HFL
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	Complied with. No new site is being developed for aggregates.

Cl. No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Compliance Status
39	Health and safety	Injury and sickness of workers and members of the public	Safety equipment's (PPEs) for construction workers	Not fully complied with (Refer Section 5.4.6) Safety equipment available but often not used by workers. Worker facilities/camp available but needs further improvement with respect to sanitation. Health & safety plan in place, however proper implementation needs to be ensured. No major accident/incident reported for any site till date. More training to be conducted to create awareness on use of PPEs /safety gear.
			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	
40	Inadequate construction stage monitoring	Likely to maximise damages	Training of environmental monitoring personnel	More specific and periodic awareness/ training on IEAR, ESPPF etc. requirements for effective implementation/ monitoring of provisions of IEAR, ESPPF and contract conditions to achieve 100% compliance. It is suggested to deploy more environmental professionals for effective environmental monitoring and reporting system.
			Implementation of effective environmental monitoring and reporting system using checklist of all contractual environmental requirements	
			Appropriate contact clauses to ensure satisfactory implementation of contractual environmental mitigation measures.	
Operation and Maintenance				
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.	Not applicable at present. Pertain to Operation & Maintenance period only
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	
43	Equipment submerged under flood	Contamination of receptors (land, water)	Equipment installed above the high flood level (HFL) by raising the foundation pad.	

Cl. No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Compliance Status
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.	
45	SF6 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 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	
			Provide adequate sanitation and water supply facilities	
47	Electric Shock Hazards	Injury/ mortality to staff and public	Careful design using appropriate technologies to minimise hazards	
			Security fences around substations	
			Barriers to prevent climbing on/ dismantling of transmission	
			Appropriate warning signs on facilities	
			Electricity safety awareness raising in project areas	
48	Operations and maintenance staff skills less than acceptable	Unnecessary environmental losses of various types	Adequate training in O&M to all relevant staff of substations & transmission/ distribution line maintenance crews.	
			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	

Cl. No.	Project activity/ stage	Potential impact	Proposed mitigation measures	Compliance Status
			maintenance activities.	
50	Equipment specifications and design parameters	Release of chemicals and gases in receptors (air, water, land)	Processes, equipment and systems using cholofluorocarbons (CFCs), including halon, should be phased out and to be disposed of in a manner consistent with the requirements of the Govt.	
51	Transmission/ distribution line maintenance	Exposure to electromagnetic interference	Transmission/ distribution line design to comply with the limits of electromagnetic interference from overhead power lines	
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	
53	Noise related	Nuisance to neighbouring properties	Substations sited and designed to ensure noise will not be a nuisance.	

5.9 CONCLUSIONS

It is vivid from the above discussion that all transmission & distribution line routes and substations location have been selected judiciously by considering the technical, environmental, socio-economic aspects. Though some changes in line length & route alignment have been observed in transmission /distribution lines as compared to IEAR scope but as a result careful route selection IA could able to avoid ecologically & socially sensitive areas including forest, protected areas, PCR etc. completely in all the lines and substations being implemented under this project.

The provisions of IEAR & EMP are being implemented at ground level and strict compliance by construction contractors is ensured through regular monitoring by IA. So far, no major impacts apart from earlier identified impacts are anticipated due to such changes in scope. Besides, all other applicable laws/rules/regulations of the country & funding agencies are being complied with and till date no violation/ penalty with respect to contravention of any regulations has been reported. During assessment, it has also been observed that so far, the project has achieved zero fatality with no major non-compliance of EMP/Contract provisions as stipulated in IEAR, which is an indicative of the strict vigil of the IA.

It has also emerged from the survey & PRA exercise that the PAPs were appreciative of the project and hoped that the power scenario would improve after commissioning of the project. Local people also benefited through project related employment that was being generated. However, following suggestions may be considered to further improve the safeguard measures and also enhance the environmental sustainability of project.

- During the construction phase, the implementing agency needs to ensure strict compliance of the contract provisions/EMP by Contractor especially in respect of workers health and safety.
- Along with labours, supervisors, engineers and Staff of Implementing Agency (IA) should also need to follow the health and safety precautions.
- Need of regular induction and training program for labours and engineers at all sites.
- Training for PMU staff regarding monitoring and implantation of EMP as proposed in IEAR. It is suggested to deploy more environmental professionals for effective environmental monitoring and reporting system.
- Lack of coordination between IA officers and contractors regarding implementation of Health and Safety Plan.

- Records of labour registration, health checkup of labours and other working staff need to be maintained at all sites and strictly monitoring to avoid engagement of child labour.
- Training and awareness regarding cleanliness and solid waste disposal to maintain the hygiene in the labour camps and construction sites.
- Demarcation and protection for sites where work has been on hold due to various reasons to avoid accidents and runoff of excavated soil from construction sites
- Project staff of the implementing agency should be well versed with the contents of the IEAR so as to ensure proper compliance by the contractors.

Overall, the commissioning of the project will augment the power distribution and availability in the region which will further catalyze economic activity and development of the area/region.

Chapter 6 MONITORING AND ORGANIZATION SUPPORT STRUCTURE

For smooth implementation of this project, following administrative and functional set up have been institutionalized for project implementation, review and monitoring etc.

6.1 ADMINISTRATIVE ARRANGEMENT FOR PROJECT IMPLEMENTATION

Central Project Implementation Unit (CPIU) - A body responsible for coordinating the preparation and implementation of the project 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 State Utility and responsible for coordinating with IA in preparing and implementing the project at the State level. It consists of experts across different areas from the Utility 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 the work site/s & operating in close association with the SPCU/ CPIU. PIU reports to the State level "Project Manager" nominated by the Project-in-Charge of IA. The IA has a Core team stationed at the CPIU on a permanent basis, and other IA officers (with required skills) make visits as and when required by this core team. This team represents IA is responsible for all coordination with SPCU, PIU, within IA and MoP, GoI. CPIU also assists MoP, GoI in monitoring project progress and coordination with The Bank.

6.2 REVIEW OF PROJECT IMPLEMENTATION PROGRESS

To enable timely implementation of the project/subprojects, following committee has been set up 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 specifies quarterly milestones or targets, which are reviewed by JCC through a formal monthly review meeting. This meeting forum is called as Joint Co-ordination Committee Meeting (JCCM). The IA convenes & keeps record of every meeting. MoP, GoI and The Bank join in as and when needed.

B. High Power Committee (HPC): The Utility in consultation with its State Government has constituted 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 meets on bimonthly basis or earlier, as per requirement. This forum is called as High Power Committee Meeting (HPCM) and the SPCU keeps records of every meeting. Minutes of the meeting will be shared with all concerned and if required, with GoI and The Bank.

C. Contractor's Review Meeting (CRM): Periodic Review Meeting is 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 meetings are 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 GoI and The Bank.

D. Review meetings are held among MoP, GoI, 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 GoI/ State Government level. Minutes of the meeting shall be prepared by IA and shared with all concerned.

6.3 E&S MONITORING

The arrangement for monitoring and reviewing of project from the perspective of environment and social management forms part of overall arrangements for project management and implementation environment. Environmental monitoring is a continuous process throughout the Project life cycle starting from site selection to construction and maintenance stage. As IA, POWERGRID endeavours to implement the project in close coordination with the respective state power utilities and departments. POWERGRID has been implementing the project based on the Implementation/Participation agreements that were signed separately between POWERGRID and the Power utilities.

The IA has appointed dedicated Environment Officer in each state including Nagaland to oversee the E&S management. Besides, DPN also has a separate cell at the Circle office level namely Environment and Social Management Unit (ESMU) headed by Chief Engineer (Power) for proper implementation and

monitoring of environmental & social management measures. Apart from day to day E&S monitoring other major responsibilities are;

- Coordinating environmental and social commitments and initiatives with various multilateral agencies, MoEF&CC and Govt. of Nagaland.
- Coordination of all environmental activities related to a project from conceptualization to operation and maintenance stage.
- 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&CC 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.

Additionally, Field In-Charge reviews the progress on daily basis and periodic review by higher management including review by Heads of SPCU and CPIU undertaken wherein apart from construction issues the environmental aspects of the projects are discussed and remedial measures taken wherever required. Besides, Periodic Contractor's Review Meeting (CRM) are being held by officials of PIU with Contractors at field offices, State Head Quarters (PIU location) and with CPIU at Guwahati for better co-ordination and resolution any pending issues. The World Bank mission team also visits various sites every six months to review the progress status including ground level implementation of safeguard measures. Any observation/agreed action plan suggested by the Bank is religiously complied in time bound manner. Additionally, review meeting among MoP, GoI, The Bank, State Governments., Utility and IA being held periodically to maintain oversight at the top level and also to debottleneck issues that require intervention at GoI/ State Government level.

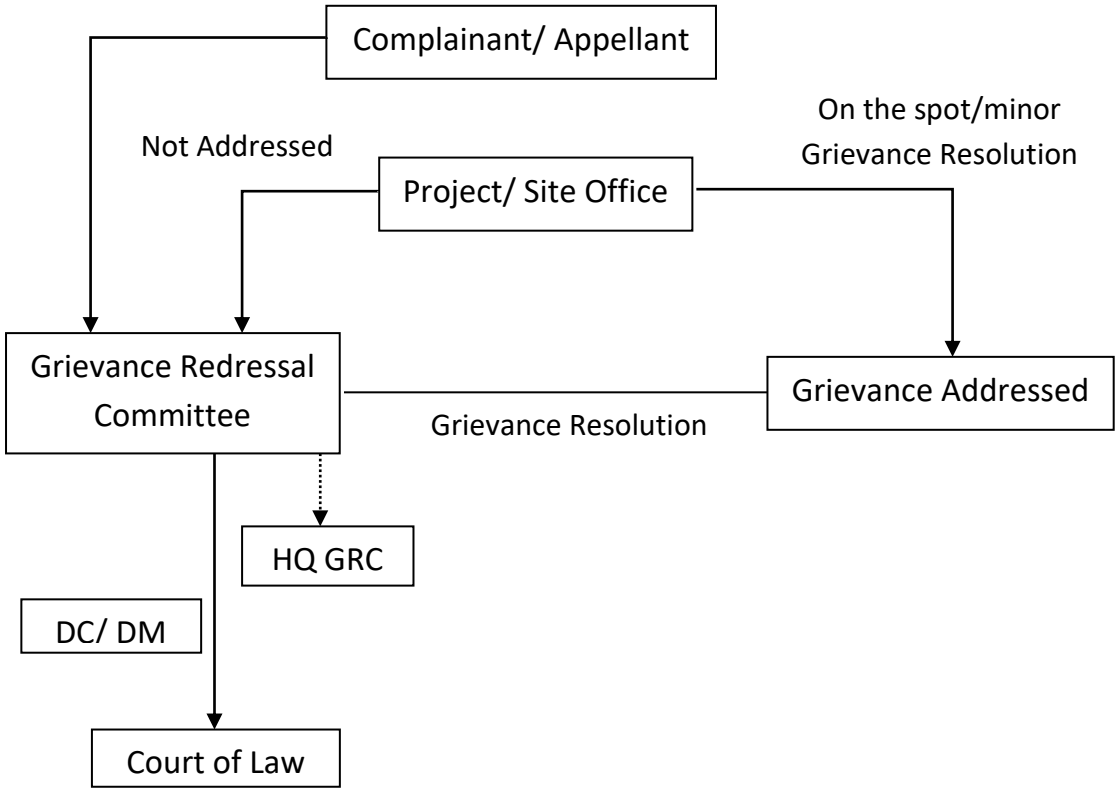
The Capacity building and Institutional Strengthening program of the IA is held intermittently to enhance the skills of the project officials. Besides, separate E&S training are also organized for Official of State Utility under Capacity Building & Institutional Strengthening (CBIS) programme. Further, State utility meetings between IA and DPN are held on a monthly/ bimonthly basis to assess the work progress and difficulties encountered in respect of land acquisition, RoW and compensation if any.

The IA has a continuous monitoring mechanism of the project w.r.t. compliance of the mitigation measures as stipulated in the IEAR. Thus, the

adherences to the clauses by the contractors are regularly monitored especially in respect of various implementations of E&S measures including health and safety aspects. Due to such strong institutional support structure coupled with monitoring mechanism in place, no major non-compliance was observed/reported during the implementation of projects till date. The project has so far had zero fatality which is indicative of the strict vigil of the IA. During the present study, it was observed that mitigation measures as suggested in IEAR are mostly complied with even though some gaps were found with respect to proper documentation and condition of labour camp at one of the DMS sub-station.

6.4 GRIEVANCE REDRESSAL MECHANISM (GRM)

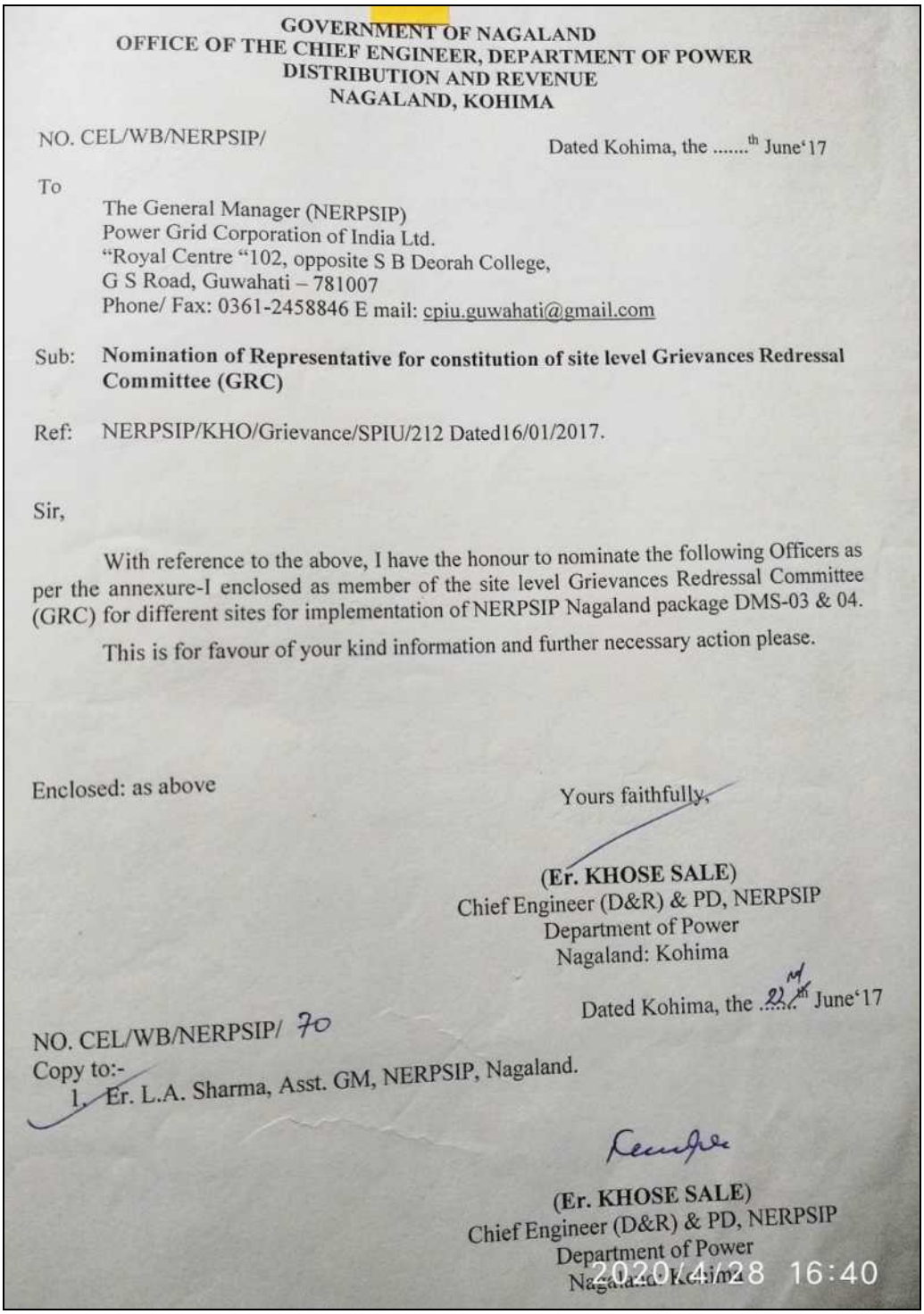
Grievance Redress Mechanism (GRM) is an integral and important mechanism for addressing/resolving the concern and grievances in a transparent and swift manner. In accordance with the provision in ESPPF, Grievance Redress Committees (GRC) have to be constituted in Nagaland both at the project/site level and at Corporate/HQ. This GRC is aimed to provide a trusted way to voice and resolve environment & social concerns of the project, and to address the concerns of the affected person/community in a time bound manner without impacting project implementation. The flow chart showing Grievance Redressal Mechanism is presented below.



The above referred GRCs are meant to act as supplement/ complement and in no way substitute the legal systems, especially embedded within RFCTLARR Act 2013, The Electricity Act, 2003, and Right to Information Act.

However, till date, Corporate/HQ level GRC have not been constituted by SPCU. Similarly, out of the required 7 site level GRCs in the sub-project districts only 2 site level GRCs have been constituted by SPCU. Moreover, these 2-site level GRC don't have representatives from local administration, village panchayat, affected persons representatives, reputed persons from the society etc. PIU vide its Letter No. NERPSIP/KOH/5000/08/2018-18/1316 dated 22/03/2019 has requested SPCU for formation of all the GRCs with required members. Letter regarding constitution of site level GRC is given as **Figure 6.1**.

Figure 6.1: Constitution of Site Level GRC, NERPSIP, Nagaland



GOVERNMENT OF NAGALAND
OFFICE OF THE CHIEF ENGINEER, DEPARTMENT OF POWER
DISTRIBUTION AND REVENUE
NAGALAND, KOHIMA

NO. CEL/WB/NERPSIP/ Dated Kohima, the .....th June'17

To
The General Manager (NERPSIP)
Power Grid Corporation of India Ltd.
"Royal Centre "102, opposite S B Deorah College,
G S Road, Guwahati – 781007
Phone/ Fax: 0361-2458846 E mail: cpiu.guwahati@gmail.com

Sub: **Nomination of Representative for constitution of site level Grievances Redressal Committee (GRC)**

Ref: NERPSIP/KHO/Grievance/SPIU/212 Dated16/01/2017.

Sir,

With reference to the above, I have the honour to nominate the following Officers as per the annexure-I enclosed as member of the site level Grievances Redressal Committee (GRC) for different sites for implementation of NERPSIP Nagaland package DMS-03 & 04.

This is for favour of your kind information and further necessary action please.

Enclosed: as above

Yours faithfully,

(Er. KHOSE SALE)
Chief Engineer (D&R) & PD, NERPSIP
Department of Power
Nagaland: Kohima

Dated Kohima, the 22nd June'17

NO. CEL/WB/NERPSIP/ 70
Copy to:-
1. Er. L.A. Sharma, Asst. GM, NERPSIP, Nagaland.

(Er. KHOSE SALE)
Chief Engineer (D&R) & PD, NERPSIP
Department of Power
Nagaland: Kohima

2020/4/28 16:40

List of official nominated for site level Grievances Redressal Committee(GRC), NERPSIP, Nagaland

Package Name	Package Description	Member from DoP, Nagaland for site level GRC	Nominated Members from POWERGRID for site level GRC
NAG-DMS-03	**New 33/11 KV Sub stations**		Sh. L.A.Sharma , Asst .GM & Sh. P.K Sutradhar, Ch. Mgr.
	33/11 KV Sechu Zubza New S/s. – 2X 5 MVA	EE (E) Kohima, DoP, Nagaland	
	33/11 KV Chiephobozou New S/s.- 2X2.5 MVA	EE (E) Kohima, DoP, Nagaland	
	33/11 KV Pfutsero New S/s. – 2X5 MVA	EE (E) Phek, DoP, Nagaland	
	Bay Extensions , Capacity Augmentation at existing 33/11 KV sub - stations		
	At ITI Kohima S/s. – Replacement of existing 2X5 MVA Transformers by 2X10 MVA Transformers.	EE (E) Kohima, DoP, Nagaland	
	At Botsa S/s – 1X5 MVA		
	At Chakabama s/s – 1X5 MVA.		
	33 KV DMS Lines		
	33 KV line at Chiephobozou new S/s from 220/132/33 Kv New Kohima S/s of DoP.-1 Km.	EE (E) Kohima, DoP, Nagaland	
	33 KV line at Pfutsero New S/s from 132/33 KV Pfutsero New S/s (Prop.) –4 Km.	EE (E) Phek, DoP, Nagaland	
NAG-DMS-04	**New 33/11 KV Sub stations**		Sh. L.A.Sharma , Asst .GM & Sh. D. Chakravarty, Ch. Mgr.
	33/11 KV Padampukhri New S/s. – 2 X 10 MVA	EE (E), Dimapur, DoP, Nagaland	
	33/11 KV Tizit New S/s. – 2X5 MVA	EE (E), Mon, DoP, Nagaland	
	Bay Extensions , Capacity Augmentation at existing 33/11 KV sub - stations		
	At 132/66/33 KV Nagarjan Sub station	EE (E), Dimapur, DoP, Nagaland	
	At Industrial Estate S/s – 1X10 MVA		
	At Referral Hospital S/s – 1X10 MVA		
	33 KV DMS Lines		
	33 Kv line at Padampukhri new S/s from 132/66/33 KV Existing S/s at Nagarjan. – 10 Km.		

(Er. KHOSE SALE)
Chief Engineer (D&R) & PD, NERPSIP
Department of Power
Nagaland: Kohima

Apart from above, grievance redressal is in built in crop/tree/tower footing compensation process where affected persons are given a chance to place their grievances after issuance of notice by revenue officials on the basis of assessment of actual damages. Grievances received towards compensation are generally addressed in open forum and in the presence of many witnesses. Process of spot verification and random checking by the district collector/ its authorized representative also provides forum for raising the grievance towards any irregularity/complain. Moreover, DPN & POWERGRID officials also address to the complaints of affected farmers and the same are forwarded to revenue official for doing the needful, if required.

It may also be noted that concerns of public are addressed regularly through public consultation process which started from project planning to construction and will be continued in operation and maintenance also. Besides, many concerns/grievances from affected persons/public have been received by Site Offices which are also regularly tracked for early resolution. However, it has been observed that most of them were minor in nature and

were resolved instantly and amicably by Site Officials after discussion & deliberation with affected person/ in consultation of revenue/district officials.

6.4.1 Grievances Received & Resolved

Till date only verbal grievances have been received at site during project execution. Details of grievances/ complaints received up to Jan., 2020 are given in **Table 6.1**.

Table 6.1: Details of Grievances/ Complaints

S. No.	Name of the Subproject /State	Location	Name of complainants	Date of complaints	Main Issue of Complaints	Status of complaint
A.	**Court Cases**					
No Court Case has been registered so far against any subprojects under NERPSIP						
B.	**Written Complaints**					
No written complaint has been received so far						
C.	**Verbal Complaints**					
1	New 33/11 Kv S/s at Chiephobozou	Chiephobozou	Visakuolie Kiewhuo (Villager)	06.06.2018	Road Condition	Discussed with DoP, regarding repairing the road.
2	New 33/11 Kv S/s at Sechu-Zubza	Zubza	Nearest Church authorities	04.06.2018	Power cut	Issue resolved through discussion
3	33/11 Kv Aug./Ext. S/s at Botsa	Botsa	Dr. Ropfu Dolie (PHC)	01.03.2018	Regarding Road Block	Complain resolved within 3 hours.
4		Botsa	Villagers of Botsa	07.05.2018	Fencing the S/s Surrounding	Discussed with con. Agency they will take necessary action.
5	New 33/11Kv S/s at Padampukhri	Padampukhri		18.07.2018	Unpleasant sound during construction	Resolved through discussion
6	New 132Kv S/C New Kohima-New Secretariat complex Transmission Line	Zhadima (AP-21)	Neizolie Loueii	13.01.2019	Compensation related issue (for trees & Land Area)	Resolved through discussion (meeting)
7	33/11KV S/S at Lalmati	Lalmati	Local villagers of Lalmati (Zubza)	02.02.2019	Unpleasant sound during four-pole structure foundation	Resolved through discussion

S. No.	Name of the Subproject /State	Location	Name of complainants	Date of complaints	Main Issue of Complaints	Status of complaint
					casting (Night time at 8PM).	
8	New 132Kv S/C New Kohima-New Secretariat complex Transmission Line	Zhadima	Concerned land owners of Loc no 01 to 28 of Zhadima village	06.06.2019	Compensation related issue	Proposal for payment of compensation for 09 location has forwarded to Guwahati for further process
9	New 220kV New Kohima to Mokokchung via Wokha NAG-TW-01	Ehunny, AP-113 to 121	Village council of Ehunnu	10.07.2019	Without concern of land owners contractor damage the standing property for approach road	Resolved through discussion (other than RoW area will be compensated by contractor.
10	New 132Kv S/C New Kohima-New Secretariat complex Transmission Line NAG-TW-05	Zhadima, AP-24	Concerned land owners of Loc 24 of Zhadima village	14.10.2019	Approach road issue	Land owners were assured that the approach road making will be handled by the M/S SPIL.
11	132kV Kohima to Wokha NAG-TW-06	Phezha AP-01	MEDOSAO SEMOU	21.10.2019	RoW (not allowing line to pass through his property)	Negotiation under Progress
12	New 132Kv S/C New Kohima-New Secretariat complex Transmission Line NAG-TW-05	Zhadima, AP-24,21,22,20,19	1. Visazolie 2. Thekruneilhou 3. Neizelie 4. Khriesamhalie 5. Neisakhotuo 6. Neizelie	08.11.2019	Approach road issue	Land owners were assured that the approach road making will be handled by the M/S SPIL.

ANNEXURE I

List of Angiosperm

List of Angiosperms

Family	Name of species
Acanthaceae	*Eranthemum pulchellum*
Acanthaceae	*Justicia mollissima*
Acanthaceae	*Strobilanthes coloratus*
Acanthaceae	*Strobilanthes hamiltoniana*
Acanthaceae	*Thunbergia coccinea*
Altingiaceae	*Altingia excelsa*
Amaranthaceae	*Achyranthes aspera*
Amaranthaceae	*Amaranthus viridis*
Amaranthaceae	*Chenopodium album*
Anacardiaceae	*Mangifera indica*
Anacardiaceae	*Rhus chinensis*
Anacradiaceae	*Mangifera sylvatica*
Annonaceae	*Fissistigma polyanthum*
Apiaceae	*Centella asiatica*
Apiaceae	*Eryngium foetidum*
Araceae	*Alocasia fallax*
Araceae	*Arisaema concinnum*
Araceae	*Colocasia forniculata*
Araceae	*Lasia spinosa*
Araliaceae	*Brassaiopsis glomerulata*
Araliaceae	*Brassaiopsis hainla*
Arecaceae	*Areca catechu*
Arecaceae	*Calamus erectus*
Arecaceae	*Calamus floribundus*
Arecaceae	*Calamus tenuis*
Arecaceae	*Trachycarpus martianus*
Asparagaceae	*Asparagus racemosus*
Asteraceae	*Ageratum conyzoides*
Asteraceae	*Artemisia nilagirica*
Asteraceae	*Bidens pilosa*
Asteraceae	*Chromolaena odoratum*
Asteraceae	*Mikania micrantha*
Asteraceae	*Parthenium hysteropharus*
Balsaminaceae	*Impatiens bicornuta*
Begoniaceae	*Begonia nepalensis*
Begoniaceae	*Begonia palmata*
Betulaceae	*Alnus nepalensis*
Bignoniaceae	*Oroxylum indicum*
Burseraceae	*Canarium bengalense*
Burseraceae	*Canarium strictum*
Calophyllaceae	*Mesua ferrea*
Caryophyllaceae	*Drymaria cordata*
Clusiaceae	*Garcinia cowa*
Clusiaceae	*Garcinia lanceifolia*
Combretaceae	*Combretum decandrum*
Combretaceae	*Terminalia myriocarpa*
Commelinaceae	*Commelina benghalensis*
Commelinaceae	*Commelina paluda*
Commelinaceae	*Pollia subumbellata*

Family	Name of species
Convolvulaceae	*Argyreia argentea*
Cucurbitaceae	*Hodgsonia heteroclita*
Cucurbitaceae	*Trichosanthes cordata*
Cyperaceae	*Cyperus exaltatus*
Cyperaceae	*Cyperus rotundus*
Dilleniaceae	*Dillenia indica*
Dioscoreaceae	*Dioscorea bulbifera*
Dipterocarpaceae	*Shorea assamica*
Euphorbiaceae	*Balakata baccatum*
Euphorbiaceae	*Euphorbia hirta*
Euphorbiaceae	*Euphorbia pulcherrima*
Euphorbiaceae	*Macaranga denticulata*
Euphorbiaceae	*Macaranga grandiflora*
Euphorbiaceae	*Ricinus communis*
Euphorbiaceae	*Sauropus androgynus*
Euphorbiaceae	*Mallotus albus*
Fabaceae	*Acacia pennata*
Fabaceae	*Acrocarpus fraxinifolius*
Fabaceae	*Albizia chinensis*
Fabaceae	*Albizia lucidior*
Fabaceae	*Albizia procera*
Fabaceae	*Bauhinia purpurea*
Fabaceae	*Bauhinia variegata*
Fabaceae	*Crotalaria pallida*
Fabaceae	*Dalbergia pinnata*
Fabaceae	*Derris scandens*
Fabaceae	*Entada rheedii*
Fabaceae	*Erythrina variegata*
Fabaceae	*Mimosa pudica*
Fabaceae	*Parkia timoriana*
Fagaceae	*Castanopsis indica*
Juglandaceae	*Engelhardtia spicata*
Lamiaceae	*Callicarpa arborea*
Lamiaceae	*Elsholtzia blanda*
Lamiaceae	*Gmelina arborea*
Lamiaceae	*Tectona grandis*
Lauraceae	*Actinodaphne obovata*
Lauraceae	*Cinnamomum bejolghota*
Lauraceae	*Cinnamomum glaucescens*
Lauraceae	*Litsea salicifolia*
Lauraceae	*Phoebe cooperiana*
Lauraceae	*Phoebe hainesiana*
Loranthaceae	*Scurrula gracilifolia*
Lythraceae	*Duabanga grandiflora*
Magnoliaceae	*Magnolia champaca*
Magnoliaceae	*Magnolia hodgsonii*
Malvaceae	*Bombax ceiba*
Malvaceae	*Colona floribunda*
Malvaceae	*Pterospermum acerifolium*

Family	Name of species
Malvaceae	*Sida rhombifolia*
Malvaceae	*Urena lobata*
Meliaceae	*Aglaia spectabilis*
Meliaceae	*Chukrasia tabularis*
Meliaceae	*Azadirachta indica*
Meliaceae	*Toona hexandra*
Menispermaceae	*Cocculus orbiculatus*
Moraceae	*Artocarpus chama*
Moraceae	*Artocarpus heterophyllus*
Moraceae	*Ficus auriculata*
Moraceae	*Ficus glomerata*
Moraceae	*Ficus oligodon*
Moraceae	*Ficus roxburghii*
Moraceae	*Ficus semicordata*
Musaceae	*Musa acuminata*
Musaceae	*Musa balbisiana*
Myrtaceae	*Syzygium tetragonum*
Oleaceae	*Jasminum amplexicaule*
Orchidaceae	*Aerides roseum*
Orchidaceae	*Bulbophyllum dyerianum*
Orchidaceae	*Bulbophyllum piluliferum*
Orchidaceae	*Bulbophyllum reptans*
Orchidaceae	*Bulbophyllum roxburghii*
Orchidaceae	*Bulbophyllum wallichii*
Orchidaceae	*Calanthe gracilis*
Orchidaceae	*Ceratostylis teres*
Orchidaceae	*Cleisostoma striatum*
Orchidaceae	*Coelogyne cristata*
Orchidaceae	*Coelogyne griffithii*
Orchidaceae	*Dendrobium acinaciforme*
Orchidaceae	*Dendrobium hookerianum*
Orchidaceae	*Eria acervata*
Orchidaceae	*Eria amica*
Orchidaceae	*Eulophia nuda*
Orchidaceae	*Liparis assamica*
Orchidaceae	*Luisia teretifolia*
Oxalidaceae	*Oxalis acetocella*
Oxalidaceae	*Oxalis corniculata*
Pandanaceae	*Pandanus odorifer*
Phyllanthaceae	*Bischofia javanica*
Phyllanthaceae	*Phyllanthus emblica*
Piperaceae	*Piper betle*
Poaceae	*Arundinaria hirsuta*

Family	Name of species
Poaceae	*Arundinaria suberecta*
Poaceae	*Bambusa balcooa*
Poaceae	*Bambusa khasiana*
Poaceae	*Bambusa pallida*
Poaceae	*Bambusa tulda*
Poaceae	*Bambusa vulgaris*
Poaceae	*Cynodon dactylon*
Poaceae	*Dendrocalamus giganteus*
Poaceae	*Dendrocalamus hamiltonii*
Poaceae	*Dendrocalamus strictus*
Poaceae	*Imperata cylindrica*
Poaceae	*Phragmites karka*
Poaceae	*Poa annua*
Poaceae	*Saccharum spontaneum*
Poaceae	*Themeda villosa*
Poaceae	*Thysanolaena maxima*
Polygonaceae	*Fagopyrum esculentum*
Polygonaceae	*Persicaria capitata*
Rosaceae	*Rubus paniculatus*
Rutaceae	*Murraya paniculata*
Sapindaceae	*Sapindus rarak*
Simaroubaceae	*Ailanthus integrifolia*
Simaroubaceae	*Alangium chinense*
Solanaceae	*Capsicum annuum*
Solanaceae	*Datura metel*
Solanaceae	*Physalis minima*
Solanaceae	*Solanum indicum*
Solanaceae	*Solanum nigrum*
Solanaceae	*Solanum xanthocarpum*
Sterculiaceae	*Sterculia villosa*
Theaceae	*Schima wallichii*
Tiliaceae	*Triumfetta bartramia*
Urticaceae	*Debregeasia longifolia*
Urticaceae	*Elatostema sessile*
Urticaceae	*Lecanthus peduncularis*
Urticaceae	*Urtica dioica*
Verbenaceae	*Lantana camara*
Zingiberaceae	*Alpinia nigra*
Zingiberaceae	*Curcuma angustifolia*
Zingiberaceae	*Globba multiflora*
Zingiberaceae	*Hedychium spicatum*
Zingiberaceae	*Zingiber officinale*

ANNEXURE II

Details of Tower Schedule of 132kV Lines

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:LILO OF 132 KV S/C Mokakchung to Mariani TL.at Longnak

SL NO	AP NO	TOWER NO	TYPE OF TOWER	REMARKS	ANGLE OF DEVIATION	SPAN IN (M)	SEC. LENG.	CUMLTV . LENGTH	R.L	LEVEL DIFF.	SUM OF ADJ. SPAN	WIND SPAN	WEIGHT SPAN IN (			WEIGHT SPAN IN (			MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE WGS-84	
													LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL			EASTING	NORTHING
1		EXT-100	B+0		13°16'05"LT				233.11		34.00	17.00		-15.54	-15.54		-36.13	-36.13		VILL-LONGNAK	94°22'59.91"	26°28'2.69"
2	1	1/0(ON LINE)	DD+3		90°14'57"RT	34	34	34	230.72	0.61	83.00	41.50	49.54	101.11	150.65	70.13	149.61	219.74		VILL-LONGNAK	94°22'58.98"	26°28'03.46"
3	2	2/0	DC+0		20°05'31"RT	49	49	83	231.65	-2.07	275.00	137.50	-52.11	76.73	24.62	-100.61	53.77	-46.83	Ditch	VILL-LONGNAK	94°23'0.04"	26°28'4.76"
4	3	3/0	DD+0		36°05'10"RT	226	226	309	236.17	4.52	340.00	170.00	149.27	83.57	232.84	172.23	100.38	272.61	FP, Ditch	VILL-LONGNAK	94°23'05.3"	26°28'08.0"
5	4	4/0	DD+0		46°57'37"RT	114	114	423	234.5	-1.67	155.00	77.50	30.43	-10.46	19.97	13.62	-30.06	-16.44	Nala	VILL-LONGNAK	94°23'10.81"	26°28'8.54"
6	5	5/0	DD+0		13°23'21"RT	41	41	464	235.2	0.70	115.00	57.50	51.46	-22.80	28.67	71.06	-60.65	10.41		VILL-LONGNAK	94°23'11.78"	26°28'7.53"
7		BAY	GANTRY			74	74	538	237.64	2.44	74.00	37.00	96.80		96.80	134.65		134.65	Vill Road	VILL-LONGNAK	94°23'12.98"	26°28'5.37"
1	1	1/0(ON LINE)	DD+3		89°45'03"RT	268	268	806	230.72	-1.84	268.00	134.00	101.11	146.45	247.56	149.61	154.33	303.94	Ditch, 11KV, 33KV, LT Line, FP	VILL-LONGNAK	94°22'58.98"	26°28'03.46"
2		EXT-101	A+0						231.88		268.00	134.00	121.55		121.55	113.67		113.67		VILL-LONGNAK	94°22'51.10"	26°28'8.56"

SUBMITTED BY:
HYAMA POWER(I) LTD.

CHECKED BY:
P.G.C.I.L

APPROVED BY:

ANNEXURE-I

CLIENT: P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK: 132 KV D/C NEW KOHIMA TO N.U.C. TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER	REMARKS	ANGLE OF DEVIATION	COMBINATION FROM	BODY EXT.	LEG EXTENSION A	LEG EXTENSION B	LEG EXTENSION C	LEG EXTENSION D	CHIMNEY EXTENSION A	CHIMNEY EXTENSION B	CHIMNEY EXTENSION C	CHIMNEY EXTENSION D	SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT) LEFT	WEIGHT SPAN IN (HOT) RIGHT	WEIGHT SPAN IN (HOT) TOTAL	WEIGHT SPAN IN (COLD) LEFT	WEIGHT SPAN IN (COLD) RIGHT	WEIGHT SPAN IN (COLD) TOTAL	FOUNDATION TYPE	MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE WGS-84 EASTING	GPS CO-ORDINATE WGS-84 NORTHING
1		BAY	GANTRY																114.56	0														
2	1	1/0	DD	X-Arm Strengthening Suggested(Due to Wt. Span Limit Cross)	14°4'14"RT	BB	0	9	9	9	9	0	0	0	0	48	48	48	108.85	1	2.29	48.00		-62.5176	-62.52		-117.285	-117.28			VILL- ZHADIMA	94°03'02.3"	25°50'12.9"
3	2	2/0	DC	Used DC instead of DB due to Sum of Adj. Span(X-Arm Strengthening Suggested (Due to Wt. Span Limit Cross)	12°13'44"RT	BB	0	9	9	9	9	0	0	0	0	226	274	322	111.74	2	-98.11	274.00	110.518	900.2547	1010.77	165.285	1398.6	1563.88			VILL- ZHADIMA	94°03'03.02"	25°50'12.24"
4	3	3/0	DC	X-Arm Strengthening Suggested(Due to Wt. Span Limit Cross)	18°55'44"RT	BB	0	0	0	0	0	0	0	0	0	565	839	887	765.39	1	-54.40	791.00	-674.25	457.1767	-217.15	-1172.6	567.6356	-604.96		Boundary, Un Metal Road	VILL- ZHADIMA	94°03'03.22"	25°50'07.53"
5	4	4/0	DC	X-Arm Strengthening Suggested(Due to Wt. Span Limit Cross)	26°20'23"RT	BB	0	0	0	0	0	0	0	0	0	229	1068	1116	836.98	2	70.64	794.00	107.883	-444.904	-337.01	-2.6356	-799.016	-801.65		FP	VILL- ZHADIMA	94°03'23.9"	25°49'34.00"
6	5	5/0	DB	X-Arm Strengthening Suggested(Due to Wt. Span Limit Cross)	7°26'57"RT	BB	0	0	0	0	0	0	0	0	0	318	1386	1434	894.72	1.5	58.24	547.00	673.904	-173.127	500.78	1026.02	-363.37	644.65		Un Metal Road	VILL- ZHADIMA	94°03'26.98"	25°49'47.19"
7	6	6/0	DB	X-Arm Strengthening Suggested(Due to Wt. Span Limit Cross)	8°9'29"LT	BB	0	3	3	3	3	0	0	0	0	347	1733	1781	941.38	1.5	49.66	666.00	433.03	-330.877	102.15	597.317	-651.422	-54.10			VILL- ZHADIMA	94°03'23.21"	25°49'25.96"
8	7	7/0	DD	X-Arm Strengthening Suggested(Due to Wt. Span Limit Cross)	52°0'37"LT	BB	0	6	6	6	6	0	0	0	0	351	2084	2132	1036.39	1.5	98.01	911.00	681.677	-17.9273	663.75	1002.42	-206.52	795.90		FP	VILL- ZHADIMA	94°03'22.58"	25°49'14.36"
9	8	8/0	DB	X-Arm Strengthening Suggested(Due to Wt. Span Limit Cross)	5°27'00"RT	BB	0	9	6	6	7.5	0	0	0	0	560	2644	2692	1127.39	0.5	92.00	680.00	577.927	175.3065	753.23	766.52	248.2974	1014.82			VILL- ZHADIMA	94°03'17.17"	25°49'02.91"
10	9	9/0	DB		11°10'15"RT	BB	0	6	6	6	6	0	0	0	0	120	2764	2812	1120.26	1	-7.83	278.00	-85.306	100.4632	45.16	-128.3	114.0498	-14.25			VILL- ZHADIMA	94°03'40.62"	25°48'59.36"
11	10	10/0	DD		31°30'32"RT	BB	0	0	0	0	0	0	0	0	0	158	2922	2970	1124.39	1	-1.87	381.00	57.6368	-56.9159	0.62	43.9502	-163.528	-119.58		Nala	VILL- ZHADIMA	94°03'43.51"	25°48'54.91"
12	11	11/0	DC		17°21'00"LT	BB	0	0	0	0	0	0	0	0	0	223	3145	3193	1148.6	0.5	20.71	656.00	279.917	85.24051	365.16	386.528	4.050°2	390.58		2 Nos FP	VILL- ZHADIMA	94°03'43.55"	25°48'47.7"
13	12	12/0	DD		42°54'5"LT	BB	0	0	0	0	0	0	0	0	0	427	3572	3620	1175.3	1.00	30.20	584.00	341.759	388.172	729.93	422.95	552.5487	975.50			VILL- ZHADIMA	94°03'47.39"	25°48'34.41"
14	13	13/0	DC	X-Arm Strengthening Suggested	22°35'17"RT	BB	0	0	0	0	0	0	0	0	0	257	3829	3877	1338.5	1.00	-36.80	722.00	-131.17	-340.986	-472.16	-295.55	-704.012	-999.56			VILL- ZHADIMA	94°03'55.26"	25°48'29.98"
15	14	14/0	DD	Used DD instead of DC due to Sum of Adj. Span(X-Arm Strengthening Suggested)	27°14'55"RT	BB	0	9	9	9	9	0	0	0	0	465	4294	4342	1279.05	3.50	147.05	815.00	805.985	102.3058	908.29	1109.91	56.28908	1225.30		Vill Road	VILL- ZHADIMA	94°04'05.21"	25°48'17.82"
16	15	15/0	DB		10°46'57"RT	BB	0	9	9	9	9	0	0	0	0	350	4644	4692	1290.58	1.00	14.03	561.00	247.694	61.0399	308.73	293.711	32.89591	326.51		2 Nos Vill Road, FP	VILL- ZHADIMA	94°04'06.67"	25°48'06.48"
17	16	16/0	DC		29°54'12"RT	BB	0	3	3	4.5	3	0	0	0	0	211	4855	4903	1301.253	0.50	5.17	476.00	149.96	57.01858	206.98	178.104	9.237581	187.34		Nala, Vill Road	VILL- ZHADIMA	94°04'06.49"	25°47'59.55"
18	17	17/0	DC		27°18'3"LT	BB	0	0	0	1.5	1.5	0	0	0	0	265	5120	5168	1315.784	1.00	11.03	510.00	207.981	118.3523	326.34	255.762	115.7431	371.51			VILL- ZHADIMA	94°04'01.39"	25°47'52.23"
19	18	18/0	DD		49°22'52"LT	BB	0	3	3	0	4.5	0	0	0	0	245	5365	5413	1313.842	1.50	0.56	572.00	126.638	-98.0886	28.55	129.257	-263.679	-134.42			VILL- ZHADIMA	94°04'00.57"	25°47'44.53"
20	19	19/0	DD	Used DD instead of DC due to Sum of Adj. Span	28°47'59"RT	BB	0	3	6	6	3	0	0	0	0	327	5692	5740	1360.011	0.50	47.17	921.00	425.089	358.4346	783.49	590.679	397.2747	987.95			VILL- ZHADIMA	94°04'08.62"	25°47'36.68"
21	20	20/0	DB		9°46'24"RT	BB	0	3	3	4.5	4.5	0	0	0	0	594	6286	6334	1339.898	0.50	-20.11	738.00	235.595	57.96	293.55	196.725	49.07	245.79		3 Nos FP	VILL- ZHADIMA	94°04'14.45"	25°47'58.31"

SL NO	AP NO	TOWER NO	TYPE OF TOWER	REMARKS	ANGLE OF DEVIATION	CONNECT WITH BB NT	CONNECT WITH BB/NT	LEG EXTENSION A	LEG EXTENSION B	LEG EXTENSION C	LEG EXTENSION D	CHIMNEY EXTENSION A	CHIMNEY EXTENSION B	CHIMNEY EXTENSION C	CHIMNEY EXTENSION D	SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT) LEFT	WEIGHT SPAN IN (HOT) RIGHT	WEIGHT SPAN IN (HOT) TOTAL	WEIGHT SPAN IN (COLD) LEFT	WEIGHT SPAN IN (COLD) RIGHT	WEIGHT SPAN IN (COLD) TOTAL	FOUNDATION TYPE	MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE WGS-84 EASTING	GPS CO-ORDINATE WGS-84 NORTHING
21	20	20/0	DB		9°46'24"RT	BB	0	3	3	4.5	4.5	0	0	0	0				1339.898	0.50		738.00	235.60	57.9582	293.55	196.73	49.06851	245.79			VILL- ZHADIMA	94°04'14.45"	25°47'58.31"
22	21	21/0	DC		19°51'20"RT	BB		0	0	0	0	0	0	0	0	144	6430	6478	1344.513	1.00	1.12	314.00	86.0418	-48.56	37.49	94.9305	133.1	-38.17			VILL- ZHADIMA	94°04'14.92"	25°47'13.50"
23	22	22/0	DD		50°41'30"LT	BB		0	0	1.5	1.5	0	0	0	0	170	6600	6648	1356.033	0.00	12.52	518.00	218.557	86.79075	305.35	303.1	-32.7253	270.38		2Nos FP	VILL- ZHADIMA	94°04'13.10"	25°47'08.30"
24	24	24/0	DD		30°51'26"RT	BB	0	3	3	4.5	6	0	0	0	0	448	7048	7096	1391.87	0.00	38.84	822.00	381.209	109.36	490.57	480.725	60.21291	540.94		2Nos FP, 33KV	VILL- ZHADIMA	94°04'22.66"	25°46'56.45"
25	26	26/0	DC	X-Arm Strengthening Suggested	20°42'40"LT	BB		0	0	0	0	0	0	0	0	374	7422	7470	1411.882	1.00	16.01	580.00	264.64	528.3908	793.03	313.787	797.6703	1111.46		4Nos FP, 33KV, Metal Road, Un Metal Road	VILL- ZHADIMA	94°04'22.85"	25°45'43.60"
26	26A	26A/0	DB		09°11'22"RT	BB		0	1.5	1.5	0	0	0	0	0	206	7628	7676	1363.06	0.50	-48.32	429.00	-322.39	396.21	73.82	-591.67	576.4308	-15.24		Vill Road 33Kv	VILL- ZHADIMA	94°04'25.89"	25°46'33.59"
27	27	27/0	DB		08°00'06"RT	BB		1.5	1.5	0	0	0	0	0	0	223	7851	7899	1327.55	0.00	-35.01	570.00	-173.21	218.093	42.89	-353.43	243.0551	-110.38		2 Nos Nala	VILL- ZHADIMA	94°04'27.92"	25°46'30.53"
28	28	28/0	DC	Used DC instead of DB due to Sum of Adj. Span	14°15'23"LT	BB		1.5	1.5	1.5	0	0	1.5	0	0	347	8198	8246	1319.4	0.00	-8.15	696.00	130.907	111.2624	242.17	103.945	71.2319	175.18			VILL- ZHADIMA	94°04'29.42"	25°46'19.75"
29	29	29/0	DB	X-Arm Strengthening Suggested	08°00'21"RT	BB	0	9	9	6	6	0	0	0	0	349	8547	8595	1327.57	2.00	12.17	552.00	237.736	645.3624	883.10	277.768	989.6364	1267.40		Metal Road	VILL- PHE7-4A	94°04'33.68"	25°46'08.78"
30	30	30/0	DD		30°08'02"LT	BB	0	6	9	9	9	0	0	0	0	203	8750	8798	1263.19	1.50	-60.88	373.00	-442.36	448.5474	6.19	-788.64	678.679	-107.96		2 Nos 33Kv, NH-2	VILL- TSIESEMA	94° 04'35.56"	25°46'02.33"
31	31	31/0	DD		32°44'25"RT	BB	0	4.5	6	3	3	0	0	0	0	170	8920	8968	1233.61	0.00	-34.08	270.00	-278.55	389.4816	110.93	-536.68	604.3792	95.70		Nala	VILL- TSIESEMA	94° 04'39.72"	25°45'58.15"
32	31A	31A/0	DB	X-Arm Strengthening Suggested	13°47'57"LT	BB		0	3	3	0	0	0	0	0	100	9020	9068	1218.89	1.00	-18.72	180.00	-783.46	-353.75	-843.29	-534.38	-603	-1107.38		Proposed 400Kv D/C Imphal to Kohima TL,	VILL- TSIESEMA	94° 4'40.04"	25°45'55.09"
33	32	32/0	DB	X-Arm Strengthening Suggested	03°32'23"LT	BB	0	6	6	9	7.5	0	0	0	0	80	9100	9148	1231.76	2.50	17.37	155.00	433.75	276.6363	710.39	683	428.0135	1111.01			VILL- TSIESEMA	94° 04'41.87"	25°45'52.88"
34	33	33/0	DC		15°22'20"RT	BB	0	6	6	9	7.5	0	0	0	0	75	9175	9223	1230.37	1.00	-9.89	254.00	-201.64	34.58934	-167.05	-353.01	-0.17003	-353.18			VILL- TSIESEMA	94° 04'43.16"	25°45'50.68"
35	34	34/0	CC		16°03'01"LT	BB		0	0	1.5	1.5	0	0	0	0	179	9354	9402	1231.39	0.50	5.42	540.00	144.411	476.9511	571.36	179.17	582.9588	762.13		2 Nos Nala	VILL- TSIESEMA	94° 04'44.73"	25°45'45.96"
36	35	35/0	DB		00°09'34"RT	BB		0	0	1.5	0	0	0	0	0	361	9715	9763	1182.73	1.00	-49.06	775.00	-65.951	208.0951	142.14	-221.96	208.7883	-13.17		33Kv, Vill Road	VILL- TSIESEMA	94°04'51.03"	25°45'34.75"
37	36	36/0	DB		05°52'25"RT	BB	0	6	7.5	9	6	0	0	0	0	414	10129	10177	1175.48	0.00	-0.25	940.00	205.905	53.93988	259.84	205.212	-80.2977	124.91		132 Kv S/C Kohima - Wokha TL, Nala	VILL- TSIESEMA	94° 04'58.4"	25°45'23.01"
38	37	37/0	DC	Used DC instead of DB due to Sum of Adj. Span(X-Arm Strengthening Suggested)	13°05'18"LT	BB		0	0	0	0	0	0	0	0	592	10601	10649	1044.69	100	62.21	778.00	478.06	-350.86	127.20	512.298	-650.82	-38.53		Nala	VILL- TSIESEMA	94° 05'06.0"	25°45'07.4"

SUBMITTED BY:
SHYAMA POWER(I) LTD.
Sudip Bairi
Surveyor
Shyama Power India Ltd

CHECKED BY:
P.G.C.I.L

APPROVED BY:
P.G.C.I.L

To be followed with Annexure-II
Re-sounding in progress
12/11/2019

ANNEXURE-II.

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:132 KV D/C NEW KOHIMA TO N.U.C. TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER	REMARKS	ANGLE OF DEVIATION	COMBINATION FROM	BODY EXT.	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			FOUNDATION TYPE	MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE WGS-84	
								A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
1		BAY	GANTRY																914.56	0		48.00		-62.518	-62.52		-117.285	-117.28	DFR		VILL- ZHADIMA	94°03'02.3"	25°50'12.9"
2	1	1/0	DD	X-Arm Strengthening Suggested(Due to Wt. Span Limit Cross)	14°4'14"RT	BB	0	9	9	9	9	0	0	0	0	48	48	48	938.95	1	2.29	274.00	110.5	900.25	1010.77	165.285	1398.6	1563.88	DFR		VILL- ZHADIMA	94°03'04.02"	25°50'12.24"
3	2	2/0	DC	Used DC Instead of DB due to Sum of Adj. Span(X-Arm Strengthening Suggested (Due to Wt. Span Limit	12°13'44"RT	BB	0	9	9	9	9	0	0	0	0	226	226	274	811.74	2	-98.11	791.00	-674.3	457.107	-217.15	-1172.6	567.636	-604.96	DFR	Boundary, Un Metal Road	VILL- ZHADIMA	94°03'10.22"	25°50'07.53"
4	3	3/0	DC	X-Arm Strengthening Suggested(Due to Wt. Span Limit Cross)	18°55'44"RT	BB		0	0	0	0	0	0	0	0	565	565	839	765.34	1	-54.40	794.00	107.9	-444.9	-337.01	-2.6356	-799.016	-801.65	DFR	FP	VILL- ZHADIMA	94°03'23.9"	25°49'54.00"
5	4	4/0	DC	X-Arm Strengthening Suggested(Due to Wt. Span Limit Cross)	26°20'23"RT	BB		0	0	0	0	0	0	0	0	229	229	1068	836.98	2	70.64	547.00	673.9	-173.13	500.78	1028.02	-383.37	644.65	DFR	Un Metal Road	VILL- ZHADIMA	94°03'26.98"	25°49'47.19"
6	5	5/0	DB	X-Arm Strengthening Suggested(Due to Wt. Span Limit Cross)	7°26'50"RT	BB		0	0	0	0	0	0	0	0	318	318	1386	894.72	1.5	58.24	665.00	491.1	-86.03	405.10	701.37	-250.317	451.05	DFR		VILL- ZHADIMA	94°03'26.23"	25°49'36.82"
7	6	6/0	DB	X-Arm Strengthening Suggested(Due to Wt. Span Limit Cross)	8°9'29"LT	BB	0	3	3	3	3	0	0	0	0	347	347	1733	941.38	1.5	49.66	698.00	433	-328.29	104.74	597.317	-647.203	-49.89	DFR	Foot Track	VILL- ZHADIMA	94°03'23.21"	25°49'25.96"
8	7	7/0	DD	X-Arm Strengthening Suggested(Due to Wt. Span Limit Cross)	50°57'10"LT	BB	0	6	6	6	6	0	0	0	0	351	351	2084	1036.39	2.5	97.51	911.00	679.3	-11.515	667.78	998.203	-196.049	802.15	DFR		VILL- ZHADIMA	94°03'22.59"	25°49'14.36"
9	8	8/0	DB	X-Arm Strengthening Suggested(Due to Wt. Span Limit Cross)	01°58'37"RT	BB	0	7.5	6	6	6	0	0	0	0	560	560	2644	1115.91	1.5	90.02	680.00	571.5	145.38	716.90	756.049	199.43	955.48	DFR		VILL- ZHADIMA	94°03'37.51"	25°49'02.17"
10	9	9/0	DC		20°33'45"RT	BB	0	6	6	6	6	0	0	0	0	120	120	2764	1110.26	1.5	-5.65	275.00	-25.38	117.75	92.36	-79.434	143.22	63.79	DFR		VILL- ZHADIMA	94°03'40.62"	25°48'59.36"
11	10	10/0	DC		26°30'25"RT	BB		0	0	0	0	0	0	0	0	155	155	2919	1122.82	1.5	-3.44	399.00	37.25	-45.45	-8.20	11.78	-151.447	-139.67	DFR	Nala	VILL- ZHADIMA	94°03'42.9"	25°48'54.8"
12	11	11/0	DC		21°59'14"LT	BB	0	3	3	3	3	0	0	0	0	244	244	3163	1141.35	0.5	22.53	652.00	289.4	68.66	358.11	395.447	-17.0183	378.43	DFR	2 Nos Foot Track	VILL- ZHADIMA	94°03'42.5"	25°48'46.9"
13	12	12/0	DD		39°11'19"LT	BB		0	0	0	0	0	0	0	0	408	408	3571	1175.3	1.00	30.45	665.00	339.3	388.17	727.52	425.016	552.55	977.57	DFR		VILL- ZHADIMA	94°03'47.39"	25°48'34.41"
14	13	13/0	DC	X-Arm Strengthening Suggested	22°36'17"RT	BB		0	0	0	0	0	0	0	0	257	257	3828	1138.5	1.00	-36.80	722.00	-131.2	-340.99	-472.18	-295.55	-704.012	-999.56	DFR		VILL- ZHADIMA	94°03'55.26"	25°48'29.98"
15	14	14/0	DD	Used DD Instead of DC due to Sum of Adj. Span(X-Arm Strengthening Suggested)	27°14'55"RT	BB	0	9	9	9	9	0	0	0	0	465	465	4293	1274.05	3.50	147.05	815.00	806	102.31	908.29	1169.01	56.29	1225.30	DFR	Vill Road	VILL- ZHADIMA	94°04'05.01"	25°48'17.82"
16	15	15/0	DB		10°46'57"RT	BB	0	9	9	9	9	0	0	0	0	350	350	4643	1290.58	1.00	14.03	561.00	247.7	61.04	308.73	293.711	32.90	326.61	DFR	2 Nos Vill Road, FP	VILL- ZHADIMA	94°04'06.87"	25°48'06.48"
17	16	16/0	DC		29°54'12"RT	BB	0	3	3	5	3	0	0	0	0	211	211	4854	1301.25	0.50	5.17	476.00	150	57.02	206.98	178.104	9.24	187.34	DFR	Nala, Vill Road	VILL- ZHADIMA	94°04'06.49"	25°47'59.55"
18	17	17/0	DC		27°18'3"LT	BB		0	0	2	1.5	0	0	0	0	265	265	5119	1315.78	1.00	11.03	510.00	208	118.362	326.34	255.762	115.74	371.51	DFR		VILL- ZHADIMA	94°04'01.19"	25°47'52.23"
19	18	18/0	DD		49°22'52"LT	BB	0	3	3	6	4.5	0	0	0	0	245	245	5364	1311.84	1.50	0.56	572.00	126.6	-98.089	28.55	129.257	-263.679	-134.42	DFR		VILL- ZHADIMA	94°04'00.57"	25°47'44.53"
20	19	19/0	DD	Used DD Instead of DC due to Sum of Adj. Span	28°42'59"RT	BB	0	3	6	6	3	0	0	0	0	327	327	5691	1360.01	0.50	47.17	921.00	425.1	358.40	783.49	590.679	397.27	987.95	DFR		VILL- ZHADIMA	94°04'08.62"	25°47'36.68"
21	20	20/0	DB		9°46'24"RT	BB	0	3	3	5	4.5	0	0	0	0	594	594	6285	1379.9	0.50	-20.11	738.00	235.6	57.96	293.55	196.725	49.07	245.79	DFR	3 Nos FP	VILL- ZHADIMA	94°04'14.45"	25°47'18.11"

Only for Loc No- 7/0 to 11/0.

SUBMITTED BY:
SHYAMA POWER(I) LTD.

CHECKED BY:
P.G.C.I.L
11/6/19

एच. के. चुतिया / H.K. Chutia
उप. प्रबंधक / Dy. Manager
एन. ई. आर. पी. एस. आई. पी. / (NERPSIP)
पावरग्रिड / POWERGRID
कोहिमा : नागालैन्ड / Kohima : Nagaland

APPROVED BY:
P.G.C.I.L

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:LILO of both ckts of 132KV SC Kohima - Meluri(Kiphire) line at PFUTSERO

SL NO	AP NO	TOWER NO	TYPE OF TOWER	CONNECT WITH BB	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV . LENGTH
								A	B	C	D	A	B	C	D			
1		EXT. TN-90	SP				12°31'23"RT	3	3	3	3							
2	1	1/0	DD	BB	0	X-Arm Strengthening Suggested	85°14'42"LT	3	6	6	3	0	0	0	0	350	350	350
3	2	2/0	DD	BB	0	X-Arm Strengthening Suggested	57°25'18"RT	6	9	9	6	0	3	1.5	0	71	71	421
4	3	3/0	DB	BB	0		07°26'10"LT	3	4.5	6	6	0	0	0	1.5	166	166	587
5	4	4/0	DB	BB			00°52'44"RT	0	0	0	1.5	0	0	0	0	313	313	900
6	5	5/0	DB	BB			13°54'44"LT	0	0	1.5	1.5	0	0	0	0	365	365	1265
7	6	6/0	DC	BB	0	X-Arm Strengthening Suggested	27°36'08"LT	6	3	3	3	0	0	0	0	116	116	1381
8	7	7/0	DD	BB	0	Used DD Type Tower Instead of DC due to Sum of Adj. Span Limit Crossed	28°54'20"LT	6	6	9	9	0	0	3	3	247	247	1628
9	8	8/0	DC	BB	0		23°33'24"RT	3	3	3	3	0	0	0	0	472	472	2100
10	9	9/0	DD	BB	0		34°36'48"LT	6	3	3	4.5	0	0	0	0	135	135	2235
11	10	10/0	DD	BB	0		36°32'47"LT	9	6	6	9	1.5	0	0	1.5	152	152	2387
12			Gantry													24	24	2411
13		1/0	DD	BB	0		89°36'37"LT	3	6	6	3	0	0	0	0	319	319	2730
14		EXT. TN-91	SP				01°26'06"RT	6	6	6	6	0	0	0	0			

R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WIND SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE WGS-84	
					LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL			EASTING	NORTHING
2042.8			350.00	175.00		130.34	130.34		102.06	102.06		VILL- Pfutsero	94°18'01.6"	25°34'49.4"
		8.62									NH-29			
2052.92	1.5		421.00	210.50	219.66	748.12	967.78	247.94	1199.22	1447.15		VILL- Pfutsero	94°18'14.03"	25°34'46.40"
		-27.90												
2022.02	1.5		237.00	118.50	-677.12	-184.54	-861.66	-1128.22	-353.90	-1482.12		VILL- Pfutsero	94°18'14.63"	25°34'48.55"
		24.49												
2049.01	1		479.00	239.50	350.54	91.61	442.15	519.90	50.53	570.43		VILL- Pfutsero	94°18'20.61"	25°34'49.67"
		11.20									11KV			
2063.71	1.5		678.00	339.00	221.39	313.72	535.11	262.47	396.78	659.25		VILL- Pfutsero	94°18'29.84"	25°34'53.60"
		-26.41									2 Times Vill Road			
2037.30	1.5		481.00	240.50	51.28	147.58	198.86	-31.78	204.28	172.51		VILL- Pfutsero	94°18'42.57"	25°34'57.39"
		-5.73												
2029.57	2.5		363.00	181.50	-31.58	551.17	519.59	-88.28	821.89	733.61		VILL- Pfutsero	94°18'46.76"	25°34'59.54"
		-58.25												
1967.32	1.5		719.00	359.50	-304.17	615.52	311.35	-574.89	855.77	280.87		VILL- Pfutsero	94°18'50.87"	25°35'06.52"
		-98.78									Nala			
1871.54	1.5		607.00	303.50	-143.52	-302.72	-446.24	-383.77	-537.07	-920.84		VILL- Pfutsero	94°18'50.79"	25°35'21.83"
		27.56									Vill Road			
1897.6	0		287.00	143.50	437.72	-208.55	229.17	672.07	-388.67	283.40		VILL- Pfutsero	94°18'52.7"	25°35'25.9"
		23.85												
1918.45	0		176.00	88.00	360.55	-119.48	241.07	540.67	-202.70	337.97		VILL- Pfutsero	94°18'51.50"	25°35'30.60"
		1.74												
1926.19			24.00	12.00	143.48		143.48	226.70		226.70		VILL- Pfutsero	94°18'50.94"	25°35'31.26"
2052.92	1.5		319.00	159.50		-40.10	-40.10		-166.44	-166.44		VILL- Pfutsero	94°18'14.03"	25°34'46.40"
		35.11									LT Line, NH-29			
2083.53			319.00	159.50	359.10		359.10	485.44		485.44		VILL- Pfutsero	94°18'24.7"	25°34'42.8"

SUBMITTED BY:
SHYAMA POWER(I) LTD.

CHECKED BY:
P.G.C.I.L

एम. के. हलम / M. K. Haram
मैनेजर / Engineer
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Recomended

एच. के. चुतिया / H.K. Chutia
उप. प्रबंधक / Dy. Manager
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APPROVED BY:
P.G.C.I.L

SL NO	AP NO	TOWER NO	TYPE OF TOWER	CONNECT WITH BB	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WIND SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (			MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE WGS-84	
								A	B	C	D	A	B	C	D									LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL			EASTING	NORTHING
1		BAY	GANTRY (ZUNHEBOTO)					0	0	0	0	0	0	0	0				1250.8			97.00	48.50		214.70	214.70		319.91	319.91		VILL-LIZU NEW	94°29'34.86"	26°02'11.68"
2	1	1/0	DD	BB	0		00°58'43"RT	9	9	9	9	0	0	0	0	97	97	97	1236	3	-8.89	215.00	107.50	-117.70	-172.14	-289.84	-222.91	-318.46	-541.37		VILL-LIZU NEW	94°29'32.13"	26°02'13.78"
3	2	2/0	DD	BB			50°31'37"RT	0	0	1.5	0	0	0	0	0	118	118	215	1257.5	0.5	15.04	242.00	121.00	290.14	148.14	438.28	436.46	202.67	639.12		VILL-LIZU NEW	94°29'28.96"	26°02'16.31"
4	3	3/0	DD	BB	0		42°12'00"RT	9	9	9	9	0	0	0	0	124	124	339	1246.1	4	-5.89	451.00	225.50	-24.14	15.70	-8.43	-78.67	-77.85	-156.52		VILL-LIZU NEW	94°29'29.08"	26°02'20.29"
5	4	4/0	DB	BB	0		06°16'52"RT	3	3	3	3	0	0	0	0	327	327	666	1276.3	1.5	26.65	512.00	256.00	311.30	-68.65	242.64	404.85	-170.67	234.18	FP, FT	VILL-LIZU NEW	94°29'37.0"	26°02'27.86"
6	5	5/0	DC	BB			22°11'28"LT	0	0	1.5	0	0	0	0	0	185	185	851	1295.2	1	16.44	714.00	357.00	253.65	254.80	508.45	355.67	248.66	604.32	FP	VILL-LIZU NEW	94°29'42.69"	26°02'31.59"
7	7	7/0	DB	BB			04°38'41"LT	0	0	1.5	1.5	0	0	0	0	529	529	1380	1298	1	2.83	744.00	372.00	274.20	94.59	368.80	280.34	86.43	366.77	FT	VILL-LIZU NEW	94°29'52.13"	26°02'46.59"
8	8	8/0	DD	BB	0	X-Arm Strengthening Suggested	37°19'22"LT	6	6	9	7.5	0	0	0	0	215	215	1595	1294.1	1.5	1.53	591.00	295.50	120.41	813.94	934.34	128.57	1210.16	1338.74	Nala	VILL-LIZU NEW	94°29'55.43"	26°02'57.81"
9	9	9/0	DC	BB	0	X-Arm Strengthening Suggested	15°03'14"LT	6	7.5	7.5	6	0	0	0	0	376	376	1971	1163.8	1	-129.78	723.00	361.50	-437.94	987.37	549.43	-834.16	1502.56	668.39	FT	VILL-LIZU NEW	94°29'52.75"	26°03'04.68"
10	10	10/0	DB	BB	0	X-Arm Strengthening Suggested	07°28'58"LT	6	9	9	6	0	0	0	0	347	347	2318	1007.5	0.5	-155.73	584.00	292.00	-640.37	1015.67	375.30	-1155.56	1583.59	428.04		VILL-LIZU NEW	94°29'46.93"	26°03'14.73"
11	11	11/0	DB	BB	0	X-Arm Strengthening Suggested	00°08'17"LT	3	4.5	4.5	3	0	0	0	0	237	237	2555	893.79	1	-117.25	840.00	420.00	-778.67	174.23	-604.44	-1346.59	93.66	-1252.93		VILL-LIZU NEW	94°29'42.00"	26°03'20.94"
12	12	12/0	DC	BB	0	X-Arm Strengthening Suggested	16°41'42"RT	9	9	9	9	0	0	0	0	603	603	3158	932.61	3.5	42.32	879.00	439.50	428.77	-402.89	25.89	509.34	-745.28	-235.94	Nala	VILL-EMLOMI	94°29'29.49"	26°03'36.89"
13	14	14/0	DB	BB	0	X-Arm Strengthening Suggested	07°25'02"RT	9	9	9	9	0	0	0	0	276	276	3434	1012.93	1.5	82.32	841.00	420.50	678.89	-231.59	447.29	1021.28	-557.03	464.25		VILL-EMLOMI	94°29'26.13"	26°03'45.45"
14	16	16/0	DC	BB	0	X-Arm Strengthening Suggested	17°25'35"LT	6	6	6	7.5	0	0	0	0	565	565	3999	1175.6	1	160.17	959.00	479.50	796.59	-490.74	305.86	1122.03	-926.09	195.94	2 Nos FP, Nala	VILL-YESHOLTOMI	94°29'22.03"	26°04'03.26"
15	17	17/0	DC	BB	0	X-Arm Strengthening Suggested	17°46'08"RT	9	9	9	9	0	0	0	0	394	394	4393	1324.52	3.5	149.42	570.00	285.00	884.71	-292.21	592.53	1320.09	-532.89	787.20		VILL-YESHOLTOMI	94°29'15.08"	26°04'14.65"
16	18	18/0	DB	BB	0	X-Arm Strengthening Suggested	06°48'03"RT	6	6	6	6	0	0	0	0	176	176	4569	1361.92	1	36.90	339.00	169.50	468.21	239.82	708.03	708.89	340.03	1048.92	Vill Road	VILL-YESHOLTOMI	94°29'13.80"	26°04'20.19"
17	19	19/0	DC	BB			17°45'57"RT	0	0	0	0	0	0	0	0	163	163	4732	1354.19	1.5	-14.23	627.00	313.50	-76.82	8.05	-68.77	-177.03	-133.71	-310.75		VILL-ASUKHUTO	94°29'13.44"	26°04'25.40"
18	21	21/0	DC	BB			20°40'07"RT	1.5	0	0	0	0	0	0	0	464	464	5196	1410.99	1	57.30	778.00	389.00	455.95	-64.43	391.52	597.71	-204.60	393.11	2 Nos FP	VILL-ASUKHUTO	94°29'17.17"	26°04'40.16"
19	22	22/0	DB	BB	0		10°51'11"LT	9	9	9	9	0	0	0	0	314	314	5510	1441.33	2	38.34	644.00	322.00	378.43	206.38	584.81	518.60	232.57	751.17	FP	VILL-ASUKHUTO	94°29'23.49"	26°04'48.61"
20	23	23/0	DB	BB	0		01°17'48"RT	9	9	9	9	0	0	0	0	330	330	5840	1434.3	2.5	-7.53	734.00	367.00	123.62	220.13	343.75	97.43	231.61	329.04	3 Nos FP	VILL-ASUKHUTO	94°29'28.13"	26°04'58.45"
21	24	24/0	DB	BB			00°08'6"RT	1.5	0	0	0	0	0	0	0	404	404	6244	1437.26	0.5	-4.04	551.00	275.50	183.87	-4.47	179.40	172.39	-53.82	118.56	3 Nos FP, Nala	VILL-ASUKHUTO	94°29'34.02"	26°05'10.43"
22	25	25/0	DB	BB			12°00'00"LT	0	0	0	0	0	0	0	0	147	147	6391	1444.08	1	6.32	596.00	298.00	151.47	194.09	345.55	200.82	174.84	375.66	2 Nos FP	VILL-ASUKHUTO	94°29'36.15"	26°05'14.77"
23	26	26/0	DB	BB			08°59'20"RT	0	0	1.5	0	0	0	0	0	449	449	6840	1452.11	1.5	7.53	704.00	352.00	254.91	14.21	269.12	274.16	-57.50	216.66		VILL-ASUKHUTO	94°29'39.69"	26°05'29.14"
24	28	28/0	DD	BB	0		32°48'01"RT	9	9	6	6	0	0	0	0	255	255	7095	1461.04	0.5	15.93	514.00	257.00	240.79	146.51	387.30	312.50	157.28	469.79	FP	VILL-ASUKHUTO	94°29'43.08"	26°05'36.64"
25	29	29/0	DB	BB	0		03°54'59"RT	9	9	6	6	0	0	0	0	259	259	7354	1459.61	1.5	-2.43	527.00	263.50	112.49	-306.65	-194.16	101.72	-585.58	-483.87	2 Nos FP	VILL-ASUKHUTO	94°29'50.52"	26°05'41.48"
26	30	30/0	DC	BB	0	X-Arm Strengthening Suggested	16°50'15"RT	6	6	3	3	0	0	0	0	268	268	7622	1526.33	0	65.12	730.00	365.00	574.65	-167.53	407.11	853.58	-419.81	433.77	Nala, Metal Road	VILL-ASUKHUTO	94°29'58.96"	26°05'45.99"
27	31	31/0	DD	BB	0	X-Arm Strengthening Suggested	52°17'47"LT	9	9	9	9	0	0	0	3	462	462	8084	1626.76	5	101.53	527.00	263.50	629.53	-663.59	-34.06	881.81	-1104.23	-222.42	3 Times Metal Road, 2 Nos FP, Vill Road Nala	VILL-ATOIZU	94°30'15.06"	26°05'49.47"
28	32	32/0	DC	BB	0	X-Arm Strengthening Suggested	19°03'12"RT	9	9	9	9	3	1.5	0	0	65	65	8149	1647.21	0.5	24.95	161.00	80.50	728.59	97.11	825.71	1169.23	128.21	1297.44	33KV, FP	VILL-ATOIZU	94°30'15.99"	26°05'51.46"
29	33	33/0	DC	BB	0		28°17'59"RT	9	9	9	9	0	0	0	0	96	96	8245	1646.11	2	-2.60	520.00	260.00	-1.11	167.39	166.28	-32.21	139.15	106.95	66KV	VILL-ATOIZU	94°30'18.50"	26°05'53.89"
30	34	34/0	DC	BB			15°03'07"RT	1.5	1.5	0	0	0	0	0	0	424	424	8669	1663.54	0	10.43	641.00	320.50	256.61	217.31	473.92	284.85	286.19	571.03	2 Nos FP, Vill Road, 33KV	VILL-ATOIZU	94°30'33.06"	26°05'57.92"

SUBMITTED BY:
SHYAMA POWER(I) LTD.

CHECKED BY:
P.G.C.I.L

वतितेमजेन /WATITEMJEN
इंजीनियर /ENGINEER
एन.ई.आर.पी.एस.आई.पी /NERPSIP
जुन्हेबोटो /ZUNHEBOTO

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CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINE :- 132KV S/C (ON DC TOWER) ZUNHEBOTO TO MOKOKCHUNG TL

SL NO	AP NO	TOWER NO	TYPE OF TOWER	CONNECT WITH BB	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WIND SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (			MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE WGS-84	
								A	B	C	D	A	B	C	D									LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL			EASTING	NORTHING
30	34	34/0	DC	BB			15°03'07"RT	1.5	1.5	0	0	0	0	0	0				1663.54	0													
31	35	35/0	DB	BB	0		10°20'49"LT	6	7.5	6	6	0	0	0	0	217	217	8886	1646.02	1.5	-13.02	641.00	320.50	256.61	217.31	473.92	284.85	286.19	571.03		VILL-ATOIZU	94°30'33.06"	26°05'57.92"
32	36	36/0	DB	BB	0		12°04'03"LT	7.5	9	6	6	0	0	0	0	316	316	9202	1633.65	0.5	-11.37	533.00	266.50	-0.31	223.25	222.94	-69.19	264.56	195.37	FP	VILL-ATOIZU	94°30'40.9"	26°05'58.26"
33	37	37/0	DB	BB		X-Arm Strengthening Suggested	03°27'39"LT	1.5	1.5	0	0	0	0	0	0	213	213	9415	1621.85	0.5	-17.80	529.00	264.50	92.75	258.05	350.80	51.44	353.98	405.43	Nala, FP	VILL-ATOIZU	94°30'51.9"	26°06'00.68"
34	38	38/0	DB	BB			05°52'15"LT	1.5	1.5	0	0	0	0	0	0	292	292	9707	1576.71	1	-45.64	505.00	252.50	-45.05	429.45	384.40	-140.98	608.88	467.89	FP	VILL-ATOIZU	94°30'58.66"	26°06'03.88"
35	39	39/0	DB	BB	0		05°57'59"RT	9	9	6	6	0	0	0	0	420	420	10127	1597.97	2.5	25.76	712.00	356.00	-137.45	98.77	-38.67	-316.88	28.37	-288.51	2 Nos FP	VILL-ATOIZU	94°31'07.96"	26°06'08.47"
36	40	40/0	DB	BB	0		12°30'48"RT	9	7.5	6	6	0	0	0	0	92	92	10219	1608.08	3	9.61	512.00	256.00	321.23	-143.43	177.80	391.63	-263.34	128.29	Nala	VILL-ATOIZU	94°31'20.29"	26°06'16.23"
37	41	41/0	DC	BB	0		15°40'23"RT	9	9	9	9	3	1.5	0	0	522	522	10741	1571.73	1.5	-31.85	614.00	307.00	235.43	371.65	607.08	355.34	441.69	797.03		VILL-ATOIZU	94°31'23.14"	26°06'17.72"
38	42	42/0	DD	BB	0		48°17'6"LT	9	9	9	9	0	0	0	0	431	431	11172	1620.55	4	46.32	953.00	476.50	150.35	20.60	170.96	80.31	-102.77	-22.46	2 Times Metal Road	VILL-KITSAKITA	94°31'41.02"	26°06'22.61"
39	43	43/0	DC	BB	0	X-Arm Strengthening Suggested	15°03'32"LT	6	6	6	6	0	0	0	0	241	241	11413	1687.5	1.5	66.45	672.00	336.00	410.40	-379.52	30.87	533.77	-696.04	-162.28	33KV, Metal Road	VILL-KITSAKITA	94°31'56.52"	26°06'23.14"
40	45	45/0	DD	BB	0	X-Arm Strengthening Suggested	30°09'46"LT	4.5	4.5	4.5	3	0	0	0	0	405	405	11818	1723.98	0	34.98	646.00	323.00	620.52	45.87	666.39	937.04	-53.28	883.76		VILL-KITSAKITA	94°32'02.09"	26°06'29.15"
41	46	46/0	DB	BB	0	X-Arm Strengthening Suggested	13°29'15"LT	9	6	6	6	0	0	0	0	370	370	12188	1611.93	1.5	-110.55	775.00	387.50	359.13	726.84	1085.97	458.28	1069.83	1528.11		VILL-KITSAKITA	94°32'08.33"	26°06'41.07"
42	47	47/0	DB	BB		X-Arm Strengthening Suggested	10°20'49"LT	1.5	1.5	0	0	0	0	0	0	291	291	12479	1605.42	0.5	-11.51	661.00	330.50	-356.84	217.23	-139.61	-699.83	262.63	-437.19		VILL-KITSAKITA	94°32'07.50"	26°06'52.96"
43	48	48/0	DC	BB		X-Arm Strengthening Suggested	18°07'31"LT	1.5	0	0	0	0	0	0	0	280	280	12759	1681.14	2.5	73.72	571.00	285.50	73.77	-337.46	-263.69	28.37	-639.70	-611.34	2 Times NH-702A	VILL-KITSAKITA	94°32'04.48"	26°07'02.30"
44	49	49/0	DB	BB	0		08°50'43"RT	3	3	3	3	0	0	0	0	250	250	13009	1698.45	1.5	21.31	530.00	265.00	620.52	-29.58	590.94	937.04	-127.43	809.61	Nala, Vill Road	VILL-KITSAKITA	94°31'59.57"	26°07'10.13"
45	50	50/0	DC	BB		X-Arm Strengthening Suggested	17°55'50"LT	1.5	1.5	0	0	0	0	0	0	196	196	13205	1683.03	0	-16.92	446.00	223.00	279.58	254.55	534.13	377.43	353.65	731.08	2 Times Vill Raod, Nala	VILL-KITSAKITA	94°31'53.32"	26°07'15.88"
46	51	51/0	DD	BB	0	Used DD tower instead of DC due to Sum of Adj. Span Limit Crossed	24°39'30"RT	4.5	6	3	3	0	0	0	0	335	335	13540	1602.55	1	-78.48	531.00	265.50	-58.55	592.34	533.79	-157.65	861.27	703.62		VILL-AOTSAKILIMI	94°31'49.07"	26°07'20.91"
47	52	52/0	DD	BB			30°16'05"RT	1.5	1.5	0	0	0	0	0	0	545	545	14085	1549.53	0.5	-55.52	880.00	440.00	-257.34	457.24	199.90	-526.27	574.19	47.92		VILL-AOTSAKILIMI	94°31'39.19"	26°07'27.29"
48	52A	52A/0	DB	BB		X-Arm Strengthening Suggested	01°43'34"RT	1.5	1.5	0	0	1.5	1.5	0	0	294	294	14379	1584.71	0	35.68	839.00	419.50	87.76	-73.08	14.68	-29.19	-212.40	-241.59	2 NOS NH-702A, Nala	VILL-AOTSAKILIMI	94°31'29.48"	26°07'42.57"
49	53	53/0	DB	BB	0	X-Arm Strengthening Suggested	08°10'35"LT	6	6	7.5	6	0	0	0	0	108	108	14487	1608.03	1	28.32	402.00	201.00	367.08	-421.53	-54.45	506.40	-722.55	-216.15	Nala, FP	VILL-AOTSAKILIMI	94°31'29.46"	26°07'52.21"
50	55	55/0	DB	BB	0		02°24'51"RT	4.5	4.5	3	3	0	0	0	0	309	309	14796	1613.35	1	2.32	417.00	208.50	529.53	140.88	670.42	830.55	132.27	962.82	Nala	VILL-AOTSAKILIMI	94°31'29.40"	26°07'55.55"
51	56	56/0	DC	BB	0	Used DC tower instead of DB due to Sum of Adj. Span Limit Crossed	05°03'42"RT	4.5	3	3	3	0	0	0	0	452	452	15248	1567.2	2	-47.19	761.00	380.50	168.12	415.33	583.45	176.73	535.18	711.92	4 Times FP	VILL-AOTSAKILIMI	94°31'28.04"	26°08'05.64"
52	57	57/0	DC	BB			19°21'57"RT	1.5	0	0	0	0	0	0	0	496	496	15744	1546.5	2	-23.63	948.00	474.00	36.67	334.40	371.06	-83.18	389.09	305.99	2 Nos Nala	VILL-AOTSAKILIMI	94°31'25.10"	26°08'20.06"
53	58	58/0	DB	BB	0	X-Arm Strengthening Suggested	01°40'53"LT	4.5	6	3	3	0	0	0	0	184	184	15928	1552.8	0	11.27	680.00	340.00	161.60	-19.08	142.53	106.91	-89.39	17.53	2 Nos NH-702A, Rain Cut, 2 Times FP	VILL-AOTSAKILIMI	94°31'24.98"	26°08'36.14"
54	59	59/0	DB	BB		X-Arm Strengthening Suggested	01°51'13"RT	0	0	0	0	0	0	0	0	358	358	16286	1493.6	2	-64.22	542.00	271.00	203.08	504.31	707.39	273.39	710.24	983.62	Rain Cut	VILL-AOTSAKILIMI	94°31'27.12"	26°08'41.82"
55	60	60/0	DD	BB			41°13'35"LT	0	1.5	1.5	0	0	0	0	0	169	169	16455	1448.3	0.5	-43.74	527.00	263.50	-146.31	553.86	407.55	-352.24	850.97	498.73	FT, FP, NH-702A,Rain Cut,11KV,33KV	VILL-AOTSAKILIMI	94°31'31.23"	26°08'52.89"
56	61	61/0	DB	BB			00°40'13"LT	0	0	0	0	0	0	0	0	404	404	16859	1365.2	1	-83.64	573.00	286.50	-384.86	577.44	192.59	-681.97	815.10	133.14		VILL-AOTSAKILIMI	94°31'33.61"	26°08'57.99"
57	62	62/0	DD	BB	0		40°33'03"LT	6	3	3	3	0	0	0	0	390	390	17249	1411.3	0.5	49.59	794.00	397.00	-173.44	-35.59	-209.03	-411.10	-181.56	-592.66	Rain Cut	VILL-LOKOBOMI	94°31'26.71"	26°09'10.29"
58	63	63/0	DC	BB			29°28'07"RT	1.5	1.5	0	0	1.5	1.5	0	0	362	362	17611	1418.6	0.5	4.29	752.00	376.00	425.59	159.51	585.10	571.56	145.90	717.46	Nala, Rain Cut	VILL-LOKOBOMI	94°31'23.98"	26°09'22.19"
59	64	64/0	DB	BB			11°20'16"RT	0	1.5	0	0	0	0	0	0	227	227	17838	1444.5	1.5	24.94	589.00	294.50	202.49	-85.74	116.75	216.10	-211.87	4.23	Rain Cut, 33KV, NH-702A	VILL-LOKOBOMI	94°31'12.51"	26°09'27.91"
60	65	65/0	DB	BB	0	X-Arm Strengthening Suggested	05°16'23"RT	4.5	6	3	3	0	0	0	0	291	291	18129	1423.2	1	-17.82	518.00	259.00	312.74	256.55	569.29	438.87	326.85	765.71	2 Times NH-702A	VILL-LOKOBOMI	94°31'08.18"	26°09'34.21"
																						441.00	220.50	34.45	420.41	454.85	-35.85	639.05	603.20		VILL-LOKOBOMI	94°31'04.71"	26°09'43.23"

SUBMITTED BY:
SHYAMA POWER(I) LTD.

CHECKED BY:
P.G.C.I.L

वतितेमजेन /WATITEMJEN
इंजीनियर /ENGINEER
एन.ई.आर.पी.एस.आई.पी /NERPSIP
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CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINE:- 132KV S/C (ON DC TOWER) ZUNHEBOTO TO MOKOKCHUNG TL

SL NO	AP NO	TOWER NO	TYPE OF TOWER	CONNECT WITH BB	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WIND SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (			MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE WGS-84	
								A	B	C	D	A	B	C	D									LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL			EASTING	NORTHING
60	65	65/0	DB	BB	0	X-Arm Strengthening Suggested	05°16'23"RT	4.5	6	3	3	0	0	0	0																	
61	66	66/0	DD	BB			40°02'56"LT	0	1.5	0	0	0	0	0	0	150	150	18279	1423.2	1	-28.52	441.00	220.50	34.45	420.41	454.85	-35.85	639.05	603.20		VILL-LOKOBOMI	94°31'04.71"	26°09'43.23"
62	67	67/0	DC	BB	0	X-Arm Strengthening Suggested	21°18'24"LT	4.5	3	3	3	0	0	0	0	443	443	18722	1397.6	1	-61.99	593.00	296.50	-270.41	475.26	204.86	-489.05	635.90	146.85		VILL-LOKOBOMI	94°31'03.26"	26°09'47.85"
63	68	68/0	DB	BB	0	X-Arm Strengthening Suggested	09°35'42"RT	3	4.5	4.5	3	0	0	0	0	292	292	19014	1332.6	1	-80.66	735.00	367.50	-32.26	684.20	651.94	-192.90	1024.89	832.00	5 Times FP	VILL-LOKOBOMI	94°30'50.52"	26°09'56.30"
64	69	69/0	DC	BB	0	X-Arm Strengthening Suggestec	27°56'24"RT	3	4.5	4.5	3	0	0	0	0	240	240	19254	1245	0	-35.88	532.00	266.00	-392.20	391.11	-1.09	-732.89	562.73	-170.16	FT	VILL-LOKOBOMI	94°30'40.20"	26°09'58.81"
65	70	70/0	DB	BB	0	X-Arm Strengthening Suggested	05°58'16"RT	3	3	3	3	0	0	0	0	294	294	19548	1209.1	0	-88.81	534.00	267.00	-151.11	694.80	543.69	-322.73	1041.57	718.84	NH-702A	VILL-AKULUTO	94°30'32.47"	26°10'02.03"
66	71	71/0	DB	BB		X-Arm Strengthening Suggested	00°29'42"RT	0	0	0	0	0	0	0	0	363	363	19911	1121.8	1.5	-114.05	657.00	328.50	-400.80	751.27	350.47	-747.57	1111.94	364.37	FP, 33KV	VILL-AKULUTO	94°30'26.06"	26°10'09.55"
67	72	72/0	DD	BB	0		35°11'38"RT	6	3	3	3	0	0	0	0	548	548	20459	1009.7	0.5	24.56	911.00	455.50	-388.27	192.72	-195.54	-748.94	141.28	-607.67		VILL-AKULUTO	94°30'19.28"	26°10'19.73"
68	73	73/0	DB	BB	0	X-Arm Strengthening Suggested	04°00'45"LT	4.5	6	3	3	0	0	0	0	265	265	20724	1031.8	1	47.37	813.00	406.50	355.28	-191.67	163.61	-406.72	-396.87	9.85	Nala	VILL-AKULUTO	94°30'09.12"	26°10'34.87"
69	74	74/0	DC	BB			25°13'51"LT	0	0	0	0	0	0	0	0	285	285	21009	1078.7	0.5	-7.30	550.00	275.00	456.67	188.95	645.62	661.87	218.35	880.22		VILL-AKULUTO	94°30'09.71"	26°10'43.64"
70	75	75/0	DB	BB			10°12'54"RT	0	0	0	0	0	0	0	0	394	394	21403	1076.9	3	-27.62	679.00	339.50	96.05	324.13	420.18	66.65	404.60	471.25	Rain Cut, FP	VILL-AKULUTO	94°30'09.68"	26°10'52.68"
71	76	76/0	DD	BB	0	X-Arm Strengthening Suggested	33°50'58"LT	4.5	3	4.5	4.5	0	0	0	0	444	444	21847	1046.8	0.5	41.03	838.00	419.00	69.87	54.42	124.29	-10.60	-51.67	-62.27	2 Nos FP, Rain Cut	VILL-LUMTHSAMI	94°30'3.57"	26°11'4.22"
72	77	77/0	DB	BB		X-Arm Strengthening Suggested	06°08'17"LT	0	1.5	0	0	0	0	0	0	359	359	22206	1084.8	0.5	-95.34	803.00	401.50	389.58	661.11	1050.69	495.67	965.97	1461.63	Rain Cut, FP, Vill Raod	VILL-LUMTHSAMI	94°29'59.39"	26°11'18.03"
73	78	78/0	DD	BB		Used DD tower instead of DC due to Sum of Adj. Span Limit Crossed	24°22'38"RT	0	0	0	0	0	0	0	0	484	484	22690	992.94	1	-28.88	843.00	421.50	-302.11	350.21	48.10	-606.97	418.71	-188.26	Rain Cut, FP	VILL-LUMTHSAMI	94°29'49.37"	26°11'25.69"
74	79	79/0	DB	BB			00°06'37"LT	0	0	0	0	0	0	0	0	449	449	23139	964.06	1	3.91	933.00	466.50	133.79	208.71	342.50	65.29	198.71	264.00	Rain Cut	VILL-ALAPHUMI	94°29'34.80"	26°11'34.50"
75	80	80/0	DB	BB			11°45'26"RT	0	0	0	0	0	0	0	0	352	352	23491	967.97	1	-10.51	801.00	400.50	240.29	230.15	470.44	250.29	264.42	514.71	Rain Cut	VILL-ALAPHUMI	94°29'26.26"	26°11'46.82"
76	81	81/0	DB	BB		X-Arm Strengthening Suggested	00°28'17"LT	0	1.5	0	0	0	0	0	0	340	340	23831	957.96	1.5	17.57	692.00	346.00	121.85	76.29	198.14	87.58	16.96	104.54	FT, Rain Cut	VILL-ALAPHUMI	94°29'19.50"	26°11'56.48"
77	82	82/0	DC	BB	0	X-Arm Strengthening Suggested	24°41'49"LT	4.5	6	4.5	3	0	0	0	0	260	260	24091	975.03	1	-85.84	600.00	300.00	263.71	728.72	992.44	323.04	1107.73	1430.76	2 Nos Rain Cut, Vill Road	VILL-ALAPHUMI	94°29'15.19"	26°12'06.80"
78	83	83/0	DD	BB			44°38'00"RT	0	0	0	0	0	0	0	0	403	403	24494	885.19	0	-38.76	663.00	331.50	-468.72	375.92	-92.81	-847.73	486.33	-361.40	Rain Cut, FP	VILL-ALAPHUMI	94°29'12.02"	26°12'14.69"
79	83A	83A/0	DB	BB	0	X-Arm Strengthening Suggested	00°04'28"LT	9	9	9	9	1.5	3	0	0	251	251	24745	851.43	2	85.44	654.00	327.00	27.08	-491.80	-464.72	-83.33	-882.57	-965.89	Nala	VILL-LUMAMI	94°29'01.91"	26°12'24.04"
80	84	84/0	DB	BB	0	X-Arm Strengthening Suggested	06°21'30"LT	9	9	9	9	3	1.5	0	0	183	183	24928	927.87	2	0.60	434.00	217.00	742.80	85.55	828.36	1133.57	81.79	1215.36		VILL-LUMAM	94°29'1.94"	26°12'32.19"
81	85	85/0	DB	BB	0	X-Arm Strengthening Suggested	06°38'46"LT	9	9	9	9	3	0	0	0	326	326	25254	928.47	2	-86.79	509.00	254.50	97.45	645.79	743.24	101.21	951.41	1052.62	FT	VILL-LUMAMI	94°29'1.33"	26°12'38.11"
82	86	86/0	DB	BB			01°11'33"RT	1.5	0	0	0	0	0	0	0	480	480	25734	842.18	2.5	-17.34	806.00	403.00	-319.79	305.51	-14.28	-625.41	346.98	-278.43	2 Nos Nala	VILL-LUMAMI	94°28'59.30"	26°12'48.54"
83	87	87/0	DC	BB		Used DC tower instead of DB due to Sum of Adj. Span Limit Crossed	12°56'02"RT	1.5	0	0	1.5	1.5	0	0	1.5	361	361	26095	832.34	1	15.17	841.00	420.50	174.49	104.29	278.78	133.02	56.05	189.07	4 Times FT, Nala	VILL-LUMAMI	94°28'54.27"	26°13'03.61"
84	88	88/0	DD	BB	0	Used DD tower instead of DC due to Sum of Adj. Span Limit Crossed	28°34'38"LT	9	9	9	9	0	0	0	0	523	523	26618	846.51	0	82.51	884.00	442.00	256.71	-24.60	232.11	304.95	-205.70	99.24	3 Times FT	VILL-LUMAMI	94°28'50.64"	26°13'14.74"
																			924.52	4.5		767.00	383.50	547.60	411.11	958.71	728.70	594.13	1322.83		VILL-ZAPHUMI(NEW)	94°28'49.75"	26°13'31.88"

Recommended by

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M/S. SHYAMA POWER (I) LTD.

Site Engineer

SUBMITTED BY:
SHYAMA POWER(I) LTD.

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SL. NO	AP NO	TOWER NO	TYPE OF TOWER	CONNECT WITH BB	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV LENGTH	R.L.	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WIND SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (			MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE WGS-84	
								A	B	C	D	A	B	C	D									LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL			EASTING	NORTHING
84	88	88/0	DD	BB	0	Used DD tower instead of DC due to Sum of Adj. Span Limit Crossed	28°34'38"LT	9	9	9	9	0	0	0	0				924.52	4.5		767.00	383.50	547.60	411.11	958.71	728.70	594.13	1322.83		VILL-ZAPHUMI(NEW)	94°28'49.75"	26°13'31.88"
85	89	89/0	DB	BB	0		10°18'43"LT	3	3	3	3	0	0	0	0	244	244	26862	888.12	1	-38.90	604.00	307.00	-167.11	158.39	-8.73	-350.13	144.71	-205.42		VILL-ZAPHUMI(NEW)	94°28'45.20"	26°13'38.55"
86	90	90/0	DB	BB	0		05°04'54"LT	3	3	3	3	0	0	0	0	360	360	27222	891.9'	0.5	4.29	570.00	285.00	201.61	44.72	246.33	215.29	6.57	221.86	3 Times Nala, 2 Nos FT, Shed	VILL-ZAPHUMI(NEW)	94°28'36.81"	26°13'47.36"
87	91	91/0	DD	BB			38°07'51"RT	0	1.5	0	0	0	0	0	0	210	210	27432	901.89	0.5	6.98	555.00	277.50	165.28	-206.28	-41.00	233.43	-446.05	-242.62		VILL-ZAPHUMI(NEW)	94°28'31.47"	26°13'51.93"
88	92	92/0	DC	BB	0	X-Arm Strengthening Suggested	15°25'18"RT	6	3	3	3	0	0	0	0	345	345	27777	971.95	1.5	72.06	753.00	376.50	541.28	458.46	1009.74	791.05	619.54	1410.60	Nala, FT	VILL-ZAPHUMI(NEW)	94°28'29.43"	26°14'03.07"
89	93	93/0	DB	BB			02°40'24"LT	0	1.5	0	0	0	0	0	0	406	408	28185	916.7	0.5	-57.25	639.00	319.50	-50.46	166.84	116.38	-211.54	199.34	-12.20	Vill Road, FT	VILL-SHITSUMI	94°28'30.61"	26°14'16.55"
90	94	94/0	DC	BB			28°27'19"RT	1.5	1.5	0	0	0	0	0	0	231	231	28416	909.66	0	-6.54	597.00	298.50	64.16	178.44	242.60	31.66	175.56	207.21	Nala, FT	VILL-SHITSUMI	94°28'31.16"	26°14'24.04"
91	95	95/0	DD	BB			34°44'54"RT	0	0	0	0	0	0	0	0	366	366	28782	911.08	0.5	0.92	732.00	366.00	187.56	-88.53	99.03	190.44	-260.40	-69.96		VILL-SHITSUMI	94°28'38.72"	26°14'33.92"
92	96	96/0	DB	BB	0	X-Arm Strengthening Suggested	00°25'48"LT	7.5	9	6	6	0	0	0	0	366	366	29148	960.38	1	54.80	634.00	317.00	454.53	235.03	689.55	626.40	298.98	925.38	2 Nos Nala	VILL-ZAPHUMI(OLD)	94°28'51.07"	26°14'38.27"
93	97	97/0	DC	BB	0		20°43'21"LT	9	9	9	9	0	0	0	0	268	268	29416	942.95	1.5	-14.93	443.00	221.50	32.97	293.51	326.48	-30.98	423.92	392.94		VILL-ZAPHUMI(OLD)	94°28'59.83"	26°14'42.04"
94	98	98/0	DD	BB	0		59°00'20"LT	4.5	4.5	3	3	0	0	0	0	175	175	29591	928.07	0.5	-19.88	321.00	160.50	-118.51	-84.25	-202.76	-248.92	-183.79	-432.71	Vill Road, Nala	VILL-ZAPHUMI(OLD)	94°29'04.09"	26°14'46.23"
95	99	99/0	DB	BB			06°46'5'RT	1.5	0	0	0	0	0	0	0	146	146	29717	944.23	1	12.66	584.00	292.00	230.25	-3.46	226.79	329.79	-144.28	185.51	Vill Road	VILL-ZAPHUMI(OLD)	94°29'02.58"	26°14'50.83"
96	100	100/0	DB	BB			00°25'04"LT	0	0	0	0	0	0	0	0	438	438	30175	997.46	0.5	53.73	847.00	423.50	441.46	227.11	668.57	582.28	241.43	823.71	Nala, Vill Road	VILL-SUMI-SETTSU	94°28'59.57"	26°15'04.72"
97	101	101/0	DC	BB			20°59'48"RT	1.5	0	0	0	1.5	0	0	0	409	409	30584	992.36	0.5	-5.10	832.00	416.00	181.89	119.50	301.38	167.57	61.26	228.83	Nala	VILL-SUMI-SETTSU	94°28'56.62"	26°15'17.55"
98	102	102/0	DC	BB			18°33'32"LT	0	1.5	0	0	0	0	0	0	423	423	31007	1014.8	1.5	21.46	854.00	427.00	303.50	-159.14	144.36	361.74	-396.30	-34.56		VILL-SUMI-SETTSU	94°28'59.02"	26°15'31.39"
99	103	103/0	DD	BB		Used DD tower instead of DC due to Sum of Adj. Span Limit Crossed	28°53'17"LT	1.5	0	0	1.5	0	0	0	0	431	431	31438	1102.9	0.5	89.04	786.00	393.00	590.14	243.14	833.29	827.30	284.70	1111.99	2 Nos Vill Road	VILL-SUMI-SETTSU	94°28'56.70"	26°15'45.08"
100	104	104/0	DC	BB			23°37'22"RT	1.5	1.5	0	0	0	0	0	0	355	355	31793	1090	0.5	-12.85	606.00	303.00	111.86	68.21	180.06	70.30	31.94	102.24	Vill Road	VILL-SUMI SETTSU	94°28'48.61"	26°15'54.22"
101	105	105/0	DC	BB			24°15'32"RT	1.5	1.5	0	0	0	0	0	0	251	251	32044	1098.4	1	7.93	483.00	241.50	182.79	332.68	515.47	219.06_	469.84	688.90		VILL-SETTSU	94°28'46.58"	26°16'02.12"
102	106	106/0	DB	BB	0		04°41'06"LT	7.5	6	6	6	0	0	0	0	232	232	32276	1064.7	1	-27.72	522.00	261.00	-100.68	-158.79	-259.47	-237.84	-351.09	-588.93		VILL-SETTSU	94°28'48.11"	26°16'09.65"
103	107	107/0	DC	BB	0	X-Arm Strengthening Suggested	23°15'58"LT	9	9	9	9	1.5	1.5	0	0	290	290	32566	1110.3	1	48.58	642.00	321.00	448.79	-154.24	294.55	641.09	-363.28	277.81		VILL-SETTSU	94°28'48.63"	26°16'19.07"
104	108	108/0	DC	BB	0	X-Arm Strengthening Suggested	25°19'55"RT	9	9	9	9	0	0	0	0	352	352	32918	1175.4	2	64.10	650.00	325.00	506.24	39.52	545.76	715.28	-29.78	685.50	66KV (M/C Tower), Un Metal Road, 33KV	VILL-SETTSU	94°28'44.18"	26°16'29.55"
105	109	109/0	DB	BB			13°46'36"RT	0	1.5	0	0	0	0	0	0	298	298	33216	1201.4	1	17.99	496.00	248.00	258.48	398.22	656.70	327.78	587.64	915.41		VILL-SETTSU	94°28'45.12"	26°16'39.36"
106	110	110/0	DC	BB	0		19°52'50"LT	4.5	4.5	4.5	3	0	0	0	0	198	198	33414	1165.2	0.5	-32.67	429.00	214.50	-200.22	245.66	45.44	-389.64	328.06	-61.58		VILL-AOLIJEN	94°28'47.19"	26°16'45.53"
107	111	111/0	DC	BB	0		28°15'14"LT	4.5	3	3	3	0	0	0	0	23'	231	33645	1149.1	1	-16.58	494.00	247.00	-14.66	-101.98	-116.64	-97.06	-249.77	-346.83	Vill Road	VILL-AOLIJEN	94°28'46.85"	26°16'53.11"
108	112	112/0	DC	BB		X-Arm Strengthening Suggested	23°51'14"RT	0	0	0	0	0	0	0	0	263	263	33908	1186	.	33.86	434.00	217.00	364.98	-485.90	-120.93	512.77	-847.61	-334.84	FT, 2 Nos Pond, 33KV	VILL-AOLIJEN	94°28'41.89"	26°17'00.26"

M/S. SHYAMA POWER INDIA LTD.

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APPROVED BY:
P.G.C.I.L

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINE:- 132KV S/C (ON DC TOWER) ZUNHEBOTO TO MOKOKCHUNG TL

SL NO	AP NO	TOWER NO	TYPE OF TOWER	CONNECT WITH BB	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV - LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WIND SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (			MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE WGS-84	
								A	B	C	D	A	B	C	D									LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL			EASTING	NORTHING
108	112	112/0	DC	BB		X-Arm Strengthening Suggested	23°51'14"RT	C	0	0	0	0	0	0	0				1186	1		434.00	217.00	364.98	-485.90	-120.93	512.77	-847.61	-334.84				
109	112A	112A/0	DD	BB	0	X-Arm Strengthening Suggested	42°58'32"RT	9	6	6	9	0	0	0	3	171	171	34079	1234.9	2	53.88	231.00	115.50	656.90	-576.91	79.99	1018.61	-961.09	57.52	LT Line	VILL- AOLIJEN	94°28'40.96"	26°17'05.87"
110	113	113/0	DD	BB	0	D/E Tower with Auxiliary X-Arm(X-Arm Strengthening Suggested)	79°01'26" RT	6	9	7.5	6	0	0	0	0	60	60	34139	1255.46	2.5	20.08	90.00	45.00	636.91	1319.49	1956.40	1021.09	2145.25	3166.34	33KV, FP, UN Metal Road	VILL- AOLIJEN	94°28'42.28"	26°17'07.44"
111			GANTRY (MOKOKCHUNG)					0	0	0	0	0	0	0	0	30	30	34169	1237.38	0	-21.58	30.00	15.00	-1289.49		######	-2115.25		-2115.25	2 Nos FP, LT Line,Shed, S/S Boundary	VILL- AOLIJEN	94°28'43.22"	26°17'07.05"

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CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK: 132 KV S/C (ON D/C TOWER) WOKHA TO ZUNHEBOTO TR.LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER	CONNECT WITH BB	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WIND SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (			MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE WGS-84	
								A	B	C	D	A	B	C	D									LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL			EASTING	NORTHING
1		EXT.BAY	GANTRY (WOKHA S/S)					0	0	0	0	0	0	0	0				407.39			28.00	14.00		41.85	41.85		59.48	59.48		VILL-PHILIMI	94°22'56.28"	26°05'55.33"
																28	28	28			-0.43								S/S Boundary			
2	1	1/0	DD	BB			03°39'39"LT	0	0	0	0	0	0	0	0				407.46	0.5		112.00	56.00	-13.85	-159.21	-173.06	-31.48	-286.58	-318.06		VILL-PHILIMI	94°22'56.47"	26°05'58.28"
3	2	2/0	DD	BB			48°30'51"RT	0	0	0	0	0	0	0	0	84	84	112	417.28	1	9.32	158.00	79.00	243.21	148.75	391.96	370.58	219.49	590.07		VILL-PHILIMI	94°22'56.73"	26°05'58.99"
4	3	3/0	DD	BB			43°13'08"RT	0	0	0	0	0	0	0	0	74	74	186	413.22	1.5	-4.56	301.00	150.50	-74.75	-14.40	-89.15	-145.49	-95.37	-240.85		VILL-PHILIMI	94°22'58.92"	26°06'00.49"
5	4	4/0	DB	BB	0		10°32'30"RT	3	3	4.5	3	0	0	0	0	227	227	413	425.23	0.5	16.01	576.00	288.00	241.40	-226.91	14.50	322.37	-481.00	-158.64		VILL-PHILIMI	94°23'07.15"	26°05'59.59"
6	5	5/0	DB	BB	0	X-Arm Strengthening Suggested	10°20'39"RT	9	9	9	9	0	0	0	0	349	349	762	498.48	2.5 •	77.25	670.00	335.00	575.91	-512.24	63.67	830.00	-938.09	-108.09	Vill Road	VILL-PHILIMI	94°23'19.10"	26°05'56.27"
7	7	7/0	DC	BB	0	X-Arm Strengthening Suggested	15°54'59"RT	9	9	9	9	0	0	0	0	321	321	1083	617.06	2	119.08	721.00	360.50	833.24	31.44	864.67	1259.09	-75.26	1183.82	33KV(With Out Conductor)	VILL-PHILIMI	94°23'29.21"	26°05'51.14"
8	8	8/0	DC	BB	0		21°26'16"RT	3	3	3	3	0	0	0	0	400	400	1483	660.24	2	37.18	730.00	365.00	368.56	-11.79	356.78	475.26	-123.69	351.57		VILL-PHILIMI	94°23'39.48"	26°05'42.08"
9	9	9/0	DC	BB			20°01'30"LT	1.5	0	0	0	0	0	0	0	330	330	1813	693.91	0.5	32.17	548.00	274.00	341.79	-96.47	245.31	453.69	-226.54	227.16	33KV(With Out Conductor)	VILL-PHILIMI	94°23'44.19"	26°05'32.28"
10	10	10/0	DD	BB	0		37°41'52"RT	4.5	3	3	4.5	0	0	0	0	218	218	2031	716.11	1	24.70	465.00	232.50	314.47	-27.23	287.24	444.54	-122.65	321.89		VILL-PHILIMI	94°23'49.71"	26°05'27.20"
11	11	11/0	DD	BB			53°23'17"LT	0	0	1.5	0	0	0	0	0	247	247	2278	740.14	1.5	20.53	353.00	176.50	274.23	336.48	610.71	369.65	515.93	885.58		VILL-PHILIMI	94°23'50.68"	26°05'19.27"
12	12	12/0	DD	BB			51°21'39"RT	0	0	0	0	0	0	0	0	106	106	2384	722.07	0	-16.57	344.00	172.00	-230.48	-60.90	-291.38	-409.93	-174.78	-584.71	Proposed 220KV D/C New Kohima to Mokokchung TL	VILL-PHILIMI	94°23'54.05"	26°05'17.51"
13	13	13/0	DC	BB	0		22°24'00"LT	3	3	4.5	4.5	0	0	0	0	238	238	2622	743.18	0.5	23.61	509.00	254.50	298.90	152.56	451.46	412.78	163.37	576.14		VILL-PHILIMI	94°23'55.32"	26°05'09.96"
14	14	14/0	DD	BB			31°00'30"LT	0	0	1.5	1.5	0	0	0	0	271	271	2893	743.63	0.5	-2.55	698.00	349.00	118.44	66.55	184.99	107.63	-26.47	81.17	33KV(With Out Conductor), Metal Road	VILL-PHILIMI	94°24'0.23"	26°05'02.29"
15	15	15/0	DD	BB	0		41°45'30"RT	3	3	4.5	4.5	0	0	0	0	427	427	3320	775.73	1	34.60	731.00	365.50	360.45	21.00	381.45	453.47	-61.92	391.54		VILL-PHILIMI	94°24'13.85"	26°04'55.73"
16	16	16/0	DB	BB	0		01°54'06"LT	3	3	3	3	0	0	0	0	304	304	3624	796.69	0	21.96	587.00	293.50	283.00	-24.40	258.60	365.92	-129.42	236.50		VILL-PHILIMI	94°24'17.53"	26°04'46.45"
17	17	17/0	DC	BB	0		19°30'47"RT	3	3	3	3	0	0	0	0	283	283	3907	824.08	1.5	25.89	580.00	290.00	307.40	63.69	371.09	412.42	10.00	422.42		VILL-PHILIMI	94°24'21.29"	26°04'37.98"
18	18	18/0	DD	BB			36°59'47"LT	0	0	0	1.5	0	0	0	0	297	297	4204	840.97	1.5	13.89	740.00	370.00	233.31	46.21	279.52	287.00	-64.75	222.25		VILL-PHILIMI	94°24'21.7"	26°04'28.29"
19	19	19/0	DD	BB	0	Used DD tower instead of DC due to Sum of Adj. Span Limit Crossed	27°11'53"LT	6	6	9	9	0	0	0	0	443	443	4647	877.29	1	42.82	792.00	396.00	396.79	-90.35	306.44	507.75	-258.00	249.74		VILL-PHILIMI	94°24'31.96"	26°04'17.16"
20	20	20/0	DD	BB	0		44°24'06"LT	9	9	9	9	0	1.5	0	0	349	349	4996	926.76	2.5•	50.97	613.00	306.50	439.35	420.99	860.34	607.00	603.92	1210.93	11KV, 33KV Metal Road	VILL-PHILIMI	94°24'43.47"	26°04'12.72"
21	21	21/0	DB	BB	0		02°16'12"LT	9	9	9	9	0	0	0	0	264	264	5260	883.19	1	-42.07	559.00	279.50	-156.99	258.83	101.84	-339.92	329.30	-10.62		VILL-PHILIMI	94°24'52.38"	26°04'15.71"
22	22	22/0	DB	BB	0		14°12'47"LT	9	9	9	9	0	0	0	0	295	295	5555	866.58	2.5	-18.11	563.00	281.50	36.17	178.05	214.22	-34.30	205.94	171.63		VILL-ROTOMI	94°25'01.84"	26°04'19.47"
23	23	23/0	DD	BB	0		30°41'48"RT	9	9	9	9	0	0	0	0	268	268	5823	858.57	1	-6.51	769.00	384.50	89.95	134.85	224.80	62.06	61.64	123.71	2 Nos FP, 33KV	VILL-ROTOMI	94°25'09.61"	26°04'24.75"
24	24	24/0	DD	BB	0	Used DD tower instead of DC due to Sum of Adj. Span Limit Crossed	27°46'08"RT	9	9	6	6	0	0	0	0	501	501	6324	894.02	1.5	31.95	786.00	393.00	366.15	274.28	640.43	439.36	357.70	797.05	33KV	VILL-ROTOMI	94°25'27.43"	26°04'28.77"
25	25	25/0	DB	BB	0		10°50'18"RT	7.5	9	6	6	0	0	0	0	285	285	6609	872.31	0.5	-20.71	463.00	231.50	10.72	-305.79	-295.07	-72.70	-555.69	-628.39	FP	VILL-ROTOMI	94°25'37.24"	26°04'23.75"
26	26	26/0	DD	BB	0		34°51'15"LT	6	4.5	3	3	0	0	0	0	178	178	6787	915.56	2	38.75	474.00	237.00	10.72	192.75	203.47	-72.70	254.95	182.25		VILL-ROTOMI	94°25'42.60"	26°04'20.67"

(Ashim Ghosh)
SUBMITTED BY:
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Site Engineer.

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SL NO	AP NO	TOWER NO	TYPE OF TOWER	CONNECT WITH BB	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WIND SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (			MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE WGS-84	
								A	B	C	D	A	B	C	D									LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL			EASTING	NORTHING
26	26	26/0	DD	BB	0		34°51'15"LT	6	4.5	3	3	0	0	0	0				915.56	2		474.00	237.00	10.72	192.75	203.47	-72.70	254.95	182.25		VILL-ROTOMI	94°25'42.60"	26°04'20.67"
27	27	27/0	DD	BB			42°04'39"LT	1.5	1.5	0	0	0	0	0	0	189	189	6976	906.82	0.5	-10.24	431.00	215.50	-3.75	62.85	59.10	-65.95	26.04	-39.91	FP	VILL-ROTOMI	94°25'49.32"	26°04'21.07"
28	29	29/0	DC	BB			20°09'17"RT	1.5	1.5	0	0	0	0	0	0	242	242	7218	914.58	0.5	7.76	682.00	341.00	179.15	227.79	406.94	215.96	232.72	448.68	FT	VILL-ROTOMI	94°25'55.49"	26°04'26.82"
29	30	30/0	DD	BB	0		30°09'31"RT	6	6	3	3	0	0	0	0	440	440	7658	910.69	1.5	-1.89	726.00	363.00	212.21	-36.19	176.02	207.28	-149.62	57.66	33KV	VILL-ROTOMI	94°26'09.81"	26°04'32.95"
30	31	31/0	DB	BB	0		07°44'15"LT	9	9	6	7.5	0	0	0	0	286	286	7944	934.45	0	28.26	787.00	393.50	322.19	216.04	538.23	435.62	194.23	629.85	33KV	VILL-ROTOMI	94°26'19.94"	26°04'32.09"
31	32	32/0	DC	BB	0	Used DC tower instead of DB due to Sum of Adj. Span Limit Crossed	12°08'36"LT	6	6	6	6	0	0	0	0	501	501	8445	945.47	1.5	9.52	760.00	380.00	284.96	240.90	525.86	306.77	311.42	618.19	FP	VILL-ROTOMI	94°26'37.75"	26°04'33.11"
32	33	33/0	DB	BB			12°17'09"RT	1.5	1.5	0	0	0	0	0	0	259	259	8704	935.06	1	-15.91	658.00	329.00	18.10	-0.12	17.98	-52.42	-126.48	-178.90		VILL-AKUHAITO	94°26'46.89"	26°04'35.31"
33	34	34/0	DB	BB	0		09°45'59"RT	4.5	4.5	3	3	0	0	0	0	399	399	9103	975.48	0.5	43.92	684.00	342.00	399.12	-2.20	396.92	525.48	-93.79	431.69	3 Nos FP	VILL-AKUHAITO	94°27'01.07"	26°04'36.10"
34	35	35/0	DC	BB	0	X-Arm Strengthening Suggested	28°52'34"RT	7.5	7.5	6	6	0	0	0	0	285	285	9388	995.72	1	22.74	517.00	258.50	287.20	553.11	840.30	378.79	829.81	1208.60	2 Nos FP	VILL-AKUHAITO	94°27'11.48"	26°04'35.19"
35	36	36/0	DC	BB	0	X-Arm Strengthening Suggested	17°03'36"RT	3	4.5	3	3	0	0	0	0	232	232	9620	942.8	1	-55.92	499.00	249.50	-321.11	490.15	169.04	-597.81	715.91	118.11	3 Nos FP	VILL-AKUHAITO	94°27'18.35"	26°04'31.02"
36	37	37/0	DD	BB	0	X-Arm Strengthening Suggested	32°00'04"RT	3	3	4.5	3	0	0	0	0	267	267	9887	890.29	1	-52.51	481.00	240.50	-223.15	837.73	614.58	-448.91	1300.29	851.38	FP	VILL-AKUHAITO	94°27'24.47"	26°04'24.34"
37	37A	37A/0	DC	BB	0	X-Arm Strengthening Suggested	18°45'35"LT	9	9	9	9	0	0	0	3	214	214	10101	800.06	3	-86.23	414.00	207.00	-623.73	316.17	-307.56	-1086.29	453.00	-633.29	Nala	VILL-AKUHAITO	94°27'25.22"	26°04'17.41"
38	38	38/0	DD	BB			30°49'35"LT	0	0	0	1.5	0	0	0	0	200	200	10301	783.72	1.5	-23.84	798.00	399.00	-116.17	259.33	143.17	-253.00	234.22	-18.78	Nala	VILL-AKUHAITO	94°27'28.51"	26°04'11.63"
39	39	39/0	DB	BB		X-Arm Strengthening Suggested	05°13'32"LT	1.5	0	0	1.5	0	0	0	0	598	598	10899	795.8	0.5	13.08	709.00	354.50	338.67	-805.33	-466.66	363.78	-1350.24	-986.47	Nala	VILL-EMLOMI	94°27'45.71"	26°04'00.24"
40	39A	39A/0	DB	BB		X-Arm Strengthening Suggested	06°03'18"RT	1.5	0	0	0	0	0	0	0	111	111	11010	848.99	1	52.69	209.00	104.50	916.33	-690.45	225.87	1461.24	-1158.54	302.71		VILL-EMLOMI	94°27'49.23"	26°03'58.39"
41	40	40/0	DC	BB		X-Arm Strengthening Suggested	25°44'54"LT	0	0	0	0	0	0	0	0	98	98	11108	889.95	2	39.96	429.00	214.50	788.45	-224.37	564.08	1256.54	-471.16	785.37		VILL-EMLOMI	94°27'52.27"	26°03'56.74"
42	41	41/0	DD	BB			46°46'51"RT	1.5	1.5	0	0	0	0	0	0	331	331	11439	960.11	1	71.16	716.00	358.00	555.37	-7.78	547.59	802.16	-134.56	667.60		VILL-EMLOMI	94°28'03.85"	26°03'54.98"
43	42	42/0	DC	BB	0		26°34'59"RT	6	6	6	6	0	0	0	0	385	385	11824	996.13	0.5	42.52	676.00	338.00	392.78	-136.43	256.35	519.56	-314.90	204.67		VILL-EMLOMI	94°28'11.58"	26°03'44.48"
44	43	43/0	DC	BB	0	X-Arm Strengthening Suggested	15°33'44"RT	9	9	9	9	0	0	0	0	291	291	12115	1039.87	2	45.24	548.00	274.00	427.43	-353.52	73.91	605.90	-658.64	-52.75	2 Times FP	VILL-LITSAMI	94°28'13.02"	26°03'35.12"
45	44	44/0	DB	BB	0	X-Arm Strengthening Suggested	08°24'48"LT	9	7.5	6	6	0	0	0	0	257	257	12372	1110.68	1.5	68.31	527.00	263.50	610.52	105.98	716.50	915.64	87.62	1003.26	FP	VILL-LITSAMI	94°28'11.64"	26°03'26.75"
46	45	45/0	DB	BB	0		01°33'35"LT	7.5	9	6	6	0	0	0	0	270	270	12642	1114.5	1	4.32	659.00	329.50	164.02	-131.64	32.37	182.38	-338.10	-155.72	11KV, FP	VILL-LITSAMI	94°28'12.07"	26°03'18.18"
47	46	46/0	DB	BB	0	X-Arm Strengthening Suggested	04°36'55"LT	9	9	9	9	0	0	0	0	389	389	13031	1183.96	3.5	69.96	663.00	331.50	520.64	315.30	835.95	727.10	428.17	1155.27	Un Metal Road	VILL-LITSAMI	94°28'13.02"	26°03'05.35"
48	47	47/0	DD	BB	0		34°25'20"LT	9	9	9	9	0	1.5	1.5	0	274	274	13305	1154.52	1	-26.94	568.00	284.00	-41.30	529.00	487.70	-154.17	770.81	616.64	FP	VILL-LITSAMI	94°28'14.70"	26°02'56.72"
49	48	48/0	DB	BB	0		14°23'15"LT	9	9	9	9	0	0	0	0	294	294	13599	1094.59	3	-61.93	673.00	336.50	-235.00	440.37	205.37	-476.81	599.18	122.36	FP	VILL-LITSAMI	94°28'22.08"	26°02'49.87"
50	49	49/0	DB	BB	0	X-Arm Strengthening Suggested	11°28'15"LT	9	9	9	9	0	0	0	0	379	379	13978	1039.66	0.5	-52.43	671.00	335.50	-61.37	995.60	934.23	-220.18	1533.41	1313.23	3 Times FP	VILL-LITSAMI	94°28'33.50"	26°02'43.09"
51	50	50/0	DD	BB	0	Used DD tower instead of DC due Sum of Adj. Span Limit Crossed (X-Arm Strengthening Suggested)	25°26'57"RT	3	3	6	3	0	0	0	0	292	292	14270	909.36	1	-136.80	885.00	442.50	-703.60	533.78	-169.82	-1241.41	683.98	-557.43	2 Nos FP	VILL-LITSAMI	94°28'43.24"	26°02'39.77"

(Ashim Sykam)
Asstt. Manager & Engineer

SUBMITTED BY:
SHYAMA POWER(I) LTD.

वतितेमजेन /WATTITEMJEN
इंजीनियर /ENGINEER
एन.ई.आर.पी.एस.आई.पी./NERPSIP
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APPROVED BY:
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SL NO	AP NO	TOWER NO	TYPE OF TOWER	CONNECT WITH BB	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WIND SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (			MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE WGS-84	
								A	B	C	D	A	B	C	D									LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL			EASTING	NORTHING
51	50	50/0	DD	BB	0	Used DD tower instead of DC due Sum of Adj. Span Limit Crossed (X-Arm Strengthening Suggested)	25°26'57"RT	3	3	6	3	0	0	0	0				909.36			885.00	442.50	-703.60	533.78	-169.82	-1241.41	683.98	-557.43		VILL-LITSAMI	94°28'43.24"	26°02'39.77"
52	51	51/0	DD	BB	0	X-Arm Strengthening Suggested	34°18'42"LT	3	3	4.5	6	0	0	0	0	593	593	14863	831.27	0.5	-77.59	906.00	453.00	59.22	-758.81	-699.59	-90.98	-1338.22	-1429.20	3 Nos Nala	VILL-LIZU NEW	94°28'57.98"	26°02'26.06"
53	52	52/0	DB	BB	0	X-Arm Strengthening Suggested	14°18'20"RT	9	6	6	6	0	0	0	0	313	313	15176	987.25	1.5	157.98	543.00	271.50	1071.81	-695.94	375.87	1651.22	-1209.27	441.94	Nala	VILL-LIZU NEW	94°29'08.86"	26°02'23.74"
54	53	53/0	DB	BB	0	X-Arm Strengthening Suggested	04°42'01"RT	6	4.5	3	3	0	0	0	0	230	230	15406	1092.1	0.5	102.85	525.00	262.50	925.94	-636.53	289.40	1439.27	-1132.84	306.43		VILL-LIZU NEW	94°29'16.11"	26°02'20.17"
55	54	54/0	DB	BB	0	X-Arm Strengthening Suggested	06°50'55"LT	6	3	3	4.5	0	0	0	0	295	295	15701	1220.14	1	127.54	370.00	185.00	931.53	-814.35	117.19	1427.84	-1353.58	74.26	FP	VILL-LIZU NEW	94°29'25.19"	26°02'15.07"
56	55	55/0	DD	BB	0	X-Arm Strengthening Suggested	08°59'06"RT	6	4.5	4.5	3	0	0	0	0	75	75	15776	1254.37	0	35.23	277.00	138.50	889.35	133.59	1022.94	1428.58	154.22	1582.80		VILL-LIZU NEW	94°29'27.57"	26°02'13.88"
57		BAY	GANTRY (ZUNHEBOTO S/S)	BB												202	202	15978	1253.74		-3.63	202.00	101.00	68.41		68.41	47.78		47.78		VILL-LIZU NEW	94°29'33.56"	26°02'10.29"

FOR EXT. 132 KV S/C DOYANG TO WOKHA TR.LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER	CONNECT WITH BB	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WIND SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (			MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE WGS-84	
								A	B	C	D	A	B	C	D									LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL			EASTING	NORTHING
1		BAY	GANTRY (WOKHA S/S)	BB				0	0	0	0	0	0	0	0				407.37	0		31.00	15.50		37.14	37.14		50.85	50.85		VILL-PHILIMI	94°22'55.95"	26°05'55.37"
2	1	1/0	DD	BB			02°16'31"RT	0	0	0	0	0	0	0	0	31	31	16009	407	0	-0.37	112.00	56.00	-6.14	-116.89	-123.04	-19.85	-216.52	-236.37	S/S Fencing, Vill Road	VILL-PHILIMI	94°22'55.87"	26°05'56.52"
3	1A	1A/0	DD	BB			35°48'02"RT	0	0	0	1.5	0	0	0	0	81	81	16090	414.53	0.5	7.03	115.00	57.50	197.89	20.73	218.62	297.52	23.10	320.62	Vill Road	VILL-PHILIMI	94°22'55.82"	26°05'59.23"
4		EXT.TN.-2	D	BB			18°32'30"RT	0	0	0	0	0	0	0	0	34	34	16124	413.96	0	-0.07	34.00	17.00	13.27		13.27	10.90		10.90		VILL-PHILIMI	94°22'56.64"	26°06'00.15"

SUBMITTED BY:
SHYAMA POWER(I) LTD.

CHECKED BY:
P.G.C.I.L

Recomended by

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APPROVED BY:
P.G.C.I.L

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	BODY EXTENSION	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)		
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL
1	BAY	BAY																902.39	0								
2	1	1/0	DD	NONE	Auxiliary X-Arm Suggested	54°49'4"RT	1.5	0	0	3	0	0	0	0	26	26	26	911.3	3	5.91	26.00		328.891	-328.89		-473.95	-473.95
3	2	2/0	DD	NONE		49°52'14"RT	1.5	1.5	0	0	0	0	0	0	63	63	89	915.76	0.5	6.96	89.00	354.89	-134.666	220.23	499.95	-205.17	294.78
4	3	3/0	DD	+0 m		52°8'18"RT	6	9	7.5	6	0	0	0	0	72	72	161	907.74	0	-1.52	135.00	197.67	67.75301	265.42	268.17	81.22	349.39
5	4	4/0	DD	+0 m		58°49'53"RT	3	3	3	3	0	0	0	0	234	234	395	874.83	0.5	-36.41	306.00	4.25	351.0338	355.28	-9.22	450.33	441.10
6	5	5/0	DB	+0 m	X-Arm Strengthening Suggested	7°11'53"LT	3	3	4.5	3	0	0	0	0	105	105	500	869.38	1	-5.94	339.00	-117.03	137.5865	20.55	-216.33	173.69	-42.64
7	6	6/0	DD	+0 m	Singel Span Limit Cross. Refer to Engineer.	20°51'16"LT	3	3	4.5	4.5	0	0	0	0	267	267	767	778.81	0	-88.58	392.00	-32.69	607.724	575.14	-68.69	804.68	735.99
8	7	7/0	DD	+0 m		42°7'34"LT	6	6	9	7.5	0	0	0	0	725	725	1512	767.84	0.5	-9.47	1012.00	-320.72	382.1485	61.42	-517.68	390.48	-127.20
9	8	8/0	DC	NONE	Used DC tower instead of DB due to Single Span Limit Crossed	08°50'38"RT	0	3	1.5	0	0	0	0	0	177	177	1689	746.4	0	-26.92	902.00	342.85	317.2577	660.11	334.52	414.31	748.83
10	10	10/0	DC	NONE	Used DC tower instead of DB due to Sum of Adj. Span Limit Crossed	06°04'14"LT	0	1.5	3	1.5	0	0	0	0	581	581	2270	670.86	0	-75.56	758.00	-140.26	486.1094	345.85	-237.31	569.10	331.79
11	12	12/0	DC	+0 m	Used DC tower instead of DB due to Single Span Limit Crossed (X-Arm Strengthening Suggested)	08°27'12"RT	7.5	9	6	6	0	0	0	0	603	603	2873	710.31	1	44.48	1154.00	94.89	190.5515	285.44	11.90	143.48	155.38
12	13	13/0	DC	+0 m	X-Arm Strengthening Suggested	21°52'51"LT	9	6	6	6	0	0	0	0	238	238	3111	800.31	0.5	90.51	841.00	412.45	-452.997	-40.55	459.52	-695.68	-236.16
13	15	15/0	DB	NONE	X-Arm Strengthening Suggested	02°36'34"RT	1.5	0	0	0	0	0	0	0	181	181	3292	851.63	0.5	55.30	419.00	691.00	-369.037	321.96	933.68	-564.01	369.67
14	16	16/0	DB	NONE		03°50'45"LT	0	0	3	3	0	0	0	0	419	419	3711	888.08	1	35.93	600.00	550.04	80.52158	630.56	745.01	25.80	770.8
15	17	17/0	DC	+0 m	X-Arm Strengthening Suggested	19°01'19"LT	9	9	9	9	0	0	0	0	426	426	4137	969.07	2	78.99	845.00	338.48	-65.8922	272.59	393.20	-184.22	208.98
16	18	18/0	DC	NONE		15°13'44"RT	0	0	0	0	0	0	0	0	500	500	4637	1026.99	0.5	50.42	926.00	491.89	98.32756	590.22	610.22	33.98	644.20
17	19	19/0	DB	+0 m		12°07'32"RT	3	3	3	3	0	0	0	0	300	300	4937	1018.57	1.5	-6.02	800.00	401.67	180.1821	581.85	466.02	192.99	659.01
18	20	20/0	DB	NONE	X-Arm Strengthening Suggested	10°00'46"RT	0	0	0	0	0	0	0	0	219	219	5156	1094.05	2	71.58	519.00	119.82	-382.111	-262.29	107.01	-590.69	-483.67
19	21	21/0	DC	+0 m	X-Arm Strengthening Suggested	21°34'24"LT	9	9	9	9	0	0	0	0	138	138	5294	1130.12	2.5	45.37	357.00	601.11	-425.487	175.61	809.69	-635.30	174.39
20	22	22/0	DD	+0 m	X-Arm Strengthening Suggested	36°13'32"LT	9	9	9	9	0	0	0	0	254	254	5548	1243.31	4	110.89	392.00	563.50	-529.648	33.85	773.30	-808.25	-34.95
21	23	23/0	DB	+0 m	X-Arm Strengthening Suggested	04°00'22"LT	9	9	9	9	0	0	0	0	175	175	5723	1157.66	3.5	-84.95	429.00	783.65	817.6283	1601.28	1362.25	1127.40	2189.65
22	24	24/0	DD	NONE		57°06'46"RT	0	0	0	0	0	0	0	0	263	263	5986	1082.16	1	-82.20	438.00	-642.63	601.5996	-41.03	-552.40	801.05	-151.35
23	25	25/0	DB	NONE		08°59'05"LT	0	0	1.5	0	0	0	0	0	253	253	6239	1081.32	1.5	-1.34	516.00	-338.60	134.4663	-204.13	-538.05	137.65	-400.20
24	26	26/0	DB	NONE		03°39'47"LT	0	1.5	3	1.5	0	0	0	0	324	324	6563	1097.94	0	16.12	577.00	118.53	77.88	196.42	115.15	42.19	157.35
25	27	27/0	DC	NONE	Used DC tower instead of DB due to Single Span Limit Crossed	11°33'59"RT	0	0	0	0	0	0	0	0	585	585	7148	1096.42	1.5	-3.92	909.00	248.12	302.58	548.70	281.81	306.85	588.66
26	28	28/0	DC	NONE		25°14'18"LT	0	0	0	0	0	0	0	0	222	222	7370	1140.15	1	45.13	807.00	282.42	-194.76	87.66	278.15	324.49	-46.35
27	29	29/0	DB	NONE		06°37'22"RT	0	1.5	0	1.5	0	0	0	0	305	305	7675	1153.14	0	13.99	527.00	416.76	83.51	500.27	546.45	54.24	600.73
28	30	30/0	DD	NONE		30°41'45"LT	0	0	0	0	0	0	0	0	201	201	7876	1183.87	1.5	9.23	506.00	221.45	31.43159	252.92	250.76	2.13	252.89
																					201.00	169.57	-112.86	56.71	198.87	-214.84	-15.97

MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
			EASTING	NORTHING
		VILL -Zadima	94°2'59.22"	25°50'17.46"
S/S Boundary, Drain	DFR	VILL -Zadima	94°2'58.32"	25°50'17.75"
Vill Road, 33KV	DFR	VILL -Zadima	94°2'58.23"	25°50'19.77"
	DFR	VILL -Zadima	94°2'59.87"	25°50'21.51"
Drain, Un Metal Road, 33KV Pond	DFR	VILL -Zadima	94°3'8.29"	25°50'20.75"
Boundary, Nala	DFR	VILL -Zadima	94°3'9.86"	25°50'17.62"
	DFR	VILL -Zadima	94°3'15.28"	25°50'9.56"
Vill Road, Un Metal Road	DFR	VILL -Zadima	94°3'35.43"	25°49'54.4"
	DFR	VILL -Zadima	94°3'41.6"	25°49'54.98"
2 Nos. Unmetal Road	DFR	VILL -Zadima	94°4'2.56"	25°49'53.2"
Nala, 3 Nos. Unmetal Road	DFR	VILL -Zadima	94°04'23.89"	25°49'53.30"
Unmetal Road	DFR	VILL -Zadima	94°04'32.41"	25°49'52.01"
2 Nos. Unmetal Road	DFR	VILL -Zadima	94°04'38.95"	25°49'52.95"
	DFR	VILL -Tsiemekhume	94°4'53.76"	25°49'54.93"
	DFR	VILL -Tsiemekhume	94°5'8.71"	25°49'57.8"
Unmetal Road	DFR	VILL -Tsiemekhume	94°5'24.21"	25°50'5.95"
3 Nos. Unmetal Road	DFR	VILL -Tsiemekhume	94°5'34.57"	25°50'8.51"
Unmetal Road, Vill Road	DFR	VILL -Tsiemekhume	94°5'42.5"	25°50'8.87"
	DFR	VILL -Tsiemekhume	94°5'47.36"	25°50'8.47"
Vill Road	DFR	VILL -Tsiemekhume	94°5'56.22"	25°50'10.51"
	DFR	VILL -Tsiemekhume	94°6'0.15"	25°50'14.89"
11KV, 2 Nos. Unmetal Road	DFR	VILL -Tsiemekhume	94°6'05.1"	25°50'2'.87"
	DFR	VILL -Tsiemekhume	94°6'14.74"	25°50'2'.87"
	DFR	VILL -Tsiemekhume	94°6'26.16"	25°50'23.04"
Metal Road	DFR	VILL -Tsiemekhume	94°6'46.78"	25°50'26.51"
Metal Road, 11KV	DFR	VILL -Tsiemekhume	94°6'54.86"	25°50'25.38"
2 Nos. Metal Road	DFR	VILL -Tsiemekhume	84°7'4.9"	25°50'30.45"
2 Nos. Metal Road	DFR	VILL -Tsiemekhume	84°7'11.64"	25°50'32.33"

SHYAMA POWER INDIA LIMITED

SUBMITTED BY:
SHYAMA POWER(I) LTD.

19/01/19

CHECKED BY:
P.G.C.I.L

POWERGRID NERPSIP KOHIMA

APPROVED BY:
P.G.C.I.L

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
28	30	30/0	DD	NONE		30°41'45"LT	0	0	0	0	0	0	0	0				1183.87	1.50										DFR	VILL-Tsiemekhume	94°7'11.64"	25°50'32.33"
29	31	31/0	DB	NONE		04°00'58"RT	1.5	0	0	0	0	0	0	0	255	255	8131	1203.62	0.50	40.75	255.00	169.57	-112.86	56.71	198.87	-214.84	-15.97	Metal Road, 11KV	DFR	VILL-Tsiemekhume	94°7'17.71"	25°50'38.36"
30	32	32/0	DB	+0 m		06°13'13"RT	4.5	5	6	3	0	0	0	0	122	122	8253	1205.22	0.00	5.10	377.00	367.86	-1.88	365.98	469.84	-28.55	441.28		DFR	VILL-Tsiemekhume	94°7'20.72"	25°50'41.44"
31	33	33/0	DC	NONE		20°49'50"LT	0	0	0	0	0	0	0	0	383	383	8636	1227.17	1.50	17.45	505.00	123.68	122.97	246.85	150.55	93.90	244.45	3 Nos. Metal Road, 11KV	DFR	VILL-Tsiemekhume	94°7'31.57"	25°50'49.21"
32	34	34/0	DB	NONE		09°12'28"RT	0	0	1.5	3	0	0	0	0	494	494	9130	1261.38	0.00	35.69	677.00	260.03	138.33	398.36	289.10	92.23	381.33	2 Nos Metal Road	DFR	VILL-Chingg Khuma	94°7'40.63"	25°51'02.97"
33	35	35/0	DB	NONE		11°24'42"LT	0	0	0	0	0	0	0	0	241	241	9371	1277.8	1.00	15.44	735.00	355.67	24.14	379.80	401.77	-16.75	385.02		DFR	VILL-Chingg Khuma	94°7'46.17"	25°51'08.95"
34	36	36/0	DC	NONE		14°33'17"LT	1.5	0	0	1.5	0	0	0	0	338	338	9709	1314.74	1.00	36.94	579.00	216.86	4.62	221.48	257.75	-65.12	192.62		DFR	VILL-Chingg Khuma	94°7'51.92"	25°51'18.63"
35	37	37/0	DD	NONE		37°10'05"RT	1.5	3	1.5	0	0	0	0	0	173	173	9882	1300.88	0.00	-6.86	511.00	333.38	146.14	479.52	403.12	171.45	574.57		DFR	VILL-Chingg Khuma	94°7'53.34"	25°51'24.00"
36	38	38/0	DC	+0 m		16°10'16"RT	3	3	3	3	0	0	0	0	366	366	10248	1245.83	1.50	59.55	539.00	26.86	427.72	454.58	1.55	531.55	533.11	11Kv. Metal Road, 2 Nos Vill Road	DFR	VILL-Chingg Khuma	94°8'03.54"	25°51'31.65"
37	39	39/0	DB	NONE	X-Arm Strengthening Suggested	06°49'39"LT	1.5	3	0	1.5	0	0	0	0	497	497	10745	1350.89	1.00	102.56	663.00	-61.72	-61.88	-123.60	-165.55	-193.57	-359.12		DFR	VILL-Chingg Khuma	94°8'18.91"	25°51'38.00"
38	40	40/0	DB	+0 m	X-Arm Strengthening Suggested	01°21'46"LT	9	9	6	6	0	0	0	0	144	144	10889	1369.35	0.50	24.86	641.00	556.88	-187.66	371.22	690.57	-297.83	392.73		DFR	VILL-Chingg Khuma	94°8'24.30"	25°51'40.23"
39	42	42/0	DC	NONE		21°38'10"RT	0	3	3	0	0	0	0	0	308	308	11197	1279.51	0.00	-95.24	452.00	931.66	619.10	950.76	441.83	816.42	1258.26	Un-Metal Road, 11Kv	DFR	VILL-Chingg Khuma	94°8'33.69"	25°51'45.71"
40	43	43/0	DD	NONE		48°44'28"LT	0	0	0	0	0	0	0	0	182	182	11379	1261.61	1.00	-18.90	490.00	-311.10	247.19	-63.90	-508.42	313.46	-194.96		DFR	VILL-Chingg Khuma	94°8'40.17"	25°51'48.70"
41	44	44/0	DD	NONE		48°21'16"RT	0	0	0	0	0	0	0	0	212	212	11591	1233.71	1.00	-27.90	394.00	-65.19	303.94	238.75	-131.46	387.93	256.46		DFR	VILL-Botsa	94°8'44.06"	25°51'52.65"
42	45	45/0	DC	NONE		16°35'10"RT	0	1.5	1.5	1.5	0	0	0	0	170	170	11761	1200.63	0.50	-32.58	382.00	-91.94	373.25	281.31	-175.93	495.55	319.63		DFR	VILL-Botsa	94°8'50.02"	25°51'53.74"
43	46	46/0	DB	NONE		06°17'20"RT	0	0	1.5	1.5	0	0	0	0	286	286	12047	1203.64	0.50	3.01	456.00	-203.25	127.17	-76.08	-325.55	120.45	-205.10	Nala	DFR	VILL-Botsa	94°8'00.20"	25°51'52.75"
44	47	47/0	DC	+0 m		17°51'19"LT	3	3	6	6	0	0	0	0	347	347	12394	1255.54	0.00	55.40	633.00	158.83	-66.63	92.20	165.55	-168.52	-2.97	Vill Road	DFR	VILL-Botsa	94°9'12.45"	25°51'50.36"
45	48	48/0	DB	NONE	X-Arm Strengthening Suggested	05°57'36"LT	0	0	1.5	1.5	0	0	0	0	359	359	12753	1276.36	0.00	17.82	706.00	413.63	104.84	518.47	515.52	73.16	588.68	2 Nos Vill Road	DFR	VILL-Botsa	94°9'25.13"	25°51'51.52"
																					713.00	254.16	-442.35	-188.19	285.84	-705.13	-419.29				

SUBMITTED BY:
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DETAILED SURVEY TOWER SCHEDULE

LINK:220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
45	45	45/0	DB	NONE	X-Arm Strengthening Suggested	05°57'58"LT	0	0	1.5	1.5	0	0	0	0				1276.36	0.00													
															354	354	13107			145.77	713.00	254.16	442.35	-188.19	285.84	-705.13	-419.29		DFR	VILL-Bolsa	94°09'25.13"	25°51'51.52"
46	46	46/0	DD	+0 m	X-Arm Strengthening Suggested	38°10'36"LT	6	7.5	6	6	0	0	0	0				1416.63	0.50										Vil Road				
															413	413	13520			-25.93	767.00	796.35	300.93	1097.29	1059.13	341.00	1400.13		DFR	VILL-Bolsa	94°09'37.66"	25°51'53.79"
47	51	51/0	DB	NONE		02°05'30"RT	0	0	1.5	3	0	0	0	0				1394.7	0.50													
															362	362	13882			55.21	775.00	112.07	-46.39	63.67	72.00	-145.72	-73.72		DFR	VILL-Bolsa	94°09'47.27"	25°52'04.11"
48	52	52/0	DC	+0 m	Used DC tower instead of DB due to Single Span Limit Crossed(Refer to Engineer)	10°29'47"RT	9	9	9	9	0	0	0	0				1447.41	5.00										Vill Road				
															799	799	14681			24.54	1161.00	410.39	445.70	856.09	507.72	465.30	973.02		DFR	VILL-Bolsa	94°09'56.17"	25°52'12.55"
49	53	53/0	DC	NONE	Used DC tower instead of DB due to Single Span Limit Crossed(Refer to Engineer)	03°10'8"RT	0	0	0	0	0	0	0	0				1427.87	1.00										Nala				
															227	227	14908			-5.89	1026.00	353.30	218.79	572.09	333.70	263.46	597.16		DFR	VILL-Hembaunu	94°10'18.92"	25°52'28.31"
50	54	54/0	DB	NONE		00°09'07"LT	0	1.5	1.5	3	0	0	0	0				1411.98	1.00													
															222	222	15130			-0.73	449.00	8.21	115.95	124.16	-36.45	118.04	81.59		DFR	VILL-Hembaunu	94°10'25.77"	25°52'32.33"
51	55	55/0	DC	NONE		18°13'15"LT	0	0	1.5	1.5	0	0	0	0				1410.75	0.50										Vill Road				
															147	147	15277			-23.40	369.00	106.05	312.93	418.98	103.96	414.5	516.46		DFR	VILL-Hembaunu	94°10'32.42"	25°52'36.27"
52	56	56/0	DB	NONE	X-Arm Strengthening Suggested	11°19'07"RT	0	0	0	0	0	0	0	0				1387.85	1.00													
															454	454	15731			-98.19	601.00	-165.93	545.67	379.75	-267.51	680.88	413.37		DFR	VILL-Terogvunyu	94°10'35.70"	25°52'40.07"
53	57	57/0	DC	+0 m		21°43'42"LT	3	3	6	3	0	0	0	0				1289.16	1.50										2 Nos Vill Road, 2Nos Nala				
															462	462	16193			-68.47	916.00	-51.67	453.91	362.24	-226.88	548.49	321.61		DFR	VILL-Terogvunyu	94°10'48.17"	25°52'49.59"
54	58	58/0	DB	+0 m		06°47'42"LT	9	9	9	9	0	0	0	0				1216.19	3.00										Vil Road				
															383	383	16576			-26.90	845.00	8.09	297.14	305.23	-86.49	341.96	255.47		DFR	VILL-Terogvunyu	94°10'56.01"	25°53'02.75"
55	59	59/0	DD	+0 m		01°11'11"LT	9	9	9	9	0	0	0	0				1188.29	2.00													
															216	216	16792			5.64	599.00	85.86	67.33	153.19	41.04	50.08	91.12		DFR	VILL-Terogvunyu	94°11'01.21"	25°53'14.25"
56	60	60/0	DC	NONE		16°50'39"RT	0	0	3	1.5	0	0	0	0				1201.63	0.50										Pond, Vill Road				
															207	207	16999			1.56	423.00	148.67	91.95	240.61	165.92	87.05	252.96		DFR	VILL-Terogvunyu	94°11'03.94"	25°53'20.78"
57	61	61/0	DD	NONE		33°39'42"LT	0	0	0	0	0	0	0	0				1203.23	0.50													
															259	259	17258			-10.12	466.00	115.05	188.27	303.32	119.95	213.20	333.16		DFR	VILL-Terogvunyu	94°11'08.62"	25°53'26.17"
58	62	62/0	DC	NONE		24°16'45"LT	0	0	0	1.5	0	0	0	0				1193.6	1.00										2 Nos Nala				
															264	264	17522			0.50	523.00	70.73	129.15	199.88	45.80	127.94	173.74		DFR	VILL-Terogvunyu	94°11'09.34"	25°53'34.63"
59	63	63/0	DB	NONE		12°59'56"RT	0	0	0	3	0	0	0	0				1194.1	1.00													
															112	112	17634			4.97	376.00	134.85	-10.74	124.10	136.06	-39.06	97.00		DFR	VILL-Zunpha	94°11'05.95"	25°53'42.45"
60	64	64/0	DB	NONE		03°44'04"RT	0	0	0	1.5	0	0	0	0				1198.57	0.50													
															125	125	17759			-15.82	237.00	122.74	252.86	375.60	151.06	333.62	484.68		DFR	VILL-Zunpha	94°11'06.81"	25°53'46.26"
61	65	65/0	DB	+0 m	X-Arm Strengthening Suggested	04°29'04"LT	3	3	4.5	3	0	0	0	0				1180.25	1.00													
															201	201	17960			-64.05	326.00	-127.86	579.79	451.93	-208.62	783.14	574.52		DFR	VILL-Zunpha	94°11'05.66"	25°53'50.36"
62	66	66/0	DB	NONE		07°32'41"RT	0	0	1.5	0	0	0	0	0				1119.5	1.00													
															332	332	18292			-16.34	533.00	-378.79	240.03	-138.76	-582.14	271.43	-310.70		DFR	VILL-Tseminyu	94°11'04.47"	25°53'56.84"
63	67	67/0	DD	NONE		50°45'07"RT	1.5	0	3	3	0	0	0	1.5				1102.34	0.50													
															127	127	18419			20.08	456.00	91.97	-174.08	-82.10	60.57	-274.67	-214.31		DFR	VILL-Tseminyu	94°11'04.65"	25°54'07.73"
64	68	68/0	DB	NONE		06°00'14"RT	0	0	3	1.5	0	0	0	0				1122.42	0.50													
																					127.00	301.08	71.20	372.27	401.87	58.98	460.85		DFR	VILL-Tseminyu	94°11'08.02"	25°54'10.33"

SHYAMA POWER INDIA LIMITED

SUBMITTED BY:
SHYAMA POWER(I) LTD.

Khuyo Bhakta
06/02/19

CHECKED BY:
P.G.C.I.L

POWERGRID NERPSIP KOHIMA

APPROVED BY:
P.G.C.I.L

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
64	68	68/0	DB	NONE		06°00'14"RT	0	0	3	1.5	0	0	0	0				1122.42	0.50													
65	69	69/0	DB	+0 m		08°27'17"LT	6	5	7.5	7.5	0	0	0	0	200	200	18619	1121.75	1.50	3.83	327.00	301.08	71.20	372.27	401.87	59.98	460.85		DFR	VILL-Tseminyu	94°11'08.02"	25°54'10.33"
66	70	70/0	DC	NONE		16°59'21"LT	3	0	1.5	3	0	0	0	0	303	303	18922	1172.69	0.00	47.73	503.00	128.80	-82.45	46.35	141.02	-181.71	-40.69		DFR	VILL-Tseminyu	94°11'14.15"	25°54'13.78"
67	71	71/0	DC	NONE		16°35'27"LT	0	0	0	0	0	0	0	0	314	314	19236	1235.11	1.50	60.73	617.00	385.45	-133.90	251.55	484.71	-257.32	227.39		DFR	VILL-Tseminyu	94°11'22.19"	25°54'20.47"
68	73	73/0	DC	NONE	X-Arm Strengthening Suggested	18°05'29"RT	0	0	0	0	0	0	0	0	384	384	19620	1293.11	1.50	58.00	698.00	447.90	-35.18	412.72	571.32	-131.57	439.76	Pond, Vill Road	DFR	VILL-Tseminyu	94°11'28.06"	25°54'29.18"
69	75	75/0	DB	+0 m		06°55'15"RT	6	7.5	9	9	0	0	0	0	363	363	19983	1230.55	0.00	-52.06	747.00	419.18	397.21	816.39	515.67	488.73	1004.30	3 Nos. Vil Road, 11KV, Unmetal Road	DFR	VILL-Tseminyu	94°11'31.00"	25°54'41.23"
70	76	76/0	DC	NONE		16°36'43"RT	0	0	1.5	1.5	0	0	0	0	356	356	20339	1189.7	0.50	-50.35	719.00	-34.21	390.73	356.52	-125.73	480.98	355.25	2 Nos. Vil Road	DFR	VILL-Tseminyu	94°11'37.78"	25°54'51.44"
71	77	77/0	DB	+0 m	X-Arm Strengthening Suggested	14°53'18"LT	3	3	4.5	3	0	0	0	0	342	342	20681	1163.33	1.00	-23.87	658.00	-34.73	275.98	241.25	-124.98	320.52	195.54	4 Nos. Vill Road	DFR	VILL-Tseminyu	94°11'45.76"	25°55'00.45"
72	78	78/0	DB	NONE	X-Arm Strengthening Suggested	10°28'34"RT	0	0	3	0	0	0	0	0	260	260	20941	1094.45	0.50	-71.48	602.00	66.02	543.5*	609.53	2*.48	718.95	740.43		DFR	VILL-Tseminyu	94°11'55.76"	25°55'08.84"
73	79	79/0	DB	+0 m		03°25'44"LT	3	4.5	6	3	0	0	0	0	133	133	21074	1055.22	0.50	-36.13	393.00	-783.51	475.09	191.58	-458.95	648.45	189.50		DFR	VILL-Tseminyu	94°12'01.82"	25°56'13.23"
74	80	80/0	DC	NONE		21°09'33"LT	0	0	0	0	0	0	0	0	314	314	21388	1062.49	1.00	3.77	447.00	-342.09	138.94	-203.15	-515.45	131.28	-384.17	Nala	DFR	VILL-Tseminyu	94°12'05.60"	25°56'15.96"
75	81	81/0	DB	NONE		05°52'50"LT	0	0	0	0	0	0	0	0	372	372	21760	1088.38	1.00	25.89	686.00	175.06	81.32	256.38	187.72	36.91	219.63	Nala	DFR	VILL-Tseminyu	94°12'13.66"	25°56'22.99"
76	82	82/0	DB	NONE		03°21'27"LT	0	0	1.5	0	0	0	0	0	267	267	22027	1086.63	1.00	-1.75	639.00	290.68	143.36	434.04	335.09	147.54	482.63		DFR	VILL-Tseminyu	94°12'19.50"	25°56'33.78"
77	83	83/0	DB	NONE		06°09'38"LT	0	0	0	0	0	0	0	0	499	499	22526	1106.36	2.00	18.73	766.00	123.64	193.04	316.69	119.45	169.09	288.55		DFR	VILL-Tseminyu	94°12'22.64"	25°56'41.85"
78	84	84/0	DD	+0 m	Used DD tower instead of DC due to Single Span Limit Crossed	24°20'42"LT	3	4.5	4.5	3	0	0	0	0	78	78	22604	1115.53	1.00	13.17	577.00	305.96	-214.96	91.00	329.91	-322.71	7.20	Vill Road	DFR	VILL-Tseminyu	94°12'28.28"	25°56'57.45"
79	85	85/0	DD	NONE		45°14'02"RT	1.5	0	0	1.5	0	0	0	0	551	551	23155	1044.38	0.50	-73.55	629.00	292.96	476.55	769.51	400.71	561.84	962.55	Vill Road	DFR	VILL-Tseminyu	94°12'28.81"	25°56'00.02"
80	86	86/0	DB	NONE		05°37'06"RT	0	0	0	1.5	0	0	0	0	224	224	23379	1076.16	0.50	31.76	775.00	74.45	-101.39	-26.94	-10.84	-191.93	-202.77	Nala	DFR	VILL-Tseminyu	94°12'24.10"	25°56'17.26"
81	87	87/0	DB	NONE		12°40'58"LT	0	0	0	0	0	0	0	0	306	306	23685	1124.65	1.50	47.52	530.00	325.39	-80.58	244.82	415.93	-179.68	236.25		DFR	VILL-Tseminyu	94°12'28.43"	25°56'23.49"
82	88	88/0	DC	NONE	X-Arm Strengthening Suggested	19°13'43"RT	1.5	0	0	1.5	0	0	0	0	149	149	23834	1164.14	1.00	39.96	455.00	386.58	-328.88	57.70	485.68	-500.02	-14.34		DFR	VILL-Tseminyu	94°12'35.07"	25°56'31.32"
83	89	89/0	DD	+0 m		41°12'16"LT	6	3	3	6	0	0	0	0	45*	45*	24285	1209.59	0.50	48.95	600.00	477.98	62.25	540.13	649.02	-7.01	642.01		DFR	VILL-Tseminyu	94°12'37.38"	25°56'35.73"
																					451.00	388.75	172.45	561.20	458.01	191.10	649.11	Vill Road	DFR	VILL-Tseminyu	94°12'48.79"	25°56'46.28"

SUBMITTED BY:
SHYAMA POWER(I) LTD.

CHECKED BY:
P.G.C.I.L

APPROVED BY:

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
83	89	89/0	DD	+0 m		41°12'18"LT	6	3	3	6	0	0	0	0				1209.59	0.50													
															257	257	24542			-7.51	708.00	386.75	172.45	561.20	456.01	191.10	649.11		DFR	VILL-Tseminyu	94°12'48.75"	25°56'46.28"
84	90	90/0	DB	+0 m		12°51'49"LT	6	6	3	3	0	0	0	0				1202.08	0.50													
															157	157	24699			13.10	414.00	84.55	-47.00	37.55	65.90	100.25	-34.35		DFR	VILL Ziphenyu	94°12'45.18"	25°56'54.60"
85	90A	90A/E	DB	+0 m		00°46'03"RT	3	4.5	3	3	0	0	0	0				1215.68	1.00													
															351	351	25050			12.82	598.00	204.00	120.56	324.56	257.25	97.26	354.50		DFR	VILL-Ziphenyu	94°12'48.29"	25°56'59.77"
86	91	91/0	DC	NONE		28°53'58"RT	1.5	3	0	0	0	0	0	0				1231	0.50										Unmetal Road				
															243	243	25293			-2.42	594.00	230.44	126.48	356.91	253.74	142.83	396.56		DFR	VILL-Ziphenyu	94°12'46.34"	25°57'10.88"
87	92	92/0	DC	+0 m	Used DC tower instead of DB due to Single Span Limit Crossed	12°33'35"LT	3	3	3	3	0	0	0	0				1228.56	1.50													
															633	633	25926			5.84	676.00	106.52	302.52	409.14	100.17	296.74	396.90		DFR	VILL -New Ziphenyu	94°12'49.45"	25°57'18.41"
88	93	93/0	DD	NONE	Used DD tower instead of DC due to Single Span Limit Crossed	27°57'06"RT	0	0	0	0	0	0	0	0				1234.92	1.00										2Nos NH-2(Kohima - Mokokchungh Road), Vil Road				
															287	287	26213			1.77	920.00	330.38	134.22	464.60	336.26	130.29	466.55		DFR	VILL -New Ziphenyu	94°12'52.29"	25°57'38.69"
89	94	94/0	DB	+0 m		04°59'05"LT	9	6	9	9	0	0	0	0				1227.19	0.50										2Nos Vill Road				
															551	551	26764			29.22	638.00	152.78	195.74	348.51	156.71	161.90	318.61		DFR	VILL -New Ziphenyu	94°14'58.42"	25°57'45.29"
90	95	95/0	DD	NONE		31°43'18"RT	3	1.5	0	1.5	0	0	0	0				1264.91	0.00										2Nos NH-2(Kohima - Mokokchungh Road), 33KV				
															247	247	27311			25.67	798.00	355.26	-32.82	322.45	389.10	-99.14	289.97		DFR	VILL -New Ziphenyu	94°13'08.35"	25°58'03.74"
91	96	96/0	DC	+0 m		16°48'39"LT	4.5	3	3	4.5	0	0	0	0				1287.58	0.00										NH-2				
															412	412	27423			-29.16	659.00	279.82	312.45	592.27	346.14	357.62	703.76		DFR	VILL -New Ziphenyu	94°13'16.19"	25°58'05.37"
92	97	97/0	DC	+0 m		18°37'11"LT	7.5	6	6	7.5	0	0	0	0				1255.92	0.50										Unmetal Road				
															325	325	27748			40.54	737.00	99.55	-25.12	74.43	54.38	-104.72	-50.34		DFR	VILL -New Ziphenyu	94°13'26.88"	25°58'15.00"
93	98	98/0	DB	+0 m		11°46'33"RT	9	9	9	9	0	0	0	0				1294.46	1.50										2Nos Nala				
															269	269	28017			-36.88	594.00	350.12	340.71	690.83	429.72	428.20	857.92		DFR	VILL -New Ziphenyu	94°13'32.22"	25°58'23.86"
94	99	99/0	DD	+0 m		43°46'22"RT	9	6	6	6	0	0	0	0				1259.58	0.50										Pond				
															257	257	28274			26.69	525.00	-71.71	-27.70	-99.41	-159.20	-93.98	-253.18		DFR	VILL -New Ziphenyu	94°13'38.32"	25°58'30.85"
95	100	100/0	DC	NONE		28°16'33"RT	1.5	0	0	0	0	0	0	0				1293.77	2.00										Unmetal Road				
															152	152	28426			-15.36	439.00	284.70	227.99	512.70	350.98	292.48	643.45		DFR	VILL -New Ziphenyu	94°13'47.54"	25°58'31.85"
96	101	101/0	DB	+0 m	X-Arm Strengthening Suggested	03°49'09"RT	9	9	9	9	0	0	0	0				1272.41	5.00										Unmetal Road,132KV S/C T/L				
															215	215	28641			-70.29	367.00	-75.99	599.23	523.24	-140.48	807.86	667.38		DFR	VILL -New Ziphenyu	94°13'52.59"	25°58'30.11"
97	102	102/0	DB	+0 m		07°16'02"RT	9	9	9	9	0	0	0	0				1199.12	2.00										NH-2 33KV				
															195	195	28836			-33.99	410.00	-364.23	359.67	-24.56	-592.86	470.91	-121.95		DFR	VILL -New Ziphenyu	94°13'59.47"	25°58'26.91"
98	103	103/0	DB	NONE	X-Arm Strengthening Suggested	01°57'10"RT	1.5	1.5	0	0	0	0	0	0				1172.63	0.50														
															142	142	28978			-47.77	337.00	-164.67	576.99	412.31	-275.91	791.67	515.76		DFR	VILL -New Ziphenyu	94°14'05.27"	25°58'23.44"
99	104	104/0	DD	+0 m		42°35'30"LT	6	6	9	6	0	0	0	0				1120.36	2.00														
															534	534	29512			-5.59	676.00	-434.99	282.75	-152.24	-649.67	289.43	-360.24		DFR	VILL -New Ziphenyu	94°14'09.42"	25°58'20.79"
100	105	105/0	DC	+0 m		15°03'05"LT	4.5	4.5	3	3	0	0	0	0				1116.71	1.00										Nala,Vil Road				
															241	241	29753			39.18	775.00	251.25	-124.02	127.23	244.57	-227.77	16.81		DFR	VILL -Nsunyu	94°14'28.52"	25°58'22.24"
101	105A	105A/0	DB	NONE		04°11'23"LT	0	0	0	0	0	0	0	0				1168.45	0.50														
															136	136	29889			17.71	377.00	365.02	-127.86	237.16	468.77	-210.96	257.81		DFR	VILL -Nsunyu	94°14'36.49"	25°58'25.92"
102	106	106/0	DC	+0 m	X-Arm Strengthening Suggested	26°17'28"RT	6	6	6	6	0	0	0	0				1170.66	1.00														
																					136.00	263.86	493.76	757.62	346.96	648.09	995.05		DFR	VILL -Nsunyu	94°14'40.79"	25°58'27.98"

SHYAMA POWER INDIA LTD.

SUBMITTED BY:
SHYAMA POWER(I) LTD.

Karuzo Rhakho
06/2/19

CHECKED BY:
P.G.C.I.L

POWERGRID NERPSIP KOHIMA

APPROVED BY:
P.G.C.I.L

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
102	106	106/0	DC	+0 m	X-Arm Strengthening Suggested	25°17'28"RT	6	6	6	6	0	0	0	0				1170.66	1.00													
															260	260	30140			-62.88											
103	107	107/0	DB	+0 m		06°26'00"RT	6	6	7.5	6	0	0	0	0				1109.28	2.50		396.00	263.86	493.76	757.62	348.96	646.09	995.05		DFR	V.L.-Nsunyu	94°14'40.79"	25°58'27.58"
															286	286	30426			-56.89											
104	108	108/0	DD	NONE		33°01'06"RT	0	0	3	1.5	0	0	0	0				1057.39	1.50		546.00	-233.76	442.19	208.43	-388.09	569.12	181.03	Vill Road	DFR	Vill -Nsunyu	94°14'50.32"	25°58'28.17"
															304	304	30730			13.46											
105	109	109/0	DD	NONE		34°51'06"LT	0	0	3	3	0	0	0	0				1070.37	1.00		590.00	-156.19	85.31	-70.88	-263.12	57.01	-226.12	2nos Nala	DFR	Vill -Nsunyu/ Chunlikha	94°15'00.53"	25°58'27.49"
															270	270	31003			-63.74											
106	110	110/0	DB	NONE		02°48'31"RT	0	1.5	3	0	0	0	0	0				1006.53	1.00		574.00	218.69	490.06	708.77	246.99	640.73	887.72		DFR	VILL -Nsunyu	94°15'09.51"	25°58'21.78"
															235	235	31248			-51.04											
107	111	111/0	DD	NONE	Single Span Limit Crossed Refered to Engineer	54°20'24"LT	0	0	3	1.5	0	0	0	0				956.09	1.50		509.00	-220.08	440.71	220.63	-370.73	576.89	206.26	Nala	DFR	VILL -Nsunyu	94°15'19.37"	25°58'21.91"
															619	619	31867			-19.30											
108	112	112/0	DD	NONE		39°45'49"RT	1.5	0	0	0	0	0	0	0				936.25	1.00		858.00	-201.71	356.40	154.69	-337.99	376.29	38.31		DFR	VILL -Nsunyu	94°15'27.89"	25°58'20.95"
															242	242	32109			101.41											
109	112A	112A/0	DB	+0 m	X-Arm Strengthening Suggested	04°28'10"RT	9	6	6	7.5	0	0	0	0				1031.7	1.00		861.00	282.60	-509.29	-246.68	242.71	-776.70	-534.00	Nala	DFR	VILL -Kaduru	94°15'43.07"	25°58'33.32"
															124	124	32233			30.50											
110	113	113/0	DB	+0 m		00°05'02"RT	9	7.5	6	6	0	0	0	0				1062.7	1.50		366.00	751.29	-307.96	443.33	1018.70	-464.92	553.78		DFR	VILL -Ehunru	94°15'51.48"	25°58'36.14"
															203	203	32436			60.60											
111	114	114/0	DC	NONE	X-Arm Strengthening Suggested	28°40'10"RT	1.5	1.5	0	0	0	0	0	0				1127.8	0.00		327.00	431.96	-347.50	84.45	588.92	-538.00	50.92		DFR	VILL -Ehunru	94°15'56.18"	25°58'36.47"
															222	222	32658			8.77											
112	115	115/0	DB	NONE		10°42'01"RT	3	0	0	0	0	0	0	0				1139.02	2.50		425.00	550.50	51.92	602.42	741.00	26.85	767.86		DFR	VILL -Ehunru	94°16'03.49"	25°58'36.89"
															486	486	33144			-15.24											
113	116	116/0	DB	NONE		03°00'12"LT	0	0	0	0	0	0	0	0				1122.28	1.00		708.00	170.08	290.17	460.24	195.15	310.18	505.32		DFR	VILL -Ehunru	94°16'10.65"	25°58'33.70"
															187	187	33331			-40.91											
114	117	117/0	DE	NONE		08°45'24"RT	0	3	1.5	0	0	0	0	0				1080.87	0.50		673.00	195.83	422.55	618.38	175.82	562.16	737.98	Vill Road	DFR	VILL -Ehunru	94°16'24.55"	25°58'24.42"
															175	175	33506			-28.91											
115	118	118/0	DD	+0 m		34°26'38"LT	3	4.5	3	3	0	0	0	0				1049.96	1.50		362.00	-235.55	335.98	100.43	-375.16	441.40	66.24	Vill Road	DFR	VILL -Yikhanu	94°16'30.29"	25°58'20.98"
															360	360	33866			102.92											
116	119	119/0	DE	+0 m	X-Arm Strengthening Suggested	09°21'21"LT	6	6	6	6	0	0	0	0				943.54	1.00		535.00	-160.98	610.00	449.03	-266.40	792.44	526.04		DFR	VILL -Ehunru	94°16'34.80"	25°58'17.21"
															251	251	34117			-69.22											
117	120	120/0	DC	+0 m	X-Arm Strengthening Suggested	15°11'31"LT	4.5	6	3	3	0	0	0	0				876.32	0.00		611.00	-250.00	540.29	290.29	-432.44	716.28	283.84		DFR	VILL -Yikhanu	94°16'47.60"	25°58'15.02"
															231	231	34348			-86.01											
118	121	121/0	DC	NONE	Used DC tower instead of DB due to Single Span Limit Crossed(X-Arm Strengthening Suggested)	02°35'27"LT	0	0	0	0	0	0	0	0				795.31	2.00		482.00	-269.29	675.53	386.24	-465.26	913.13	447.86		DFR	VILL -Ehunru	94°16'56.73"	25°58'15.04"
															533	533	34881			44.00											
119	122	122/0	DD	+0 m		30°54'18"LT	4.5	3	3	6	0	0	0	0				834.81	0.50		764.00	-444.53	142.33	-302.19	-682.13	89.66	-592.48		DFR	VILL -Phami	94°17'04.69"	25°58'16.95"
															212	212	35093			55.92											
120	123	123/0	DB	+0 m	X-Arm Strengthening Suggested	05°50'32"RT	6	3	3	4.5	0	0	0	0				890.73	0.50		745.00	390.67	-290.74	99.93	443.34	-459.06	-15.72		DFR	VILL -Phami	94°17'23.14"	25°58'22.20"
															291	291	35384			84.02											
121	124	124/0	DC	+0 m	X-Arm Strengthening Suggested	15°12'49"RT	9	7.5	6	6	0	0	0	0				872.25	1.00		503.00	502.74	-288.77	213.97	671.06	-473.02	198.04		DFR	VILL -Phami	94°17'28.05"	25°58'27.43"
																					291.00	579.77	-209.97	369.81	764.02	-323.44	440.58	Vill Road	DFR	VILL-Psaphimi	94°17'35.26"	25°58'34.32"

SHYAMA POWER INDIA LIM

SUBMITTED BY:
SHYAMA POWER (I) LTD.

Karuzo Rhakho
06/12/19

CHECKED BY:
P.G.C.I.L

POWERGRID NERPSIP KOHIMA

APPROVED BY:
P.G.C.I.L

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK 220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
121	124	124/0	DC	+0 m	X-Arm Strengthening Suggested	15°12'49"RT	9	7.5	6	6	0	0	0	0				972.25	1.00													
															115	115	35499			20.45	466.00	579.77	-209.97	369.81	764.02	-323.44	440.58					
122	125	125/0	DB	+0 m		11°02'45"RT	6	6	3	3	0	0	0	0				985.7	1.00									Vill Road				
															340	340	35839			61.66	455.00	324.97	-102.77	222.20	438.44	-218.50	219.94					
123	126	126/0	DC	NONE		22°18'12"LT	3	3	0	0	0	0	0	0				1060.36	1.00													
															229	229	36068			68.77	569.00	442.77	-337.19	105.58	558.50	-528.82	29.68					
124	127	127/0	DD	+0 m		38°42'24"RT	9	6	6	7.5	0	0	0	0				1123.13	1.00													
															238	238	36306			2.10	467.00	566.19	105.73	671.92	757.82	100.10	857.92					
125	128	128/0	DC	+0 m		22°53'09"RT	6	6	3	3	0	0	0	0				1126.23	1.00									Nala				
															305	305	36611			88.63	543.00	132.27	-284.57	-152.30	137.90	-470.01	-332.11					
126	129	129/0	DD	+0 m		41°02'24"LT	6	6	9	6	0	0	0	0				1217.85	5.00									FP, 11KV				
															230	230	36841			-29.83	535.00	589.57	310.07	899.65	775.01	392.84	1167.85					
127	130	130/0	DC	+0 m		15°21'53"LT	6	6	7.5	9	0	0	0	0				1185.33	2.00													
															156	156	36997			-26.94	386.00	-80.07	337.74	257.67	-162.84	447.95	285.11					
128	131	131/0	DB	NONE		10°18'31"RT	0	0	3	1.5	0	0	0	0				1152.59	0.50													
															398	398	37395			-57.46	554.00	-181.74	416.15	234.40	-291.95	508.28	216.33					
129	132	132/0	DB	NONE		04°33'36"RT	0	0	3	0	0	0	0	0				1106.13	1.50									FP				
															292	292	37687			-56.71	690.00	-18.15	438.11	419.96	-110.78	562.05	451.77					
130	132A	132A/0	DB	NONE	Strengthening Suggested	11°11'31"LT	0	0	3	0	0	0	0	0				1045.42	1.50													
															124	124	37811			-31.05	416.00	-146.11	438.63	292.52	-270.05	598.42	328.37					
131	133	133/0	DD	+0 m		40°33'39"RT	6	6	6	7.5	0	0	0	0				1012.37	1.50													
															642	642	38453			-16.38	766.00	-314.53	359.38	44.75	-474.42	375.66	-98.77					
132	134	134/0	DD	+0 m	Used DD tower instead of DC due to Sum of Adj. Span Limit Crossed	26°52'13"RT	6	6	9	7.5	0	0	0	0				995.49	2.00													
															389	389	38832			-17.03	1011.00	282.82	253.92	536.54	266.34	283.37	549.71					
133	135	135/0	DD	+0 m		59°58'27"RT	3	3	6	3	0	0	0	0				982.45	2.00									FP				
															258	258	39090			13.07	627.00	115.08	52.80	167.89	85.63	20.48	106.11					
134	136	136/0	DD	+0 m		31°10'52"LT	6	6	9	6	0	0	0	0				994.53	4.00													
															196	196	39276			-20.47	454.00	205.20	254.70	459.90	237.52	321.19	558.71					
135	137	137/0	DC	+0 m	X-Arm Strengthening Suggested	22°22'47"LT	3	3	6	4.5	0	0	0	0				976.11	3.00													
															302	302	39578			-85.77	498.00	-58.70	578.17	519.47	-125.19	759.41	634.22					
136	138	138/0	DC	NONE	Used DC tower instead of DB due to Sum of Adj. Span Limit Crossed	14°37'03"LT	0	0	1.5	3	0	0	0	0				892.34	2.00													
															427	427	40005			15.12	728.00	-276.17	160.24	-115.93	-457.41	137.64	-319.76					
137	139	139/0	DD	+0 m		48°03'06"LT	6	6	9	9	0	0	0	0				899.45	0.00									11KV				
															346	346	40351			14.46	773.00	266.76	235.86	502.62	289.36	262.53	551.88					
138	140	140/0	DB	+0 m		05°30'49"LT	3	3	6	3	0	0	0	0				889.5	1.50									11KV				
															352	352	40703			-12.24	698.00	110.14	228.30	338.44	83.47	250.49	333.96					
139	141	141/0	DB	NONE		14°35'34"LT	0	0	0	0	0	0	0	0				879.75	1.00													
															178	178	40881			10.39	530.00	123.70	1.21	124.90	101.51	-36.04	65.46					
140	142	142/0	DB	NONE		08°54'15"LT	0	0	0	0	0	0	0	0				890.05	1.50													
																					178.00	176.78	144.09	320.89	214.04	148.56	362.63			DFR	VILL-Puneboga	94°20'15.81"	25°59'08.54"

SHYAMA POWER INDIA LIMITED

SUBMITTED BY:
SHYAMA POWER(I) LTD.

Karunya Rhakla
06/12/19

CHECKED BY:
P.G.C.I.L

POWERGRID NERPSIP KOHIMA

APPROVED BY:
P.G.C.I.L

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK 220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
140	142	142/0	DB	NONE		08°54'15"LT	0	0	0	0	0	0	0	0				880.65	1.50													
															267	267	41148			-1.83	445.00	176.79	144.09	320.89	214.04	148.58	362.63		DFR	VILL-Punebosa	94°20'16.81"	25°59'08.54"
141	143	143/0	DC	+0 m		23°17'03"RT	6	6	6	6	0	0	0	0				882.27	1.00													
															293	293	41441			-44.63	560.00	122.91	375.60	498.51	118.42	472.81	591.22		DFR	VILL-Kitami	94°20'21.03"	25°59'15.18"
142	144	144/0	DB	+0 m		06°25'11"RT	4.5	4.5	3	3	0	0	0	0				839.64	0.00													
															235	235	41676			-8.54	528.00	-82.66	172.16	89.50	-178.81	195.35	15.54		DFR	VILL-Kitami	94°20'26.59"	25°59'22.92"
143	145	145/0	DB	+0 m		06°49'49"LT	6	6	7.5	6	0	0	0	0				828.6	0.50													
															264	264	41940			-47.79	499.00	62.84	404.27	467.12	39.55	519.79	559.44		DFR	VILL-Kitami	94°20'34.86"	25°59'27.92"
144	146	146/0	DC	NONE		20°34'11"RT	0	1.5	1.5	0	0	0	0	0				786.31	0.00													
															137	137	42077			-79.52	401.00	-140.27	282.81	142.53	-255.79	373.73	117.94		DFR	VILL-Kitami	94°20'41.15"	25°59'34.26"
145	147	147/0	DC	NONE		16°58'16"LT	0	0	1.5	0	0	0	0	0				767.79	1.00													
															234	234	42311			-10.23	371.00	-145.81	182.76	36.95	236.73	210.65	-26.08		DFR	VILL-Kitami	94°20'45.77"	25°59'36.16"
146	148	148/0	DB	NONE		11°53'36"LT	0	0	0	0	0	0	0	0				758.06	1.50													
															311	311	42622			-30.95	545.00	51.24	305.18	356.43	23.35	368.68	392.04		DFR	VILL-Kitami	94°20'51.58"	25°59'41.44"
147	149	149/0	DC	NONE		26°50'29"RT	0	0	0	0	0	0	0	0				727.11	1.50													
															422	422	43044			-46.85	733.00	5.82	377.98	383.80	-57.69	448.83	391.14		DFR	VILL-Kitami	94°20'58.49"	25°59'49.69"
148	150	150/0	DC	NONE	Used DC tower instead of DB due to Sum of Adj. Span Limit Crossed	11°51'52"LT	0	1.5	1.5	0	0	0	0	0				678.76	0.00										2 Nos. FP				
															531	531	43575			-69.85	953.00	44.02	463.35	507.37	26.83	547.30	520.47		DFR	VILL-Kitami	94°21'11.6"	25°59'56.09"
149	151	151/0	DC	NONE	Used DC tower instead of DB due to Singel. Span Limit Crossed(X-Arm Strengthening Suggested)	14°38'17"RT	1.5	1.5	0	0	0	0	0	0				609.41	0.50										2 Nos Unmetal Road				
															132	132	43707			-57.94	663.00	67.65	726.20	793.85	-16.30	1006.31	990.01		DFR	VILL-Kitami	94°21'26.33"	26°0'7.2"
150	152	152/0	DC	NONE	Used DC tower instead of DB due to Singel. Span Limit Crossed(X-Arm Strengthening Suggested)	09°40'08"LT	0	0	3	1.5	0	0	0	0				550.97	0.00													
															657	657	44364			-39.88	789.00	-594.20	419.80	-174.41	-874.31	458.53	-415.78	2 Nos Unmetal Road,Dayang River	DFR	VILL-Shena Old	94°21'30.75"	26°0'9"
151	154	154/0	DD	NONE		31°27'12"RT	3	0	0	3	0	0	0	0				511.59	0.50													
															132	132	44496			57.04	769.00	237.20	-583.95	-346.75	198.47	-859.70	-661.24		DFR	VILL-Shena Old	94°21'49.98"	26°0'21.12"
152	155	155/0	DB	NONE	X-Arm Strengthening Suggested	02°54'51"RT	0	1.5	0	0	0	0	0	0				568.13	0.00													
															331	331	44827			73.88	463.00	715.95	-170.22	545.73	991.70	-312.65	678.05		DFR	VILL-Shena Old	94°21'54.76"	26°0'21.38"
153	156	156/0	DB	+0 m	X-Arm Strengthening Suggested	12°11'34"RT	3	3	6	3	0	0	0	0				641.01	2.00													
															350	350	45177			104.42	681.00	501.22	-273.73	227.48	643.65	-464.12	179.53		DFR	VILL-Shena Old	94°22'6.61"	26°0'21.55"
154	157	157/0	DD	NONE		32°08'52"LT	1.5	0	0	0	0	0	0	0				747.43	1.00										Unmetal Roac				
															432	432	45609			102.60	782.00	623.73	141.22	482.51	814.12	-292.78	521.34		DFR	VILL-Shena Old	94°22'19.0"	26°0'18.0"
155	158	158/0	DB	NONE	X-Arm Strengthening Suggested	00°31'47"RT	0	0	0	0	0	0	0	0				849.53	0.50										3 Nos Unmetal Road				
															202	202	45811			21.22	634.00	573.22	-57.00	516.22	724.78	-124.04	600.74		DFR	VILL-Shena Old	94°22'33.04"	26°0'24.03"
156	159	159/0	DC	NONE	Used DC tower instead of DB due to Singel. Span Limit Crossed	13°07'03"LT	0	0	1.5	1.5	0	0	0	0				871.25	1.00													
															517	517	46328			56.18	719.00	259.00	65.96	324.97	326.04	-15.72	310.32		DFR	VILL Shena Old	94°22'40.01"	26°0'26.08"
157	161	161/0	DD	+0 m		38°36'35"LT	6	6	6	6	0	0	0	0				932.93	2.50													
															523	523	46851			71.19	1040.00	451.04	56.77	507.80	532.72	-30.10	502.62		DFR	VILL-Shena Old	94°22'55.03"	26°0'36.07"
158	162	162/0	DC	+0 m	Used DC tower instead of DB due to Sum of Adj. Span Limit Crossed	14°33'14"RT	6	6	6	7.5	0	0	0	0				1001.62	1.00													
															538	538	47389			85.17	1061.00	466.23	30.89	497.12	553.10	-70.13	482.96		DFR	VILL-Shena Old	94°23'00.3"	26°0'52.9"
159	163	163/0	DB	+0 m	X-Arm Strengthening Suggested	06°58'09"RT	6	6	7.5	7.5	0	0	0	0				1067.29	0.50										Nala				
																					538.00	507.11	241.63	748.74	808.13	306.60	914.73		DFR	VILL-Shena Old	94°23'10.1"	26°1'8"

SUBMITTED BY:
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CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK 220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.O.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
159	163	163/0	DE	+0 m	X-Arm Strengthening Suggested	06°58'09"RT	6	6	7.5	7.5	0	0	0	0				1087.29	0.50										DFR	VILL-Shena Old	94°23'10.1"	26°1'18"
160	163A	163A/0	DB	+0 m		13°17'10"LT	6	6	9	6	0	0	0	0	177	177	47565	1071.27	2.50	-16.02	715.00	507.11	241.63	748.74	608.13	306.60	914.73		DFR	VILL-Shena Old	94°23'14.2"	26°1'12.8"
161	164	164/0	DB	+0 m		05°00'50"LT	3	3	6	4.5	0	0	0	0	381	381	47947	1026.96	0.50	45.31	556.00	-64.63	389.37	324.74	-129.60	445.26	315.67	FP	DFR	VILL-Shena Old	94°23'16.8"	26°1'23.8"
162	165	165/0	DB	+0 m		13°33'11"RT	6	6	6	6	0	0	0	0	303	303	48250	989.91	2.00	-35.55	664.00	-11.63	327.97	339.60	-64.26	402.84	338.58	Nala	DFR	VILL-Shena Old	94°23'19.8"	26°1'23.8"
163	166	166/0	DD	+0 m		34°38'00"LT	3	3	3	3	0	0	0	0	432	432	48682	977.2	1.00	-14.71	738.00	-24.97	767.22	242.25	-99.84	288.65	186.10	Vill Road	DFR	VILL-Shena Old	94°23'23.5"	26°1'32.9"
164	167	167/0	DB	NONE		05°58'05"RT	0	1.5	0	0	0	0	0	0	325	325	49007	901.49	1.00	-78.71	757.00	154.76	526.77	691.55	148.05	681.32	829.37	3 Nos FP	DFR	VILL-Shena Old	94°23'32.3"	26°1'44.7"
165	168	168/0	DB	NONE		24°24'51"LT	0	0	0	0	0	0	0	0	298	298	49305	877.8	0.50	-23.19	623.00	-201.77	266.05	64.28	-356.32	315.71	-40.61	Vill Road	DFR	VILL-Shena Old	94°23'32"	26°1'55.2"
166	169	169/0	DE	NONE		02°07'49"RT	0	0	0	0	0	0	0	0	416	416	49721	808.38	1.00	-69.92	714.00	31.95	460.80	492.76	-17.71	568.06	550.35	2 Nos Vill Road	DFR	VILL-Shena Old	94°23'33"	26°2'4.8"
167	170	170/0	DE	+0 m		11°01'59"LT	4.5	4.5	3	3	0	0	0	0	281	281	50002	875.8	0.50	20.92	697.00	-44.80	28.52	-16.28	-152.06	-16.99	-171.05	2 Nos Vill Road	DFR	VILL-Shena Old	94°23'30.64"	26°2'18.18"
168	171	171/0	DC	+0 m	Used DD tower instead of DC due to Sum of Adj. Span Limit Crossed	28°34'43"RT	9	9	9	9	0	0	0	0	293	293	50295	785.32	2.50	-40.48	574.00	252.48	354.30	606.78	299.99	442.46	742.45		DFR	VILL-Shena Old	94°23'25.5"	26°2'27.2"
169	174	174/0	DC	+0 m	Used DC tower instead of DB due to Sum of Adj. Span Limit Crossed (X-Arm Strengthening Suggested)	12°23'21"RT	9	9	9	9	0	0	0	0	663	663	50958	612.9	1.50	-167.42	956.00	61.30	711.31	650.01	-149.46	672.45	722.99	Vill Road	DFR	VILL-Shena Old	94°23'26.25"	26°2'36.27"
170	175	175/0	DB	NONE		08°56'20"LT	0	0	0	0	0	0	0	0	325	325	51283	552.26	1.00	-60.14	988.00	-48.31	482.48	434.17	209.45	618.24	408.78	FP	DFR	VILL-Shena Old	94°23'30.7"	26°2'57.5"
171	176	176/0	DD	NONE		42°06'50"RT	3	3	1.5	0	0	0	0	0	440	440	51723	512.33	0.50	-39.43	765.00	-157.48	354.79	197.31	-293.24	411.97	118.74		DFR	VILL-Shena Old	94°23'35.47"	26°3'7.2"
172	177	177/0	DC	+0 m	Used DC tower instead of DB due to Singel. Span Limit Crossed (X-Arm Strengthening Suggested)	14°33'40"LT	3	3	3	6	0	0	0	0	449	449	52172	484.29	3.00	-27.54	889.00	65.21	316.76	401.97	28.03	355.90	383.97	Nala	DFR	VILL-Shena Old	94°23'39.40"	26°03'20.80"
173	178	178/0	DB	NONE	X-Arm Strengthening Suggested	02°49'26"RT	0	0	0	1.5	0	0	0	0	157	157	52329	540.99	1.00	55.70	606.00	132.24	-455.12	-322.87	93.10	-681.52	-588.41	Tuic River	DFR	VILL-Phillimi	94°23'52.86"	26°03'28.90"
174	179	179/0	DD	+0 m	X-Arm Strengthening Suggested	40°21'51"LT	6	6	6	7.5	0	0	0	0	488	488	52817	711.55	1.00	176.56	645.00	612.12	-300.18	311.93	838.52	-531.07	307.45	Vill Road	DFR	VILL-Phillimi	94°23'56.49"	26°03'32.89"
175	180	180/0	DB	NONE	X-Arm Strengthening Suggested	00°57'49"LT	1.5	0	0	1.5	0	0	0	0	252	252	53069	796.41	1.00	78.86	740.00	768.18	-344.68	443.50	1019.07	-544.38	474.68		DFR	VILL-Phillimi	94°24'08.87"	26°03'44.91"
																					252.00	596.68	-181.01	415.68	796.38	-290.69	505.70		DFR	VILL-Phillimi	94°24'09.35"	26°03'52.45"

SUBMITTED BY:
SHYAMA POWER(I) LTD.

19/01/19

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P.G.C.I.L

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CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
175	180	180/0	DB	NONE	X-Arm Strengthening Suggested	00°57'49"LT	1.5	0	0	1.5	0	0	0	0	—			796.41	1.00										DFR	VILL-Phillimi	94°24'09.35"	26°03'52.45"
176	181	181/0	DB	NONE		12°15'29"RT	0	0	0	0	0	0	0	0	155	155	53224	822.09	0.00	26.64	407.00	590.68	-181.01	415.68	796.38	-290.69	505.70		DFR	VILL-Phillimi	94°24'09.59"	26°03'57.45"
177	182	182/0	DC	+0 m		25°27'44"LT	6	6	7.5	9	0	0	0	0	293	293	53517	853.72	1.00	56.67	448.00	336.01	-41.74	294.27	445.69	-121.61	324.08		DFR	VILL-Phillimi	94°24'12.38"	26°04'06.68"
178	183	183/0	DB	NONE		09°05'13"RT	0	0	1.5	3	0	0	0	0	263	263	53780	860.78	1.50	0.56	556.00	334.74	-128.30	463.04	414.64	-126.94	541.55		DFR	VILL-Phillimi	94°24'10.63"	26°04'15.10"
179	184	184/0	DB	NONE		12°47'51"RT	0	0	3	1.5	0	0	0	0	154	154	53974	851.81	0.50	2.03	457.00	134.70	81.26	215.96	136.06	74.55	210.65		DFR	VILL-Phillimi	94°24'10.43"	26°04'21.26"
180	184A	184A/0	DB	NONE		05°36'54"RT	0	0	1.5	1.5	0	0	0	0	204	204	54178	822.89	0.50	-38.92	398.00	112.74	388.96	501.70	119.42	510.70	630.12		DFR	VILL-Phillimi	94°24'11.96"	26°04'27.81"
181	185	185/0	DB	+0 m		11°34'01"LT	6	6	6	9	0	0	0	0	289	289	54467	809.08	0.50	-7.81	483.00	-184.96	185.15	0.19	-306.70	202.39	-104.31		DFR	VILL-Phillimi	94°24'14.90"	26°04'36.91"
182	186	186/0	DD	+0 m		30°27'13"LT	3	3	3	3	0	0	0	0	196	196	54663	814.53	0.50	2.45	485.00	103.85	79.20	183.05	86.67	71.22	157.83	2 Times Vill Road	DFR	VILL-Phillimi	94°24'15.75"	26°04'43.15"
183	187	187/0	DD	NONE		43°56'54"LT	0	0	0	0	0	0	0	0	299	299	54962	808.14	1.50	-10.39	495.30	116.80	201.77	318.57	124.78	223.94	348.72	Metal Road	DFR	VILL-Phillimi	94°24'11.25"	26°04'52.17"
184	188	188/0	DC	NONE		25°49'45"RT	0	1.5	3	0	0	0	0	0	265	265	55227	778.95	0.00	-27.68	564.00	97.23	289.61	386.84	75.05	356.26	431.32	Metal Road	DFR	VILL-Phillimi	94°24'02.49"	26°04'55.44"
185	189	189/0	DB	NONE		12°37'08"RT	0	0	0	0	0	0	0	0	214	214	55441	780.21	1.00	19.76	479.00	-24.81	245.68	221.28	-91.26	304.81	213.54	3 Times Metal Road	DFR	VILL-Phillimi	94°23'57.43"	26°05'00.60"
186	189A	189A/0	DC	NONE		19°57'46"RT	0	0	0	0	0	0	0	0	257	257	55698	755.11	1.50	-5.59	471.00	-31.88	161.22	129.33	-90.81	175.10	84.29	2 Times Metal Road	DFR	VILL-Phillimi	94°23'52.81"	26°05'07.78"
187	190	190/0	DD	+0 m	Use DC tower instead of DC due to Proposed Power Line crossing	16°46'26"RT	7.5	9	7.5	6	0	0	0	0	265	265	55963	740.94	1.00	-7.67	522.00	95.78	176.03	271.82	81.90	194.50	276.41	2 Times Metal Road	DFR	VILL-Phillimi	94°23'52.47"	26°05'16.30"
188	191	191/0	DD	+0 m	Use DC tower instead of DC due to Proposed Power Line crossing	15°35'23"RT	18	18	18	18	0	0	0	0	116	116	56079	739.92	2.50	9.48	381.00	86.97	-64.92	24.05	70.50	-117.07	-46.58	Proposed 132KV D/C W-Z TL	DFR	VILL-Phillimi	94°23'51.97"	26°05'20.01"
189	192	192/0	DC	+0 m	X-Arm Strengthening Suggested	24°09'50"LT	6	9	6	6	0	0	0	0	214	214	56293	720.88	0.50	-79.04	330.00	180.92	311.11	492.03	233.07	397.70	630.78		DFR	VILL-Phillimi	94°23'55.36"	26°05'25.37"
190	194	194/0	DD	NONE		43°27'43"LT	0	1.5	0	0	0	0	0	0	301	301	56594	658.7	1.50	-69.18	515.00	-97.11	490.19	393.08	-183.70	642.86	459.15	Metal Road	DFR	VILL-Phillimi	94°23'55.53"	26°05'35.20"
191	195	195/0	DB	NONE		00°52'27"LT	1.5	0	0	0	0	0	0	0	516	516	57110	577.09	1.00	-61.11	617.00	-195.19	464.43	299.24	-341.86	594.74	252.88		DFR	VILL-Phillimi	94°23'42.66"	26°05'48.38"
192	196	196/0	DD	NONE		43°08'00"LT	1.5	0	0	0	0	0	0	0	414	414	57524	561.90	1.00	-15.13	930.00	21.57	261.97	283.54	-78.74	285.29	206.55	Metal Road	DFR	VILL-Phillimi	94°23'32.30"	26°05'57.89"
193	197	197/0	DD	NONE		42°34'16"RT	0	3	0	0	0	0	0	0	188	188	57712	551.38	1.50	-11.08	602.00	152.03	182.65	334.68	128.74	220.26	348.97		DFR	VILL-Phillimi	94°23'25.48"	26°05'58.19"
194	198	198/0	DB	+0 m		10°42'19"RT	3	3	6	6	0	0	0	0	273	273	57985	478.97	0.00	-67.91	461.00	5.35	510.65	516.00	-32.26	669.39	637.14	Vill Road	DFR	VILL-Phillimi	94°23'18.53"	26°06'04.45"
																					273.00	-237.65	204.00	33.65	-396.39	216.72	-179.67				

SUBMITTED BY:
SHYAMA POWER(I) LTD.

19/11/19

CHECKED BY:
P.G.C.I.L

APPROVED BY:
P.G.C.I.L

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
194	198	198/0	DB	+0 m		10°42'19"RT	3	3	6	6	0	0	0	0				478.97	0.00										DFR	VILL-Philimi	94°23'18.53"	25°06'04.45"
195	199	199/0	DC	NONE		25°24'54"RT	0	0	0	0	0	0	0	0	348	348	58333	476.53	1.50	-6.94	671.00	-237.65	204.00	-33.65	396.39	216.72	176.67					
196	200	200/0	DD	NONE		30°07'52"RT	1.5	3	1.5	0	0	0	0	0	193	193	58526	485.03	1.00	9.00	541.00	144.00	26.36	170.37	131.28	-3.40	127.88	Metal Road	DFR	VILL-Philimi	94°23'33.74"	25°05'53.95"
197	201	201/0	DB	NONE		13°04'15"RT	0	0	0	0	0	0	0	0	276	276	58802	482.24	1.00	-82.79	469.00	166.64	589.17	755.81	196.40	780.59	976.99		DFR	VILL Philimi	94°23'10.88"	25°05'20.18"
198	202	202/0	DC	NONE		24°54'00"LT	1.5	3	0	0	0	0	0	0	257	257	59059	392.91	1.00	-9.92	533.00	-313.17	183.10	-130.07	-504.59	206.27	-298.32	Rubber Garden	DFR	VILL-Philimi	94°23'14.20"	25°06'28.64"
199	203	203/0	DB	NONE		06°27'16"RT	0	0	0	0	0	0	0	0	307	307	59366	431.95	0.50	39.54	564.00	73.90	-40.22	33.68	50.73	-122.41	-71.68	Rubber Garden, FP, Doyang Exel, NH-2	DFR	VILL-Philimi	94°23'19.55"	25°06'35.54"
200	204	204/0	DC	NONE		21°52'58"RT	0	0	0	1.5	0	0	0	0	299	299	59665	473.73	1.00	41.26	606.00	347.22	-58.15	289.06	429.41	-146.26	283.15	Rubber Garden	DFR	VILL-Mukhami	94°23'21.25"	26°06'45.36"
201	205	205/0	DD	+0 m		45°16'26"RT	4.5	6	3	3	0	0	0	0	224	224	59889	480.73	0.00	11.00	523.00	357.15	38.14	395.29	445.26	6.80	452.06		DFR	VILL-Mukhami	94°23'24.22"	26°06'54.57"
202	206	206/0	DC	NONE	Used DC tower instead of DB due to Sum of Adj. Span Limit Crossed	13°55'11"RT	1.5	1.5	0	0	0	0	0	0	424	424	60313	483.51	0.00	-0.22	648.00	185.89	212.76	398.64	217.20	213.11	430.31		DFR	VILL-Mukhami	94°23'29.39"	26°07'09.33"
203	207	207/0	DD	+0 m	Used DD tower instead of DC due to Sum of Adj. Span Limit Crossed	21°21'21"RT	9	7.5	6	6	0	0	0	0	443	443	60756	564.62	3.00	84.31	867.00	211.22	-64.75	146.47	210.89	-186.20	24.69	2 Times NH-2	DFR	VILL-Mukhami	94°23'44.66"	26°07'01.28"
204	208	208/0	DD	+0 m		35°18'36"LT	9	7.5	6	6	0	0	0	0	600	600	61356	609.41	3.00	44.59	1043.00	507.75	188.22	695.97	629.20	140.80	770.00	2 Times NH-2	DFR	VILL-Mukhami	94°24'00.4"	26°06'58.9"
205	210	210/0	DC	+0 m		27°26'56"LT	9	7.5	6	6	0	0	0	0	392	392	61748	583.68	1.50	-24.23	992.00	411.78	288.97	700.75	459.20	328.41	787.62		DFR	VILL-Mukhami	94°24'18.81"	26°06'48.8"
206	211	211/0	DD	+0 m		45°12'5"LT	6	3	3	3	0	0	0	0	168	168	61916	581.13	2.50	-6.55	560.00	103.03	142.64	245.67	69.59	167.52	231.11		DFR	VILL-Mukhami	94°24'32.93"	26°06'49.87"
207	212	212/0	DD	+0 m		37°53'08"LT	7.5	7.5	6	6	0	0	0	0	243	243	62159	589.18	0.00	13.55	411.00	25.36	37.63	62.99	0.48	2.05	2.52		DFR	VILL-Mukhami	94°24'38.1"	26°06'52.78"
208	213	213/0	DB	NONE		01°58'01"RT	1.5	3	0	0	0	0	0	0	391	391	62553	558.96	1.00	-37.20	634.00	205.37	338.60	543.97	240.95	399.31	640.27		DFR	VILL-Mukhami	94°24'39.8"	26°07'00.54"
209	214	214/0	DB	NONE		08°28'24"LT	0	0	0	0	0	0	0	0	242	242	62792	576.68	1.00	11.10	633.00	52.40	52.01	104.41	-8.31	22.74	14.43	NH-2	DFR	VILL-Mukhami	94°24'33.77"	26°07'11.64"
210	216	216/0	DD	+0 m	Used DD tower instead of DC due to Sum of Adj. Span Limit Crossed	29°21'52"RT	9	7.5	6	6	0	0	0	0	470	470	63262	573.02	2.50	7.44	712.00	189.99	211.19	401.18	219.26	201.09	420.35		DFR	VILL-Mukhami	94°24'30.08"	26°07'19.12"
211	217	217/0	DC	NONE		27°22'21"RT	0	0	0	0	0	0	0	0	302	302	63564	564.63	1.00	-12.89	772.00	298.81	215.20	474.01	268.91	242.44	511.35	FP	DFR	VILL Mukhami	94°24'21.41"	26°07'32.22"
212	218	218/0	DC	+0 m	X-Arm Strengthening Suggested	15°30'57"LT	6	3	3	3	0	0	0	0	376	376	63940	588.42	0.00	27.79	678.00	86.80	76.83	163.64	59.56	29.67	89.23		DFR	VILL-Mukhami	94°24'21.5"	26°07'42.1"
213	219	219/0	DB	+0 m	X-Arm Strengthening Suggested	09°25'51"LT	3	3	3	3	0	0	0	0	134	134	64074	640.28	1.50	50.36	510.00	299.17	-498.27	-199.10	346.33	-738.10	-391.76		DFR	VILL-Mukhami	94°24'27.69"	26°07'52.91"
214	220	220/0	DB	NONE		03°16'46"RT	0	0	0	0	0	0	0	0	315	315	64389	643.66	1.50	0.38	449.00	632.27	155.69	787.95	872.10	154.92	1027.01	NH-2	DFR	VILL-Mukhami	94°24'28.4"	26°07'57.17"
																					315.00	159.31	40.65	199.97	160.08	-11.89	148.19		DFR	VILL-Mukhami	94°24'28.9"	26°08'07.41"

SHYAMA POWER INDIA LTD.

SUBMITTED BY:
SHYAMA POWER(I) LTD.

19/01/19

CHECKED BY:
P.G.C.I.L

POWERGRID NERPSIP KOHIMA

APPROVED BY:
P.G.C.I.L

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
214	220	220/0	DB	NONE		03°16'46"RT	0	0	0	0	0	0	0	0				643.55	1.50		644.00	155.31	40.65	195.97	160.08	-11.89	148.19		DFR	VILL- Mukham	94°24'28.9"	26°08'07.41"
215	221	221/0	DB	NONE		11°20'23"LT	0	0	0	0	0	0	0	0	329	329	64718	670.25	1.00	27.09	492.00	288.35	-16.68	271.67	340.89	-58.34	282.56	33KV	DFR	Vill- Phishumi	94°24'30.01"	26°08'18.1"
216	222	222/0	DC	NONE		15°36'58"RT	0	1.5	0	0	0	0	0	0	163	163	64881	680.39	0.50	10.64	845.00	179.68	341.32	521.00	221.34	341.25	562.59		DFR	Vill- Phishumi	94°24'29.53"	26°08'23.4"
217	223	223/0	DD	NONE	Used DD tower instead of DC due to Singel. Span Limit Crossed	27°06'02"RT	3	1.5	0	1.5	0	0	0	0	683	683	65564	680.47	0.50	0.08	608.00	341.68	-189.59	152.09	341.75	-296.54	45.21	NH-2, Nala	DFR	VILL- Phishum	94°24'34.11"	25°08'44.98"
218	224	224/0	DC	NONE		21°23'46"RT	3	6	0	0	0	0	0	0	125	125	65689	702.42	1.50	20.95	353.00	314.59	-29.28	285.30	421.54	-90.08	331.46	Nala	DFR	Vill- Phishumi	94°24'37.00"	26°08'48.2"
219	225	225/0	DC	+0 m		18°49'54"RT	6	6	3	3	0	0	0	0	228	228	65917	720.64	1.00	21.72	422.00	257.28	190.73	448.02	318.08	230.50	548.58	Nala	DFR	VILL- Phishum	94°24'43.9"	26°08'52.3"
220	226	226/0	DC	NONE	X-Arm Strengthening Suggested	26°37'53"LT	3	1.5	0	0	0	0	0	0	194	194	66111	712.55	2.00	-12.09	426.00	3.27	-414.78	-411.51	-36.50	-639.97	-676.47		DFR	VILL- Phishum	94°24'50.3"	26°08'53.71"
221	227	227/0	DD	NONE		57°44'27"LT	0	0	3	3	0	0	0	0	232	232	66343	792.42	0.00	81.87	530.00	646.78	333.02	979.80	871.97	411.10	1283.07	11KV	DFR	VILL- Phishum	94°24'57.25"	26°08'58.24"
222	228	228/0	DB	+0 m		07°32'27"RT	4.5	4.5	3	3	0	0	0	0	298	298	66641	753.96	1.00	-36.46	764.00	-35.02	183.39	148.37	-113.10	162.34	49.24	Vill Road	DFR	VILL- Phishum	94°24'55.9"	26°09'07.66"
223	229	229/0	DC	+0 m		15°57'13"LT	3	3	3	3	0	0	0	0	466	466	67107	768.83	0.50	15.37	643.00	282.61	-181.47	101.14	303.66	-296.0"	7.64	Nala, 2 Nos Vill Road, Coffee Garden	DFR	VILL- Phishum	94°24'55.85"	26°09'22.9"
224	230	230/0	DD	+0 m		44°53'42"RT	3	3	3	3	0	0	0	0	177	177	67284	801.6	1.50	31.77	569.00	358.47	129.35	487.82	473.01	101.08	574.09	NH-2	DFR	VILL- Phishum	94°24'53.31"	26°09'28.3"
225	232	232/0	DC	+0 m		22°16'49"LT	3	3	3	3	0	0	0	0	392	392	67676	818.97	1.50	17.37	612.00	262.65	156.08	418.73	290.92	175.63	466.56		DFR	VILL- Phishum	94°24'59.1"	26°09'39.8"
226	233	233/0	DC	NONE		17°00'58"RT	3	3	0	0	0	0	0	0	220	220	67896	814.73	1.00	-6.74	695.00	63.92	123.03	186.95	44.37	74.46	118.83	NH-2	DFR	VILL- VK Town	94°24'59.87"	26°09'47.25"
227	234	234/0	DD	NONE		37°31'15"LT	3	1.5	0	3	0	0	0	0	475	475	68371	850.88	1.00	36.15	783.00	351.97	36.31	388.28	400.54	-13.62	386.91		DFR	VILL- VK Town	94°25'05.79"	26°10'01.54"
228	235	235/0	DB	+0 m		01°43'38"RT	7.5	7.5	6	6	0	0	0	0	308	308	68679	867.98	0.00	24.10	595.00	271.69	178.67	450.36	321.62	193.58	515.21		DFR	VILL- VK Town	94°25'02.69"	26°10'11.14"
229	236	236/0	DB	+0 m		05°46'52"RT	3	3	3	3	0	0	0	0	287	287	68966	865.27	1.00	-6.71	635.00	138.33	273.32	381.65	93.42	321.82	415.24		DFR	VILL- VK Town	94°24'59.76"	26°10'20.01"
230	237	237/0	DD	NONE		30°37'42"RT	1.5	3	0	1.5	0	0	0	0	318	318	69284	844.6	1.50	-24.17	971.00	44.68	203.80	248.48	-3.82	151.74	147.92		DFR	VILL- VK Town	94°24'58.00"	26°10'30.26"
231	238	238/0	DC	+0 m	Used DC tower instead of DB due to Sum of Adj. Span Limit Crossed	05°49'36"LT	6	6	6	6	0	0	0	0	653	653	69937	890.67	0.50	53.27	978.00	449.20	249.92	699.12	501.26	287.01	788.27	FP	DFR	VILL- Ajigami	94°25'06.45"	26°10'50.01"
232	239	239/0	DB	+0 m		06°05'14"LT	7.5	6	6	6	0	0	0	0	325	325	70262	871.98	0.50	-18.89	812.00	75.06	-66.86	8.22	37.99	-198.54	-160.55	Vill Road	DFR	VILL- Ajigami	94°25'09.5"	25°11'00.17"
233	240	240/0	DC	NONE	Used DC tower instead of DB due to Singel. Span Limit Crossed(X-Arm Strengthening Suggested)	12°51'19"RT	1.5	3	0	1.5	0	0	0	0	487	487	70749	978.97	1.00	100.49	487.00	553.86	187.13	740.99	585.54	229.19	814.73	Vill Road	DFR	VILL- Sastami	94°25'12.37"	26°11'15.93"

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DETAILED SURVEY TOWER SCHEDULE

LINK:220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
233	240	240/0	DC	NONE	Used DC towel instead of DB due to Singel Span Limit Crossed(X-Arm Strengthening Suggested)	12°51'19"RT	1.5	3	0	1.5	0	0	0	0				978.97	1.00		663.00	553.86	187.13	740.99	685.54	229.19	914.73					
															176	176	70535			-11.60											
234	241	241/0	DB	+0 m		08°03'12"LT	7.5	9	6	6	0	0	0	0				960.87	0.50		608.00	-11.13	324.94	313.81	-53.19	371.16	317.97	2 Nos HP	DFR	VILL- Sastami	94°25'12.37"	26°11'15.93"
															432	432	71357			-31.29											
235	242	242/0	DC	+0 m		21°26'02"LT	6	6	6	6	0	0	0	0				930.58	1.50		615.00	107.06	229.66	336.72	60.84	288.28	349.12		DFR	VILL- Sastami	94°25'18.60"	26°11'34.64"
															183	183	71540			-16.81											
236	243	243/0	DB	NSNL		05°11'08"LT	0	0	0	0	0	0	0	0				919.27	1.00		428.00	-46.66	258.18	211.51	-105.28	315.74	210.46	Vil Road	DFR	VILL- Sastami	94°25'17.89"	26°11'40.66"
															245	245	71785			-22.10											
237	244	244/0	DB	NONE		07°50'05"RT	1.5	1.5	0	0	0	0	0	0				896.67	0.50		659.00	-13.18	272.98	259.80	-70.74	330.97	230.23	NH-2, FP, 11KV	DFR	VILL Sastami	94°25'16.15"	26°11'48.31"
															414	414	72195			-18.16											
238	245	245/0	DC	NONE		28°30'59"RT	0	1.5	0	1.5	0	0	0	0				878.51	0.50		772.00	141.02	40.56	181.58	-113.03	-16.17	94.86	NH-2	DFR	VILL- Izheto	94°25'14.9"	26°12'01.9"
															358	358	72557			32.85											
239	246	246/0	DC	NONE		18°54'24"LT	0	0	0	0	0	0	0	0				912.46	1.50		605.00	317.44	-93.04	224.39	376.17	-184.91	191.26	Vill Road, FP	DFR	VILL- Izheto	94°25'20.54"	26°12'12.37"
															247	247	72804			35.56											
240	247	247/0	DB	NONE		00°31'48"LT	0	0	0	1.5	0	0	0	0				947.52	1.00		551.00	340.04	267.82	607.87	431.91	316.97	748.88		DFR	VILL- Izheto	94°25'21.47"	26°12'20.22"
															304	304	73108			-23.41											
241	248	248/0	DB	+0 m		08°01'47"LT	9	9	6	6	0	0	0	0				918.11	1.00		797.00	36.18	2.61	38.79	-12.97	-100.86	-113.83	NH-2	DFR	VILL- Izheto	94°25'22.68"	26°12'30.12"
															493	493	73601			79.94											
242	249	249/0	DC	+0 m		22°13'33"LT	9	6	7.5	7.5	0	0	0	0				997.05	0.00		852.00	490.39	-69.24	421.15	593.86	-174.77	419.09	3 Nos Vill Road	DFR	VILL- Izheto	94°25'22.01"	26°12'46.06"
															359	359	73960			59.37											
243	250	250/0	DB	+0 m		13°15'42"RT	6	6	7.5	9	0	0	0	0				1057.42	1.00		658.00	428.24	46.88	475.12	533.77	3.34	537.11		DFR	VILL Izheto	94°25'16.50"	26°12'55.91"
															299	299	74259			20.40											
244	251	251/0	DC	+0 m		15°01'11"RT	3	3	4.5	6	0	0	0	0				1080.82	1.00		615.00	252.12	196.36	448.48	295.66	212.64	508.30		DFR	VILL - Longkhum	94°25'14.45"	26°13'06.62"
															316	316	74575			-8.06											
245	252	252/0	DB	NONE		03°16'01"LT	3	1.5	0	0	0	0	0	0				1076.26	1.50		684.00	119.64	99.44	219.07	103.36	63.56	166.92		DFR	VILL- Longkhum	94°25'15.09"	26°13'16.60"
															368	368	74943			20.69											
246	253	253/0	DB	NONE		03°18'20"RT	3	1.5	0	0	0	0	0	0				1095.95	0.50		607.00	268.56	68.97	337.53	304.44	47.52	351.97	11KV, Vill Road	DFR	VILL- Longkhum	94°25'14.84"	26°13'28.45"
															235	235	75182			8.03											
247	254	254/0	DC	NONE		15°53'30"LT	0	0	0	0	0	0	0	0				1104.48	1.00		453.00	170.03	63.99	234.02	191.48	45.74	237.21	Vill Road	DFR	VILL- Longkhum	94°25'15.21"	26°13'36.27"
															214	214	75396			6.12											
248	255	255/0	DB	+0 m		02°59'13"LT	3	3	4.5	3	0	0	0	0				1107.1	0.50		509.00	150.01	187.01	337.03	168.26	203.78	372.04		DFR	VILL- Longkhum	94°25'13.50"	26°13'43.00"
															295	295	75691			-7.75											
249	256	256/0	DC	NONE		19°33'05"LT	0	0	0	0	0	0	0	0				1103.35	1.50		545.00	107.99	-90.15	17.84	91.22	-181.43	-90.20	NH-2, Vill Road	DFR	VILL Longkhum	94°25'10.36"	26°13'52.22"
															250	250	75941			35.76											
250	257	257/0	DB	+0 m		02°41'20"RT	7.5	6	6	7.5	0	0	0	0				1131.61	0.00		580.00	340.15	80.54	420.69	431.43	44.71	476.14		DFR	VILL- Longkhum	94°25'05.06"	26°13'58.71"
															330	330	76271			18.53											
251	258	258/0	DB	+0 m		07°25'37"LT	7.5	6	6	6	0	0	0	0				1151.64	1.50		517.00	249.46	-30.69	218.77	285.29	63.38	201.91		DFR	VILL- Longkhum	94°24'58.68"	26°14'07.64"
															187	187	76458			15.44											
252	259	259/0	DB	NONE		04°19'5"RT	0	0	0	0	0	0	0	0				1173.08	1.50		187.00	217.69	53.87	271.56	270.38	18.39	288.77		DFR	VILL- Longkhum	94°24'54.24"	26°14'12.37"

SUBMITTED BY:
SHYAMA POWER(I) LTD.

19/01/19

CHECKED BY:
P.G.C.I.L

APPROVED BY:
P.G.C.I.L

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUML TV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
252	259	259/0	DB	NONE		04°19'05"RT	0	0	0	0	0	0	0	0				1173.08	1.50													
															275	275	76733			15.29	462.00	217.69	53.87	271.56	270.38	18.39	288.77		DFR	VILL- Longkhum	94°24'54.24"	26°14'12.37"
253	260	260/0	DB	NONE		08°45'14"RT	0	0	0	0	0	0	0	0				1166.37	1.50													
															172	172	76905			-2.25	447.00	271.13	105.68	376.80	256.61	114.02	370.63		DFR	VILL- Longkhum	94°24'48.29"	26°14'19.58"
254	261	261/0	DB	NONE		02°26'47"RT	1.5	0	0	3	0	0	0	0				1165.12	0.50													
															450	450	77355			40.80	622.00	66.32	88.63	154.95	57.98	30.77	88.75	3 Nos Vill Road, Tea Garden	DFR	VILL- Longkhum	94°24'45.57"	26°14'24.64"
255	262	262/0	DD	+0 m	Used DD tower instead of DC due to Sum of Adj. Span Limit Crossed	27°18'46"RT	3	3	3	3	0	0	0	0				1223.42	1.00													
															532	532	77887			29.98	982.00	361.37	181.24	542.61	419.23	145.28	564.51	3 Nos Vill Road	DFR	VILL- Longkhum	94°24'36.65"	26°14'37.74"
256	263	263/0	DB	NONE		09°00'23"RT	3	1.5	0	0	0	0	0	0				1255.9	0.50													
															207	207	78094			37.76	739.00	350.76	-170.87	179.89	386.72	-287.26	99.45		DFR	VILL- Longkhum	94°24'39.50"	26°14'55.09"
257	264	264/0	DB	NONE		02°20'53"RT	3	3	0	0	0	0	0	0				1293.16	0.00													
															308	308	78402			17.87	515.00	377.87	66.73	444.60	494.28	29.71	523.99		DFR	VILL- Longkhum	94°24'41.12"	26°15'01.72"
258	265	265/0	DC	NONE		22°24'51"RT	1.5	3	0	0	0	0	0	0				1312.03	1.00													
															320	320	78722			22.76	628.00	241.27	53.02	294.29	278.29	7.63	285.92		DFR	VILL- Longkhum	94°24'43.92"	26°15'11.29"
259	266	266/0	DB	+0 m		14°06'43"RT	9	7.5	6	6	0	0	0	0				1328.79	2.00													
															239	239	78961			38.39	559.00	266.98	-122.10	144.88	312.37	-224.60	87.76	2 Nos Nala	DFR	VILL- Longkhum	94°24'51.44"	26°15'19.45"
260	267	267/0	DC	+0 m		24°55'58"LT	9	7.5	6	6	0	0	0	0				1369.18	3.00													
															398	398	79359			37.92	637.00	361.10	55.70	416.79	483.60	-5.10	456.50	Vill Road	DFR	VILL- Longkhum	94°24'57.68"	26°15'24.53"
261	268	268/0	DB	+0 m		10°21'22"RT	9	6	6	6	0	0	0	0				1406.6	2.50													
															253	253	79612			61.33	651.00	342.30	-238.1*	104.20	433.10	-392.80	10.30	Nala, 2 Times Vill Road	DFR	VILL- Longkhum	94°25'03.89"	26°15'36.1"
262	269	269/0	DC	+0 m	X-Arm Strengthening Suggested	23°15'59"RT	9	9	6	6	0	0	0	0				1467.43	2.00													
															122	122	79734			-28.02	375.00	491.11	406.45	897.56	645.80	553.01	1198.81		DFR	VILL- Longkhum	94°25'09.11"	26°15'42.8"
263	270	270/0	DB	NONE	X-Arm Strengthening Suggested	02°53'36"RT	0	1.5	1.5	0	0	0	0	0				1443.41	0.00													
															216	216	79950			-53.07	338.00	-284.45	477.55	193.10	-431.01	634.33	203.32		DFR	VILL- Longkhum	94°25'13.01"	26°15'44.66"
264	271	271/0	DB	NONE		03°37'23"LT	1.5	3	0	0	0	0	0	0				1390.34	0.00													
															356	356	80306			-30.15	572.00	-261.55	305.38	43.84	-418.33	359.43	-58.9*	Vill Road	DFR	VILL- Longkhum	94°25'20.22"	26°15'47.94"
265	272	272/0	DC	NONE		15°07'56"LT	1.5	1.5	0	0	0	0	0	0				1360.18	0.00													
															246	246	80552			1.14	602.00	50.62	116.03	166.65	-3.43	113.07	109.64		DFR	VILL- Longkhum	94°25'31.22"	26°15'53.68"
266	273	273/0	DC	NONE		29°25'04"RT	0	0	0	0	0	0	0	0				1362.83	1.50													
															146	146	80698			-5.08	392.00	129.97	125.33	255.30	132.93	147.54	280.47	Metal Road, 11KV	DFR	VILL- Longkhum	94°25'37.42"	26°15'59.31"
267	274	274/0	DB	NONE		03°14'32"RT	0	0	0	0	0	0	0	0				1357.75	1.50													
															246	246	80944			-34.41	392.00	20.57	333.39	354.06	-1.54	422.65	421.11		DFR	VILL- Longkhum	94°25'42.56"	26°16'0.44"
268	275	275/0	DB	NONE		02°27'42"RT	1.5	0	0	1.5	0	0	0	0				1321.84	0.00													
															203	203	81147			-18.99	449.00	-87.39	242.20	154.81	-176.65	301.90	125.25	Metal Road	DFR	VILL- Longkhum	94°25'51.12"	26°16'02.11"
269	276	276/0	DC	+0 m		25°15'45"LT	9	6	7.5	6	0	0	0	0				1299.35	2.50													
															499	499	81646			-65.54	702.00	-39.20	447.05	407.85	-98.90	530.87	431.97		DFR	VILL- Longkhum	94°25'58.36"	26°16'03.27"
270	277	277/0	DB	NONE		01°28'44"RT	0	0	0	0	0	0	0	0				1239.31	2.00													
															274	274	81920			-90.71	773.00	51.95	305.58	357.53	-31.87	377.10	345.24	Metal Road	DFR	VILL- Alichen	94°26'13.26"	26°16'12.53"
271	278	278/0	DB	NONE		03°22'18"RT	0	0	1.5	0	0	0	0	0				1207.9	1.00													
																					274.00	-31.58	385.47	353.89	-103.10	491.11	388.00		DFR	VILL- Alichen	94°26'21.33"	26°16'17.44"

SHYAMA POWER INDIA LIMITED

SUBMITTED BY:
SHYAMA POWER(I) LTD.

CHECKED BY:
P.G.C.I.L

POWERGRID NERPSIP KOHIMA

APPROVED BY:
P.G.C.I.L

CLIENT P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:220 KV S/C ON D/C NEW KOHIMA TO MOKOKCHUNG TRANSMISSION LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER UPTO BASIC BODY	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC LENG.	CUM LTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			MAJOR CROSSING DETAIL	PROP. FOUNDATION TYPE	VILL NAME	GPS CO-ORDINATE WGS-84	
							A	B	C	D	A	B	C	D								LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				EASTING	NORTHING
271	278	278/0	DB	NONE		03°22'16"RT	0	0	1.5	0	0	0	0	0				1207.6	1.00													
272	279	279/0	DD	+0 m		15°58'36"LT	9	9	6	6	0	0	0	0	273	273	82193	1157.41	2.00	-45.18	547.00	-31.58	385.47	353.89	-103.10	491.11	388.00	33KV, LT Line, Un metal Road, Vill Road	DFR	VILL- Alichen	94°26'21.33"	26°16'17.44"
273	280	280/0	DD	+0 m	Used DD tower instead of DC due to Single Span Limit Crossed	28°46'29"RT	6	6	9	6	0	0	0	0	120	120	82413	1138.39	2.00	-19.05	393.00	-112.47	258.77	186.30	-218.11	400.08	181.97	132 KV S/C Doyang to Aoljen TL, 11KV	DFR	VILL- Alichen	94°26'30.03"	26°16'21.65"
274	281	281/0	DD	+0 m		31°09'27"LT	9	9	9	9	0	0	0	0	458	458	82771	1115.5	1.00	-18.86	578.00	-178.77	290.94	112.16	-280.08	317.22	37.14	2 Nos FP, Nala	DFR	VILL- Alichen	94°26'33.01"	26°16'24.42"
275	282	282/0	DC	+0 m		20°25'58"RT	6	7.5	7.5	6	0	0	0	0	412	412	83186	1077.88	1.00	-100.62	870.00	167.06	573.33	740.40	140.78	729.18	869.97		DFR	VILL- Alichen	94°25'51.16"	26°16'28.41"
276	284	284/0	DC	NONE	X-Arm Strengthening Suggested	21°12'20"RT	0	0	0	3	0	0	0	0	599	599	83785	1031.93	2.00	7.05	1011.00	-161.33	281.80	120.46	-317.18	274.29	-42.90	Nala	DFR	VILL- Alichen	94°25'55.51"	26°16'36.0"
277	285	285/0	DD	+0 m		54°07'54"RT	16	16	16	16	0	0	0	0	285	285	84067	1112.48	3.50	97.05	884.00	317.20	-369.68	-52.48	324.71	-595.99	-262.27		DFR	VILL- Alichen	94°27'19.0"	26°16'46.12"
278	286	286/0	DD	+0 m		33°08'26"LT	18	18	18	18	0	0	0	0	89	89	84156	1116.1	5.00	2.12	374.00	654.68	8.67	663.35	871.99	-8.53	863.46	132 KV S/C Doyang to Aoljen TL, Vill Road	DFR	VILL- Alichen	94°27'31.51"	26°16'44.36"
279	287	287/0	DC	NONE		22°48'21"LT	0	0	1.5	1.5	0	0	0	0	375	375	84531	1124.64	1.50	-5.96	464.00	80.33	211.41	291.73	95.53	221.55	317.08	Vill Road, Nala	DFR	VILL- Alichen	94°27'44.18"	26°16'40.88"
280	288	288/0	DC	NONE		16°02'38"LT	0	1.5	1.5	0	0	0	0	0	509	509	85040	1173.07	0.50	49.43	884.00	163.59	108.43	272.03	153.45	46.46	199.92	2 Nos Nala	DFR	VILL- Alichen	94°28'02.50"	26°16'42.59"
281	289	289/0	DB	+0 m		05°20'48"RT	3	3	4.5	6	0	0	0	0	119	119	85159	1187.57	1.00	17.00	628.00	400.57	-155.37	245.20	402.54	-246.53	216.00	Nala	DFR	VILL- Alichen	94°28'00.44"	26°16'44.05"
282	290	290/0	DB	+0 m	X-Arm Strengthening Suggested	08°02'49"RT	3	3	3	4.5	0	0	0	0	428	428	85587	1266.72	2.00	78.15	547.00	274.37	-50.64	213.73	365.53	-177.16	188.38	NH-2, 11KV	DFR	VILL- Settsu	94°28'21.57"	26°16'47.83"
283	291	291/0	DD	NONE	X-Arm Strengthening Suggested	51°42'15"RT	0	0	0	1.5	0	0	0	0	147	147	85734	1250.17	1.00	-18.55	575.00	488.64	263.30	751.94	605.16	343.83	948.99		DFR	VILL- Settsu	94°28'26.49"	26°16'46.64"
284	292	292/0	DD	NONE		43°49'11"RT	0	0	3	0	0	0	0	0	64	64	85798	1274.45	1.50	23.79	211.00	-116.30	-527.10	-643.40	-196.83	-764.31	-961.14	Metal Road	DFR	VILL- Settsu	94°28'26.22"	26°16'46.98"
285	Ext T-160	T-160	DD			33°43'58"LT	0	0	0	0	0	0	0	0	57	57	85855	1268.30		-4.64	121.00	591.10	150.94	742.04	828.31	202.85	1031.19			VILL- Settsu	94°28'28.17"	26°16'45.19"
286	Ext T-161	T-161	DD			11°06'58"LT	0	0	0	0	0	0	0	0	103	103	85958	1249.87		-18.45	160.00	-93.94	320.92	226.98	-145.89	435.23	289.34			VILL- Settsu	94°28'30.39"	26°16'42.52"
287	Ext BAY	BAY	GANTRY				0	0	0	0	0	0	0	0	157	157	86115	1217.17		-32.70	260.00	-217.92	391.77	173.85	-332.23	524.68	192.45	Sub Station Boundary		VILL- Settsu	94°28'34.45"	26°16'39.09"
																					157.00	-234.77		-234.77	-367.68		-367.68					
288	Ext T-158	T-158	DB				18	18	18	18	0	0	0	0				1246.69	0.00													
289	Ext T-159	T-159	DB			6°09'30"LT	3	3	3	3	0	0	0	0	181	181	86296	1277.39	0.00	15.50	181.00		-38.30	38.30		-92.95	-92.95			VILL- Settsu	94°28'31.89"	26°16'58.46"
290	293	293/0	DD	+0 m		46°23'11"LT	9	9	9	9	0	0	0	0	49	49	86345	1261.68	1.50	-11.21	230.00	219.30	368.60	587.90	273.95	514.59	788.54			VILL- Settsu	94°28'29.91"	26°16'48.85"
291	294	294/0	DD	+0 m		01°55'37"LT	9	7.5	6	6	0	0	0	0	220	220	86565	1213.48	1.00	-50.70	269.00	-319.60	456.62	137.03	-465.59	603.69	138.10		DFR	VILL- Settsu	94°28'29.76"	26°16'47.49"
292		BAY	GA				0	0	0	0	0	0	0	0	72	72	86637	1217.2	0.00	-1.28	292.00	-236.62	62.74	-173.88	-383.59	74.08	-309.60	S/S Boundary	DFR	VILL- Settsu	94°28'34.28"	26°16'41.54"
																					72.00	9.26		9.26	-2.08		-2.08				94°28'35.79"	26°16'39.63"

SUBMITTED BY:
SHYAMA POWER(I) LTD.

CHECKED BY:
P.G.C.I.L

APPROVED BY:
P.G.C.I.L

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:LILO OF 132 KV SC KOHIMA TO WOKHA AT NEW KOHIMA TR.LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER	CONNECT WITH BB	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WIND SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			FOUNDATION TYPE	MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE	
								A	B	C	D	A	B	C	D									LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				WGS-84	
																																EASTING	NORTHING
1		EXT-Tower	C				20°53'19"RT	0	0	0	0	0	0	0	0				1270.84			100.00	50.00		-295.83	-295.83		-514.74	-514.74			TSIESEMA	94°04'54.54"	25°45'51.07"
2	1	1/0 (ON LINE)	DD	BB	0		92°49'54"LT	6	3	3	6	0	0	0	0	100	100	100	1287.41	0.5	19.07	126.00	63.00	395.83	-485.01	-89.18	614.74	-800.25	-185.51		FP	TSIESEMA	94°04'55.06"	25°45'54.20"
3	2	2/0	DD	BB	0		56°45'27"RT	4.5	3	3	6	0	0	0	0	26	26	126	1294.55	0.5	7.14	139.00	69.50	511.01	-280.20	230.81	826.25	-493.33	332.92		Boundary	TSIESEMA	94°04'53.89"	25°45'54.32"
4	3	3/0	DB	BB		X-Arm Strengthening Suggested	4°39'9"RT	0	0	0	0	0	0	0	0	113	113	239	1319.03	1	20.98	507.00	253.50	393.20	-143.32	249.87	606.33	-358.76	247.57		2 Nos 11KV, Boundary, NH-2	TSIESEMA	94°04'51.92"	25°45'57.50"
5	5	5/0	DD	BB	0		35°8'41"RT	3	3	3	3	0	0	0	0	394	394	633	1390.47	1.5	73.94	675.00	337.50	537.32	-218.84	318.49	752.76	-446.31	306.45			TSIESEMA	94°04'45.91"	25°46'09.13"
6	6	6/0	DB	BB	0	X-Arm Strengthening Suggested	3°47'23"LT	6	6	6	6	0	0	0	0	281	281	914	1443.65	2	55.68	478.00	239.00	499.84	15.47	515.31	727.31	-37.09	690.21			TSIESEMA	94°04'47.56"	25°46'18.13"
7	8	8/0	DD	BB	0		36°15'0"LT	4.5	3	4.5	4.5	0	0	0	0	197	197	1111	1454.17	0.5	9.02	589.00	294.50	181.53	61.05	242.59	234.09	-24.37	209.72			NERHEMA	94°04'48.28"	25°46'24.43"
8	9	9/0	DB	BB	0	X-Arm Strengthening Suggested	9°12'40"LT	9	9	9	9	0	0	0	0	392	392	1503	1477.84	1	29.17	836.00	418.00	330.95	789.73	1120.68	416.37	1149.11	1565.48		2 Nos FP, Pond	NERHEMA	94°04'41.04"	25°46'35.4"
9	10	10/0	DC	BB		X-Arm Strengthening Suggested	21°36'42"RT	0	0	0	0	0	0	0	0	444	444	1947	1347.84	1	-139.00	832.00	416.00	-345.73	174.70	-171.03	-705.11	162.48	-542.64		2 Nos FP	NERHEMA	94°04'30.55"	25°46'46.30"
10	11	11/0	DC	BB	0	Used DC type instead of DB type due to Sum of adj. span limit crossed.	13°47'01"LT	4.5	3	3	3	0	0	0	0	388	388	2335	1348.97	1	4.13	720.00	360.00	213.30	423.71	637.01	225.52	586.84	812.37		2 Nos Foot Track, Nala	ZHADIMA	94°04'25.90"	25°46'58.17"
11	12	12/0	DB	BB	0		05°28'47"RT	6	6	3	3	0	0	0	0	332	332	2667	1300.79	0	-47.18	423.00	211.50	-91.71	234.42	142.71	-254.84	354.01	99.17		Nala, 11KV, Fencing, Foot Track	ZHADIMA	94°04'19.25"	25°47'07.16"
12	13	13/0	DC	BB			23°04'44"RT	0	0	0	0	0	0	0	0	91	91	2758	1295.81	1.5	-9.48	364.00	182.00	-143.42	98.57	-44.85	-263.01	74.56	-188.45		Nala	ZHADIMA	94°04'17.72"	25°47'09.65"
13	14	14/0	DB	BB	0		02°20'12"LT	4.5	4.5	3	3	0	0	0	0	273	273	3031	1298.02	1	5.71	515.00	257.50	174.43	288.56	462.99	198.44	394.63	593.07		Nala	ZHADIMA	94°04'16.78"	25°47'18.47"
14	15	15/0	DB	BB			09°03'09"LT	0	0	0	0	0	0	0	0	242	242	3273	1278.66	1	-22.36	541.00	270.50	-46.56	-122.64	-169.20	-152.63	-294.91	-447.54		FP	ZHADIMA	94°04'15.68"	25°47'26.34"
15	16	16/0	DC	BB	0	X-Arm Strengthening Suggested	17°17'48"LT	3	3	3	3	0	0	0	0	299	299	3572	1321.03	1.5	44.87	407.00	203.50	421.64	-369.65	52.00	593.91	-637.82	-43.91		Nala	ZHADIMA	94°04'12.57"	25°47'35.62"
16	17	17/0	DC	BB	0	Used DC type instead of DB type due to single span limit crossed (X-Arm Strengthening Suggested)	10°25'24"RT	4.5	3	3	4.5	0	0	0	0	108	108	3680	1345.76	1	25.23	585.00	292.50	477.65	487.82	965.47	745.82	645.65	1391.47			ZHADIMA	94°04'10.29"	25°47'38.61"
17	19	19/0	DD	BB		Single span limit crossed refer to engineer	56°27'48"RT	1.5	1.5	0	0	0	0	0	0	477	477	4157	1282.68	0.5	-65.58	711.00	355.50	-10.82	147.15	136.32	-168.65	166.23	-2.42		Nala	ZHADIMA	94°04'03.13"	25°47'52.57"
18	20	20/0	DC	BB	0		21°41'36"LT	4.5	3	3	3	0	0	0	0	234	234	4391	1276.79	1.5	-3.89	481.00	240.50	86.85	193.40	280.25	67.77	237.64	305.41		Nala	ZHADIMA	94°04'07.62"	25°47'59.23"
19	21	21/0	DC	BB	0		18°38'32"LT	3	3	3	3	0	0	0	0	247	247	4638	1266.77	1	-9.52	654.00	327.00	53.60	305.80	359.41	9.36	370.56	379.92		2 Nos Foot Track, Nala	ZHADIMA	94°04'09.46"	25°48'06.82"
20	23	23/0	DC	BB	0	X-Arm Strengthening Suggested	17°31'55"LT	3	3	3	3	0	0	0	0	407	407	5045	1244.31	1.5	-22.96	613.00	306.50	101.20	795.90	897.10	36.44	1234.52	1270.96		2 Nos Foot Track, FP	ZHADIMA	94°04'08.21"	25°48'20.10"
21	24	24/0	DB	BB	0	X-Arm Strengthening Suggested	07°56'06"LT	3	3	3	3	0	0	0	0	206	206	5251	1165.10	1	-78.71	694.00	347.00	-589.90	625.01	35.11	-1028.52	866.20	-162.32		Foot Track	ZHADIMA	94°04'05.33"	25°48'26.21"
22	24A	24A/0	DB	BB			12°53'5"RT	1.5	0	0	0	0	0	0	0	488	488	5739	1065.57	1	-102.53	647.00	323.50	-137.01	187.40	50.38	-378.20	255.70	-122.51		2 Nos Nala	ZHADIMA	94°03'56.30"	25°48'39.79"
23	25	25/0	DB	BB			09°27'35"LT	1.5	1.5	0	0	0	0	0	0	159	159	5898	1055.11	0	-9.46	508.00	254.00	-28.40	7.91	-20.49	-96.70	-97.54	-194.24			ZHADIMA	94°03'54.40"	25°48'44.61"
24	26	26/0	DC	BB	0	Used DC type instead of DB type due to single span limit crossed	14°10'09"LT	9	9	9	9	0	0	0	0	349	349	6247	1080.17	2	32.06	474.00	237.00	341.09	-80.69	260.40	446.54	-171.33	275.21		Nala	ZHADIMA	94°03'48.52"	25°48'54.61"
25	27	27/0	DB	BB	0		01°43'56"RT	3	4.5	3	3	0	0	0	0	125	125	6372	1095.04	1	9.87	344.00	172.00	205.69	141.22	346.91	296.33	161.29	457.63		Foot Track	ZHADIMA	94°03'45.50"	25°48'57.50"

SUBMITTED BY:
SHYAMA POWER(I) LTD.

CHECKED BY:
P.G.C.I.L

Dy. Mgr. Powergrid

POWERGRID NERPSIP KOHIMA

APPROVED BY:
P.G.C.I.L

CLIENT:P.G.C.I.L

DETAILED SURVEY TOWER SCHEDULE

LINK:LILO OF 132 KV SC KOHIMA TO WOKHA AT NEW KOHIMA TR.LINE

SL NO	AP NO	TOWER NO	TYPE OF TOWER	CONNECT WITH BB	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WIND SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			FOUNDATION TYPE	MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE	
								A	B	C	D	A	B	C	D									LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				WGS-84	
																															EASTING	NORTHING
25	27	27/0	DB	BB	0		01°43'56"RT	3	4.5	3	3	0	0	0	0				1095.04	1		344.00	172.00	205.69	141.22	346.91	296.33	161.29	457.63			ZHADIMA	94°03'45.50"	25°48'57.50"
																219	219	6591			-3.83									FP			
26	28	28/0	DB	BB	0	X-Arm Strengthening Suggested	12°54'35"LT	9	9	9	9	0	0	0	0				1084.71	0.5		398.00	199.00	77.78	407.41	485.20	57.71	608.66	666.37			ZHADIMA	94°03'40.27"	25°49'02.99"
																179	179	6770			-31.38												
27	29	29/0	DD	BB	0		29°30'25"RT	3	6	3	3	0	0	0	0				1060.83	2		590.00	295.00	-228.41	579.71	351.30	-429.66	816.59	386.93			ZHADIMA	94°03'35.17"	25°49'06.47"
																411	411	7181			-84.81									2 Nos Nala			
28	30	30/0	DC	BB	0	X-Arm Strengthening Suggested	19°18'27"RT	6	4.5	3	4.5	0	0	0	0				974.02	0		731.00	365.50	-168.71	726.77	558.06	-405.59	1085.54	679.95			ZHADIMA	94°03'29.18"	25°49'18.64"
																320	320	7501			-100.01									Foot Track			
29	31	31/0	DB	BB		X-Arm Strengthening Suggested	05°08'36"RT	0	0	0	0	0	0	0	0				878.01	1		586.00	293.00	-406.77	166.68	-240.09	-765.54	188.00	-577.54			ZHADIMA	94°03'28.21"	25°49'29.06"
																266	266	7767			-4.94									Nala			
30	32	32/0	DB	BB	0	X-Arm Strengthening Suggested	04°48'54"RT	3	3	3	3	0	0	0	0				870.07	1		638.00	319.00	99.32	551.81	651.14	78.00	783.38	861.38			ZHADIMA	94°03'28.44"	25°49'37.59"
																372	372	8139			-75.04												
31	33	33/0	DD	BB		X-Arm Strengthening Suggested	37°19'12"LT	0	1.5	1.5	0	0	0	0	0				797.53	0.5		673.00	336.50	-179.81	618.03	438.21	-411.38	913.98	502.60			ZHADIMA	94°03'29.63"	25°49'49.65"
																301	301	8440			-77.60									Umetal Road			
32	34	34/0	DD	BB	0	Used DD type both side due to long span	11°50'57"LT	6	7.5	6	6	0	0	0	0				714.43	1		909.00	454.50	-317.03	-148.50	-465.53	-612.98	-434.94	-1047.92			ZHADIMA	94°03'23.88"	25°49'57.55"
																608	608	9048			151.71									Nala			
33	35	35/0	DD	BB	0	Used DD type both side due to long span (X-Arm Strengthening Suggested)	16°42'15"LT	3	3	3	3	0	0	0	0				870.64	2.5		687.00	343.50	756.50	-466.89	289.61	1042.94	-787.45	255.49			ZHADIMA	94°03'08.66"	25°50'12.26"
																79	79	9127			22.06									Umetal Road, Fancing			
34	36	36/0	DD	BB			13°19'03"LT	0	0	0	0	0	0	0	0				893.20	0		170.00	85.00	545.89	-69.88	476.01	866.45	-142.92	723.53			ZHADIMA	94°03'06.14"	25°50'13.44"
																91	91	9218			5.79												
35		Bay	Gantry																898.99	0		91.00	45.50	160.88		160.88	233.92		233.92			ZHADIMA	94°03'03.03"	25°50'14.17"

SL NO	AP NO	TOWER NO	TYPE OF TOWER	CONNECT WITH BB	CONNECT WITH NT	REMARKS	ANGLE OF DEVIATION	LEG EXTENSION				CHIMNEY EXTENSION				SPAN IN (M)	SEC. LENG.	CUMLTV. LENGTH	R.L	C.P.D.	LEVEL DIFF.	SUM OF ADJ. SPAN	WIND SPAN	WEIGHT SPAN IN (HOT)			WEIGHT SPAN IN (COLD)			FOUNDATION TYPE	MAJOR CROSSING DETAIL	VILL NAME	GPS CO-ORDINATE	
								A	B	C	D	A	B	C	D									LEFT	RIGHT	TOTAL	LEFT	RIGHT	TOTAL				WGS-84	
																															EASTING	NORTHING
1	1	1/0 (ON LINE)	DD	BB	0		83°32'25"LT	3	3	3	3	0	0	0	0				1287.41	0.5		133.00	66.50		-86.08	-86.08		-153.87	-153.87			TSIESEMA	94°04'55.06"	25°45'54.20"
																42	42	42			2.48												
2		EXT-Tower	C				24°44'56"RT	0	0	0	0	0	0	0	0				1292.39	0		42.00	21.00	128.08		128.08	195.87		195.87			TSIESEMA	94°04'55.07"	25°45'55.65"

6 3 3 6

SUBMITTED BY:
SHYAMA POWER(I) LTD.

Surveyor
S.P.I.L

CHECKED BY:
P.G.C.I.L

AET.

Dy. Mgr.
Powergrid.

APPROVED BY:
P.G.C.I.L

ANNEXURE III

NoC from Concerned Land owner/ Headman/ Village Council

OFFICE OF THE
TSEMINYU VILLAGE VILLAGE COUNCIL
P.O TSEMINYU – 797109 KOHIMA: NAGALAND

Ref. No. TS 30719 *Date* 30.07.2019

NO OBJECTION CERTIFICATE

This is to certify that construction of upcoming 220 KV line from AP-73/0 to AP-89/0 under the jurisdiction of Tseminyu (ur) is well known from every location as proposed by your company for the purpose, using my authority I have no objection towards the execution of work any time at your own convenience.

Wishing the Project grand success.

Chairman
Tseminyu Village Council

(NRILO KHING)
Chairman

OFFICE OF THE VICE-CHAIRMAN
ALICHEN COMPOUND COMMITTEE
SPO Alichen-798607 Mokokchung Dist. Nagaland

Email: alncmpd@rediffmail.com
Office : +91-9436647087

NO.AC-01/Misc-NOC/2019/57 /Dated the Alichen 2 th Feb' 19

NO OBJECTION CERTIFICATE

This is to certify that construction of upcoming 220 KV line from AP-277/0 to AP-288/0 under the jurisdiction of Alichen (ur) is well known from every location as proposed by your company. For the purpose, using my authority I have no objection towards the execution of work any time at your own convenience.

Wishing the project a grand success.

Office of the Alichen Compound
Vice Chairman
Date 2/2/19
Mokokchung Nagaland

Vice Chairman
(KIKAMERI LONGKUMER)
Vice- Chairman
(Name & Designation of the issuing authority)

OFFICE OF THE
VILLAGE COUNCIL UNGMA
MOKOKCHUNG : NAGALAND P.O. MOKOKCHUNG
P.S. II MOKOKCHUNG
PIN – 798601

REF.NO/UVC/..... Date: 8.2.2019

No objection certificate

This is to certify that construction of upcoming 220 KV line @ AP-289 and AP-291 under the village UNGMA jurisdiction is well known every location as proposed by your company. Hence the village authority has duly issue no objection certificate for execution of work any time as your own convenience.

Wishing the Project a grand success.

Thanking You.

08/02/19.
(ALEMTOSHI JAMIR)
Chairman
Village Council Ungma
Mokokchung - 798601
Nagaland

OFFICE OF THE

NSUNYU VILLAGE COUNCIL

P.O/P.S. Tseminyu, Kohima - Nagaland - 797109

Ref. No.....

Date. 25/07/2018

NO OBJECTION CERTIFICATE (NOC)

This is to certify that the Nsunyu village council have no objection to the power Department to carry out the survey for construction of 220kV S/C (on D/C towers) (PGCIL) transmission lines under North eastern Region system improvement project within its jurisdiction.

The village council will extent its full cooperation for implementation of the said project.

(JESSE SEB)
Chairman
Nsunyu Village Council

OFFICE OF THE NSUNYU VILLAGE COUNCIL
Date.....

Chairman
Nsunyu Village Council

OFFICE OF THE

TEROGVUNYU VILLAGE COUNCIL

P.O. TSEMINYU - 797109

Dist. Kohima : Nagaland

Ref. No.....

Date. 14th July 2018

NO OBJECTION CERTIFICATE

The Terogvunyu Village council has no objection in regard to Survey (erection of power Tower) by the power grid co-operation of India within its village jurisdiction.

The village council is also acknowledge the department for extending any possible land/ property damage compensation to the effected owner.

The village council wish all the success.

(DANIEL TEP)

Chairman

Chairman
Terogvunyu Village Council

ANNEXURE IV

Sample Case of Compensation Payment

DEPARTMENT OF POWER, GOVT. OF NAGALAND
Executing Agency : Power Grid Corporation of India Ltd.,
(A Govt of India Enterprise)

पावरग्रिड

NOTICE CUM COMPENSATION CERTIFICATE FOR CROP AND TREE

Sl. No.: .....

Sl. No. 097

Date 28/08/2019

To,

Shri/Ms. Thenlo Jasu S/W/o Khonkhü Jasü Village Tesoguvugu

Tahsil ..... District Kohima State Nagaland

Subject : Construction of 220 kV Power Transmission System from New Kohima (Chatima) To mokokchung Under NERPSIP.

Sir/Madam,

Under the power vested in The Electricity Act 2003,Section 68 and 164 read with part III of Indian Telegraph Act 1885 and The Central Electricity Authority(measures relating to Safety and Electric Supply) Regulation 2010, A Notice is hereby given that 220 kV New Kohima (Chatima) to mokokchung Transmission Line will go through your property.

Certain minimum unavoidable damage of Crop / Tree is likely to take place during the Foundation / Erection / Stringing works of the aforesaid transmission line. The tree(s) or crop(s) so fell/Cut or dealt with will be handed over to you. You are therefore requested to remain present to receive the same personally. The compensation for yield component of the tree(s) so fall and the crop(s) actually/ damaged will be paid to you as assessed by the Executive Magistrate/ Revenue Department or any other Competent Authority specified by the appropriate Government in this behalf.

S.NO	LOCATION/ SPAN	DETAIL OF DAMAGES DURING CONSTRUCTION				
		LAND KHASARA/DAG/ PATTA NO	NAME OF THE CROP OR TREES	AREA OR NOS	*Size/Girth	REMARKS
	AP-69					Paddy field

* GIRTH OF THE TREE MEANS CIRCUMFERENCE AT CHEST LEVEL

Received Notice with consent for work.

For and On behalf of Department of Power Govt. of Nagaland

Owner's Signature

Signature of POWERGRID

Sign of Witness I .....

Sign of Witness II.....

Chairman
Village Council Henkiri

VERIFICATION BY REVENUE AUTHORITY

Certified that Land under Khasra / Dag / Patta no.....of Village.....Tahsil.....
District..... State.....belongs to Sri / Smt .....Son / Wife of .....
He / She is sole / shared owner of the above mentioned Land / property.

Seal & Signature of
Circle Officer / District Administration

POWERGRID CORPORATION OF INDIA LTD
LAND COMPENSATION ASSESSMENT SHEET

Name of the Transmission Line: 132kV D/C New Kohima-New Secretariat Complex Transmission Line

Sl No	Tax No/Span	Notice No./Date	Name of Cultivators with Father's name	Village,Tehsil, District	Khasar/dag/ Patta No	Affected Land Size(in sq.m)	Area(in Sq.ft)	Rate in Rs. Per Unit	Compensation Payable in Rs.	Bank Details	Remarks
1	AP5	Notice No-NL/132kV NK-NS/LAND/19 Dated:24.01.2019	Landowner's name -Zaniwo Father's Name- Lt.Yanolie	Zhadima		51.9841	559.504868	95	53152.96249		Land has been classified as Commercial Plantation
2	AP6	Notice No-NL/132kV NK-NS/LAND/20 Dated:15.02.2019	Landowner's Name-Duotsolie Angami Father's Name-Rheitsil	Zhadima		67.0924	722.115501	95	68600.97261		Land has been classified as Commercial Plantation
3	AP7	Notice No-NL/132kV NK-NS/LAND/31 Dated:15.02.2019	Landowner's Name-Seyie Kuotsu Father's Name-Razouvolie	Zhadima		134.8153	1451.01707	95	137846.622		Land has been classified as Commercial Plantation
6	AP10	Notice No-NL/132kV NK-NS/LAND/30 Dated:04.07.2019	Landowner's Name- Zevolhoulie Father's Name-Lhoulie	Zhadima		57.9577	623.798725	95	59260.87888		Land has been classified as Commercial Plantation
7	AP11	Notice No-NL/132kV NK-NS/LAND/18 Dated:13.02.2019	Landowner's Name-Niezeke Father's Name-Kibvelhou	Zhadima		74.8052	805.128368	95	76487.19492		Land has been classified as Commercial Plantation
9	AP16	Notice No-NL/132kV NK-NS/LAND/010 Dated:24.01.2019	Landowner's Name-Rokososie Khoubve Father's Name-Shouchiilhou	Zhadima		79.754	858.392302	95	81547.26869		Land has been classified as Commercial Plantation
10	AP18	Notice No-NL/132kV NK-NS/LAND/010 Dated:24.01.2019	Landowner's Name-Thepfurie-o Father's Name-Lt.Kieo	Zhadima		192.938	2076.59169	150	311488.7541		Land has been classified as Residential

Seal and Signature of POWERGRID
एच. के. चूतिया / H.K. Chutia
उप. प्रबंधक / Dy. Manager
एन. इ. आर. पी. एस. आई. पी. / (NERPSIP)
पावरग्रिड / POWERGRID
कोहिमा : नागालैण्ड / Kohima : Nagaland

Khrieze Rhacho
1/11/19

Seal and Signature of the Department of Power

Sub-Divisional Office
Transmission Sub-Division
Kohima : Nagaland

Seal and Signature of Circle Officer/District Administration

Revenue Officer
Kohima, Nagaland

POWERGRID CORPORATION OF INDIA LTD

Crop and Tree COMPENSATION ASSESSMENT SHEET

Name of the Transmission Line: 132kV D/C New Kohima-New Secretariat Complex Transmission Line

Sl No.	Loc No/Span	Notice No./Date	Name of Cultivators with Father's name	Village,Tahsil, District	Khasar/dag/ Patta No.	Detail of Damage Crop/tree	Girth(in feet)	Qty/Area	Rate in Rs. Per Unit	Compensation Payable in Rs.	Bank Details	Remarks
1	AP5	Notice No-NL/132kV NK-NS/LAND/15 Dated:24.01.2019	Landowner's name- Zanivi-o Father's Name- Lt.Yaneilie	Zhadima		Tik	2.09	1	200	200		
						Jagia	1.312	1	150	150		
						Jagia	1.312	1	150	150		
						Jagia	1.312	1	150	150		
						Tik	3.6	2	400	800		
						Tik	3.6	2	400	800		
						Tik	1.64	4	200	800		
						Tik	1.96	1	200	200		
						Sochil	2.624	1	150	150		
						Ze	2.624	1	200	200		
						Tik	4.92	1	400	400		
						Chi	3.28	1	400	400		
						Jagia	2.46	1	150	150		
						Jagia	2.46	1	150	150		
						Tik	1.312	1	200	200		
						Tik	2.12	1	200	200		
						Ze	1.31	4	200	800		
						Gamari	3.6	2	400	800		
						Ze	3.11	4	400	1600		
						Tik	4.26	2	400	800		
Total										9100		

Seal and Signature of POWERGRID

एच. के. चुतिया / H.K. Chutia
उप. प्रबंधक / Dy. Manager
एन. ई. आर. पी. एस. आई. पी. / (NERPSIP)
पावरग्रिड / POWERGRID
कोहिमा : नागालैण्ड / Kohima : Nagaland

Khrugo Shaeho
29/8/19

Seal and Signature of the Department of Power

Sub-Divisional Officer
Transmission Sub-Divisio...
Kohima : Nagaland

Seal and Signature of Circle Officer/District Administration

Revenue Officer
Kohima, Nagaland

POWERGRID CORPORATION OF INDIA LTD

Crop and Tree COMPENSATION ASSESSMENT SHEET

Name of the Transmission Line: 132kV D/C New Kohima-New Secretariat Complex Tranmission Line

Sl No.	Loc No/Span	Notice No./Date	Name of Cultivators with Father's name	Village,Tahsil, District	Khasar/dag/ Patta No.	Detail of Damage Crop/tree	Girth(in feet)	Qty/Area(i	Rate in Rs. Per Unit	Compensation Payable in Rs.	Bank Details	Remarks
1	AP6	Notice No-NL/132kV NK-NS/LAND/20 Dated:15.02.2019	Landowner's Name-Duotsolie Angami Father's Name-Rheitsi	Zhadima		Mhicho	4.5	1	400	400		
						Ze	4.2	2	400	800		
						Theputsizio	3.4	3	150	450		
						Prizo	4..3	1	150	150		
						Peng0-Tsido	2.82	4	200	800		
						Pegia	2.1	3	150	450		
						Tegun	3.6	5	150	750		
						Keriinzii	2.8	3	150	450		
						Huto	4.2	1	160	160		
						Sotsii	3.11	1	150	150		
						Ze	3.1	3	400	1200		
Total										5760		

Seal and Signature of POWERGRID

एच. के. चुतिया / H.K. Chutia
उप. प्रबंधक / Dy. Manager
एन. इ. आर. पी. एस. आई. पी. / (NERPSIP)
पावरग्रिड / POWERGRID
कोहिमा : नागालैन्ड / Kohima : Nagaland

Seal and Signature of the Department of Power

Sub-Divisional Officer
Transmission Sub-Divisio
Kohima : Nagaland

Seal and Signature of Circle Officer/District Administration

Revenue Officer
Kohima, Nagaland

Khrieyo Khaleho
29/3/19

POWERGRID CORPORATION OF INDIA LTD

Crop and Tree COMPENSATION ASSESSMENT SHEET

Name of the Transmission Line: 132kV D/C New Kohima New Secretariat Complex Transmission Line

Sl No.	Loc No/Span	Notice No./Date	Name of Cultivators with Father's name	Village,Tahsil, District	Khasar/dag/ Patta No.	Detail of Damage Crop/tree	Girth(in feet)	Qty/Area(i	Rate in Rs Per Unit	Compensation Payable in Rs.	Bank Details
1	AP7	Notice No-NL/132kV NK-NS/LAND/31 Dated:15.02.2019	Landowner's Name-Seyie Kuotsu Father's Name-Razouvolie	Zhadima		Bamboo	0.58 1.2	50	50	2500	
						Pine tree	0.98	1	200	200	
						Pine tree	2.29	2	200	400	
						Pine tree	1.31	1	200	200	
						Pine tree	1.96	2	200	400	
						Pine tree	2.29	6	200	1200	
						Pine tree	1.8	1	200	200	
						Pine tree	2.29	2	200	400	
						Pine tree	2.62	2	200	400	
						Pine tree	1.96	2	200	400	
						Mhicho	6.56	1	400	400	
						Chevi	3.28	1	150	150	
						Ze	3.28	1	400	400	
						Amla	1.64	1	200	200	
						Chi	5.9	1	400	400	
						Khapo	1.96	1	150	150	
Total										7600	

Seal and Signature of POWERGRID

एच. के. चुतिया / H.K. Chutia
उप. प्रबंधक / Dy. Manager
एन. इ. आर. पी. एस. आई. पी. / (NERPSIP)
पावरग्रिड / POWERGRID
कोहिमा : नागालैन्ड / Kohima : Nagaland

Seal and Signature of the Department of Power

Seal and Signature of Circle Officer/District Administration

Revenue Officer
Kohima, Nagaland

Kenuzo Rhakho
29/3/19

POWERGRID CORPORATION OF INDIA LTD
Crop and Tree COMPENSATION ASSESSMENT SHEET

ame of the Transmission Line: 132kV D/C New Kohima-New Secretariat Complex Tranmission Line

Loc No/Span	Notice No./Date	Name of Cultivators with Father's name	Village,Tahsil, District	Khasar/dag/Patta No.	Detail of Damage Crop/tree	Girth(in feet)	Qty/Area(I	Rate in Rs. Per Unit	Compensation Payable in Rs.	Bank Details	Remarks
AP10	Notice No-NL/132kV NK-NS/LAND/30	Landowner's Name-Zevolhoulie Father's Name-Lhoulie	Zhadima		Thezhii	3.7	8	400	3200		
					Mhicho	1.2	10	200	2000		
					Neem	3.6	6	320	1920		
					Ze	3.1	2	400	800		
					Ze	2	2	200	400		
Total									8320		

Seal and Signature of
POWERGRID
Dy Manager
(NERPSIP)
POWERGRID
Kohima : Nagaland

Khrieze Khaleo
29/3/19

Seal and Signature of the
Department of Power
Sub-Divisional Officer
Transmission Sub-Division
Kohima : Nagaland

Seal and Signature of
Circle Officer/District
Administration
Revenue Officer
Kohima, Nagaland

POWERGRID CORPORATION OF INDIA LTD
Crop and Tree COMPENSATION ASSESSMENT SHEET

ne of the Transmission Line: 132kV D/C New Kohima-New Secretariat Complex Transmission Line

Loc No/Span	Notice No./Date	Name of Cultivators with Father's name	Village, Tahsil, District	Khasar/dag /Patta No.	Detail of Damage Crop/tree	Girth (in feet)	Qty/Area(I	Rate in Rs. Per Unit	Compensation Payable in Rs.	Bank Details	Remarks
AP11	Notice No-NL/132kV NK-NS/LAND/18 Dated:13.02.2019	Landowner's Name-NEIZELIE Father's Name-Lt. KIBVELHOU	Zhadima		Neem	4.7	1	320	320		
					Mhicho	6	1	400	400		
					Asam	2.9	1	150	150		
					Mhicho	5.5	1	400	400		
					Thezhii	4.5	1	400	400		
					Thezhii	4.6	1	400	400		
					Thezhii	3.1	7	400	2800		
					Kero	2.11	8	200	1600		
					Mhicho	2.5	15	200	3000		
Total									9470		

Seal and Signature of
POWERGRID

एच. के. चुतिया / H.K. Chutia
उप प्रबंधक / Dy Manager
एन. ई. आर. पी. एस. आई. पी. / (NERPSIP)
पावरग्रिड / POWERGRID
कोहिमा : नागालैण्ड / Kohima : Nagaland

Seal and Signature of the
Department of Power

Khrizo Khakho
29/8/19

Sub-Divisional Officer
Transmission Sub-Division
Kohima : Nagaland

Seal and Signature of Circle
Officer/District Administration

Revenue Officer
Kohima, Nagaland

POWERGRID CORPORATION OF INDIA LTD
Crop and Tree COMPENSATION ASSESSMENT SHEET

Name of the Transmission Line: 132kV D/C New Kohima-New Secretariat Complex Tranmission Line

Sl No.	Loc No/Span	Notice No./Date	Name of Cultivators with Father's name	Village,Tahsil, District	Khasar/dag/Patta No.	Detail of Damage Crop/tree	Girth(in feet)	Qty/Area(I	Rate in Rs. Per Unit	Compensation Payable in Rs.	Bank Details	Remarks
1	AP16	Notice No-NL/132kV NK-NS/LAND/010 Dated:24.01.2019	Landowner's Name-Rokososie Khoubve Father's Name-Shouchiilhou	Zhadima		Mego	2.64	5	200	1000		
						Phrie	1.6	4	200	800		
						Banana		4	350	1400		
						Miicho	5.6	2	400	800		
						Orange	0.25	10	700	7000		
Total										11000		

Seal and Signature of
POWERGRID

एच. के. चुतिया / H.K. Chutia
उप प्रबंधक / Dy Manager
एन. इ. आर. पी. एस. आई. पी. / (NERPSIP)
पावरग्रिड / POWERGRID
कोहिमा : नागालैन्ड / Kohima : Nagaland

Seal and Signature of the
Department of Power

Karuzo Khaleno
29/8/19

Seal and Signature of
Circle Officer/District
Administration

Revenue Officer
Kohima, Nagaland

POWERGRID CORPORATION OF INDIA LTD

Crop and Tree COMPENSATION ASSESSMENT SHEET

Name of the Transmission Line: 132kV D/C New Kohima-New Secretariat Complex Transmission Line

Sl No.	Loc No/Span	Notice No./Date	Name of Cultivators with Father's name	Village,Tahsil, District	Khasar/dag/ Patta No	Detail of Damage Crop/tree	Girth(in feet)	Qty/Area(l	Rate in Rs. Per Unit	Compensation Payable in Rs.	Bank Details	Remarks
1	AP18	Notice No-NL/132kV NK-NS/LAND/21 Dated:15.02.2019	Lanowner's Name-Mezhiituo Khro Father's Name-Vilazhii	Zhadima		Thegaruo	2.62	4	200	800		
						Phezhii	1.312	4	150	600		
						Phedu	7.21	1	150	150		
						Mehie	2.62	5	150	750		
						Keduo	2.29	1	150	150		
						Mhicho	8.201	1	400	400		
						Meru	1.64	1	200	200		
						Thezhii	0.98	10	200	2000		
						Mhicho	3.6	1	400	400		
Total										5450		

Seal and Signature of POWERGRID

एच. के. चूतिया / H.K. Chutia
उप. प्रबंधक / Dy. Manager
एन. इ. आर. पी. एस. आई. पी. / (NERPSIP)
पावरग्रिड / POWERGRID
कोहिमा : नागालैन्ड / Kohima : Nagaland

Seal and Signature of the Department of Power

Sub-Divisional Officer
Transmission Sub-Division
Kohima : Nagaland

Kenuzo Phakho
29/8/19

Seal and Signature of Circle Officer/District Administration

Revenue Officer
Kohima, Nagaland

TO WHOM IT MAY CONCERN

This is to certify that an amount of Rs 145446 (In words) one lakh forty five thousand four hundred forty six has been duly compensated to Shri/Ms Seyie Kuotsu for the land and surface damages incurred during the construction of 132kV New-Kohima (Zhadima) to New Secretariat Complex(Nagaland University Campus) Transmission Line under NERPSIP, Nagaland at location no. APT of Zhadima Village, Kohima district measuring an Area of 1451.105 Sq.ft.

10/7/2020

(Signature of landowner)

Witness
(i).

(ii).

(Signature of POWERGRID)

भारतीय स्टेट बैंक
State Bank Of India

(00214)-KOHIMA
NEAR DEPUTY COMMISSIONER'S OFFICE
KOHIMA,NAGALAND 797001
Tel : 370 2291318 Fax : 2291409 IFS Code : SBIN0000214 SWIFT :

05 02 2020
D D M M Y Y Y Y

PAY PETER KUOTSU

रुपये RUPEES One lakh forty five thousand four-hundred forty six only.

को या उनके आदेश पर OR ORDER

अदा करें ₹ 1,45,446/-

A/c No. 10530522383

VALID UPTO ₹ 50 LACS AT NON-HOME BRANCH

CURRENT A/C

PREFIX :
1515000002

O/O DEPUTY COMMISSIONER

Deputy Commissioner
Kohima, Nagaland

MULTI-CITY CHEQUE Payable at Par at All Branches of SBI

34609 / 100 / BLUE ORDER (R) / 14/Jun/2017
SESHAASAI (D) / CTS-2010

⑈869582⑈ 797002102⑆ 000563⑈ 29

TO WHOM IT MAY CONCERN

This is to certify that an amount of Rs 67580/- (In words) SIXTY SEVEN THOUSAND FIVE HUNDRED EIGHTY has been duly compensated to Shri/Ms ZEVOLHOULIE for the land and surface damages incurred during the construction of 132kV New-Kohima (Zhadima) to New Secretariat Complex(Nagaland University Campus) Transmission Line under NERPSIP, Nagaland at location no. AP-10 of Zhadima Village, Kohima district measuring an Area of 623.837 Sq.ft.

Witness
(i).

(ii).

(Signature of landowner)

(Signature of POWERGRID)

भारतीय स्टेट बैंक
State Bank Of India

(30214)-KOHIMA
NEAR DEPUTY COMMISSIONER'S OFFICE
KOHIMA,NAGALAND 797001
Tel : 370 2291318 Fax : 2291409 IFS Code : SBIN0000214 SWIFT :

चेक 3 महीने के लिए वैध - VALID FOR 3 MONTHS ONLY
0 5 0 2 2 0 2 0
D D M M Y Y Y Y

PAY ZEVOLHOULIE CHOPUO

रुपये RUPEES Sixty seven thousand five hundred eighty only.

को या उनके आदेश पर OR ORDER

अदा करें ₹ 67,580/-

A/c No. 10530522383

VALID UPTO ₹ 50 LACS AT NON-HOME BRANCH

CURRENT A/C
PREFIX :
1515000002

O/O DEPUTY COMMISSIONER

Deputy Commissioner
Kohima, Nagaland

MULTI-CITY CHEQUE Payable at Par at All Branches of SBI

⑈869583⑈ 799002402⑆ 000563⑈ 29

SBI/NAGA/(D)/CTS-2010

पावरग्रिडकारपोरेशनऑफइंडियालिमिटेड
(भारत सरकारका उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)
पावरग्रिड

(NORTH EASTERN REGION POWER SYSTEM IMPROVEMENT PROJECT)
NAGALAND: KOHIMA
NORTH EASTERN REGION

TO WHOM IT MAY CONCERN

This is to certify that an amount of Rs ..62252/-.....(In words) ....SIXTY...TWO...THOUSAND...TWO..HUNDRED..FIFTY..TWO.... has been duly compensated to Shri/Ms ...ZANIVI-O..... for the land and surface damages incurred during the construction of 132kV New-Kohima (Zhadima) to New Secretariat Complex(Nagaland University Campus) Transmission Line under NERPSIP, Nagaland at location no....AP-5..... of Zhadima Village, Kohima district measuring an Area of .....559.5376..... Sq.ft.

(Signature of landowner)

Witness
(i).

(ii).

(Signature of POWERGRID)

भारतीय स्टेट बैंक
State Bank Of India

(09214)-KOHIMA
NEAR DEPUTY COMMISSIONER'S OFFICE
KOHIMA,NAGALAND 797001
Tel : 370 2291310 Fax : 2291409 IFS Code : SBIN0000214 SWIFT :

बैंकर के चेक हेतु VALID FOR 3 MONTHS ONLY

05022020
D D M M Y Y Y Y

PAY ZANUO VI O KUOTSU को या उनके आदेश पर OR ORDER

रुपये RUPEES Sixty two thousand two hundred-
- fifty two only. अदा करें ₹ 62,252/-

A/C No. 10530522383

VALID UPTO ₹ 50 LACS AT NON-HOME BRANCH

CURRENT A/C
PREFIX :
1515000002

O/O DEPUTY COMMISSIONER

Deputy Commissioner
Kohima, Nag...

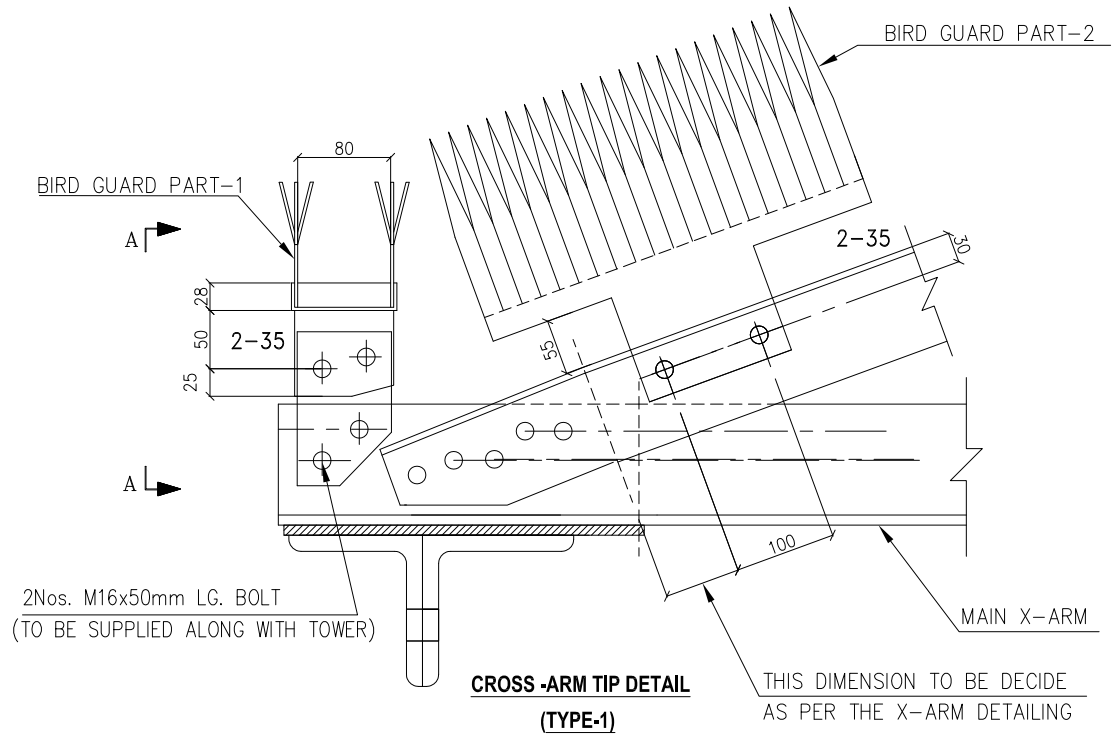
MULTI-CITY CHEQUE Payable at Par at All Branches of SBI

"869580" 799002102: 000563" 29

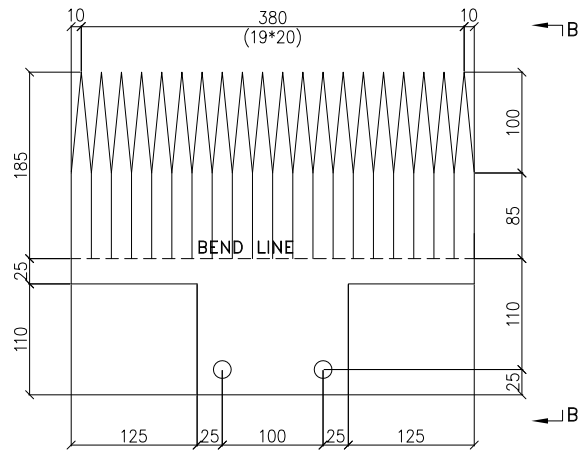
"4609 / 100 / BLUE ORDER (F) / 14/JUN/2017
SESHAASAI (D) / CTS-2010

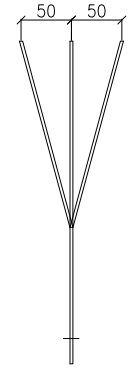
ANNEXURE V

Drawing of Bird Guard/ Anti Perching Devises



CROSS -ARM TIP DETAIL
(TYPE-1)

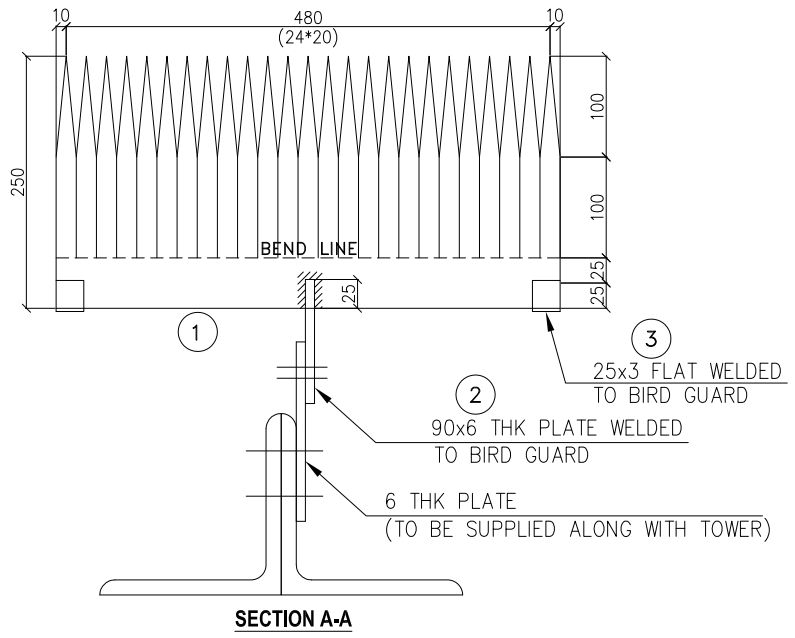




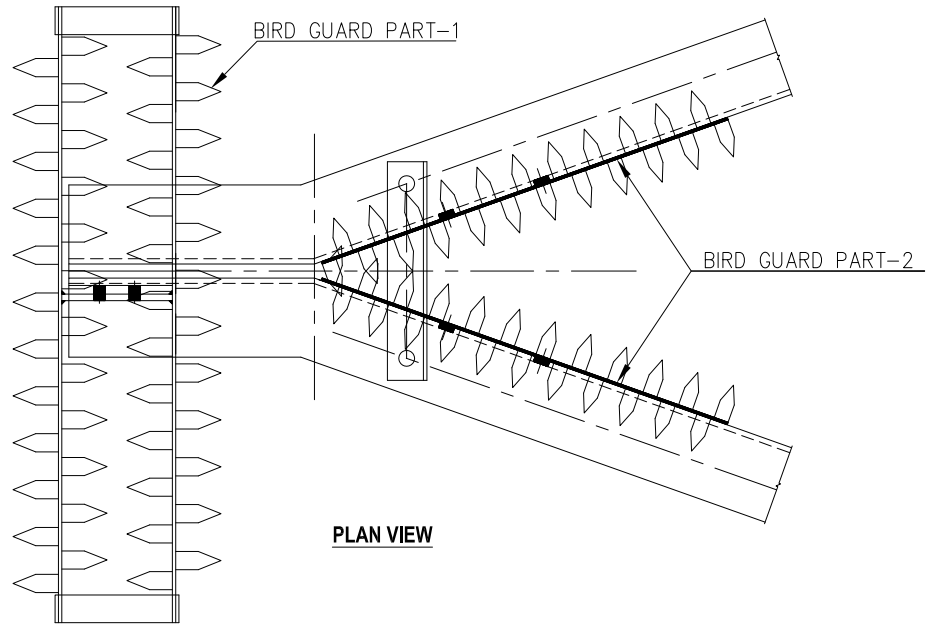
VIEW B-B

④ 320x3THK.-400LG.
QTY: 2 NOS / SETS

BIRD GUARD PART-2



SECTION A-A

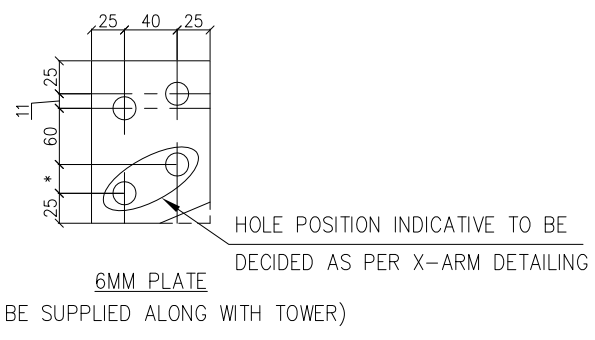


PLAN VIEW

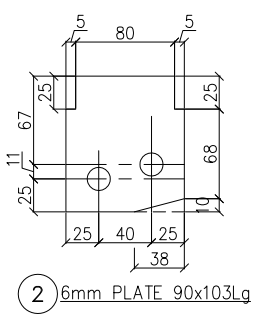
MATERIAL LIST / SETS (TYPE-1)				
NO	DESC.	QTY./ SET	WT/PC (kg)	TOTAL (kg)
1	3 THK 250x500 LG	2	2.944	5.888
2	6 THK 90x103 LG	1	0.437	0.437
3	3 THK 25x140 LG	2	0.082	0.164
4	3MM THK 320x400 LG	2	3.014	6.028
	16ø x35MM Lg B&N	6	0.119	0.714
	16ø 3.5mm SP.Washer	6	0.009	0.054
			GRD. TOTAL=13.285	

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. GALVANISED AFTER FABRICATION.
3. FIXING ARRANGEMENT TO BE CHECKED WITH TOWER.
4. SUITABLE PROVISION OF CLEAT/PLATE/HOLE TO BE PROVIDED ON SUSPENSION TOWER FACILITING INSTALLATION OF BIRD GUARD AFTER STRINGING.
5. ONE SET OF BIRD GUARD FOR I-STRING (TYPE-1) INCLUDES.
   A) BIRD GUARD PART-1(TYPE-1) = ONE NUMBER
   B) BIRD GUARD PART-2 = TWO NUMBERS
6. HOLE FOR FIXING BG PART-2 TO BE ENSURED ON TOWER MEMBER.
7. 6MM PLATE & 2 Nos. M16x50 Lg. BOLT & NUT TO BE SUPPLIED ALONG WITH TOWER



6MM PLATE
(TO BE SUPPLIED ALONG WITH TOWER)

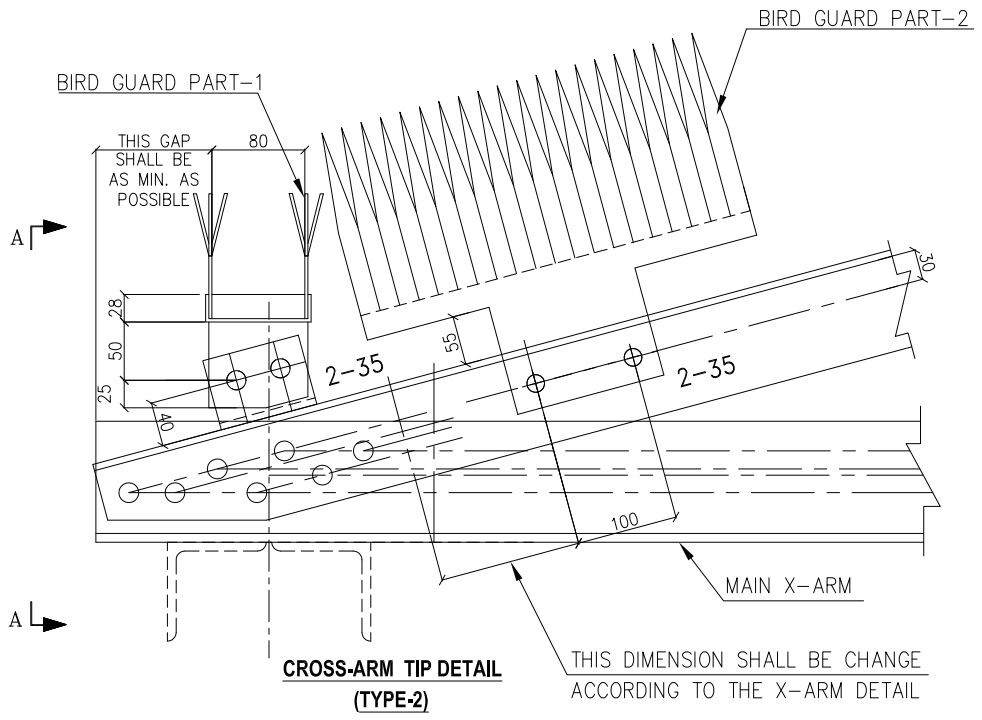


② 6mm PLATE 90x103Lg

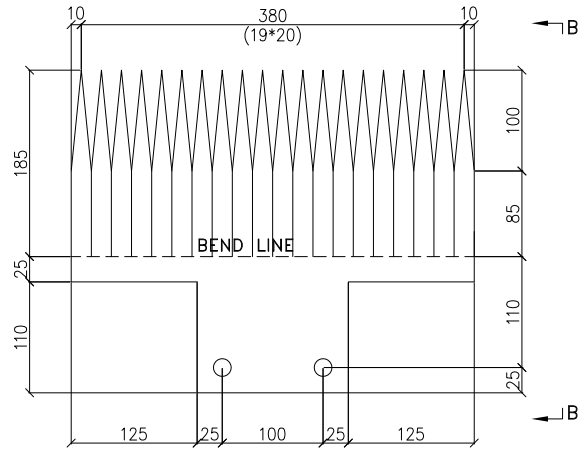
POWER GRID CORPORATION OF INDIA LIMITED

TITLE : **DETAILS OF BIRD GUARD FOR I-STRING (TYPE - 1)-REVISED**

DRAWING No. CC:ENGG:TLACC:BG (SHEET 1 of 2)

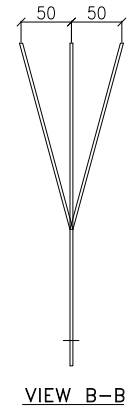


CROSS-ARM TIP DETAIL (TYPE-2)

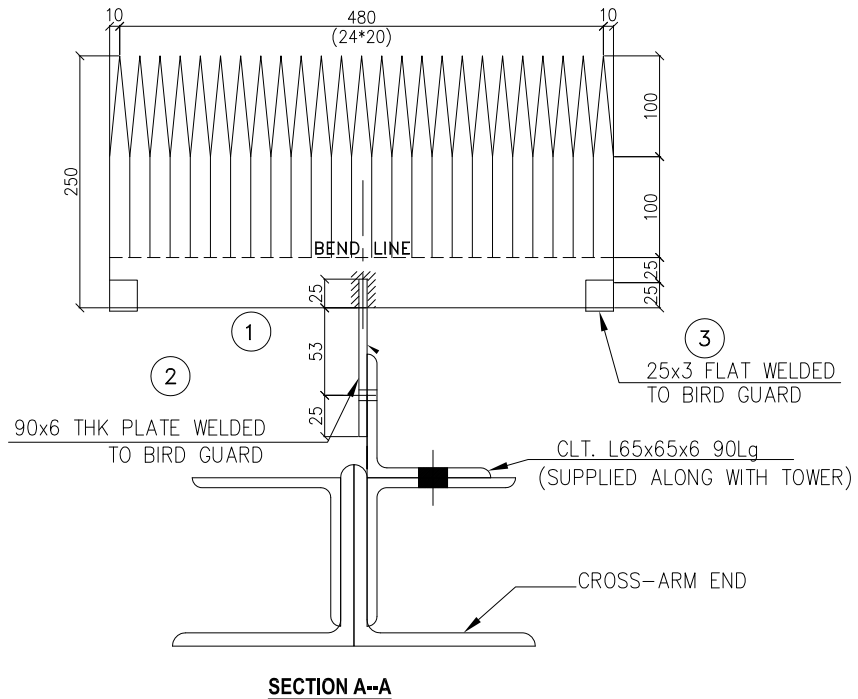


4 — 320x3THK.-400LG.
QTY: 2 NOS / SETS

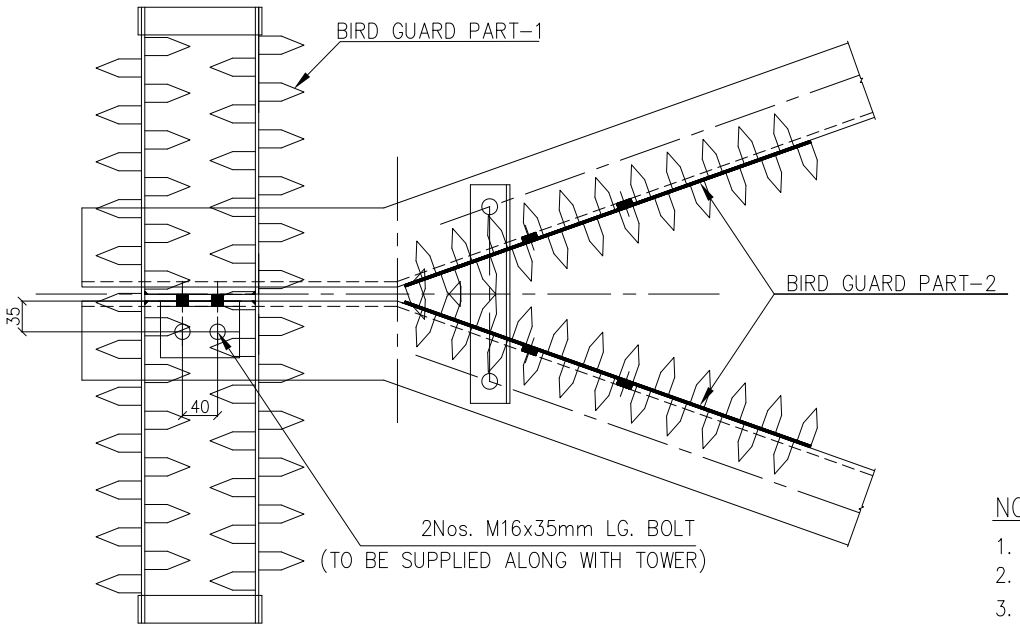
BIRD GUARD PART-2



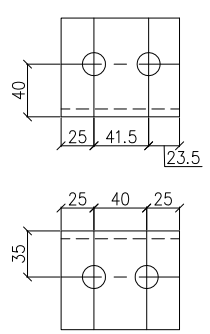
VIEW B-B



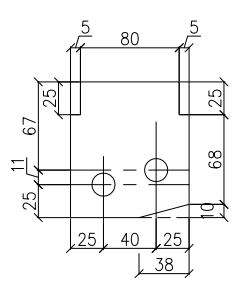
SECTION A--A



PLAN VIEW



CLT. L65x65x6 90Lg
(TO BE SUPPLIED ALONG WITH TOWER)



②6mm PLATE 90x103Lg

MATERIAL LIST / SETS (TYPE-2)				
NO	DESC.	QTY./ SET	WT/PC (kg)	TOTAL (kg)
1	3 THK 250x500 LG	2	2.944	5.888
2	6 THK 90x103 LG	1	0.437	0.437
3	3 THK 25x140 LG	2	0.082	0.164
4	3MM THK 320x400 LG	2	3.014	6.028
	16ø x35MM Lg B&N	6	0.119	0.714
	16ø 3.5mm SP.Washer	6	0.009	0.054
			GRD. TOTAL=	13.285

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. GALVANISED AFTER FABRICATION.
3. FIXING ARRANGEMENT TO BE CHECKED WITH TOWER.
4. SUITABLE PROVISION OF CLEAT/PLATE/HOLE TO BE PROVIDED ON SUSPENSION TOWER FACILITING INSTALLATION OF BIRD GUARD AFTER STRINGING.
5. ONE SET OF BIRD GUARD FOR I-STRING (TYPE-2) INCLUDES.
   A) BIRD GUARD PART-1(TYPE-2) = ONE NUMBER
   B) BIRD GUARD PART-2 = TWO NUMBERS
6. HOLE FOR FIXING BG PART-2 TO BE ENSURED ON TOWER MEMBER
7. L65x65x6-90Lg. & 2 Nos. M16x35 Lg. BOLT & NUT TO BE SUPPLIED ALONG WITH TOWER

POWER GRID CORPORATION OF INDIA LIMITED

TITLE :

DETAILS OF BIRD GUARD FOR I-STRING (TYPE - 2)-REVISED

DRAWING No. CC:ENGG:TLACC:BG (SHEET 2 of 2)

ANNEXURE VI

Signed Copy of Safety Plan Submitted by Contractor

TECHNO POWER ENTERPRISES (P) LTD

(ELECTRICAL ENGINEERS & CONTRACTORS)

CORPORATE & CORRESPONDENCE OFFICE :
INFINITY THINK TANK, TOWER - II
10TH FLOOR, PLOT - A3, BLOCK - GP, SECTOR - V
SALT LAKE CITY, KOLKATA - 700 091, INDIA
PHONE : 033 4063 6169, 4064 5703 / 5704
Website : www.rausheenagroup.com
CIN : U45309NL2000PTC006046

MOLLU VILLA, NEPALI BASTI
P.O. : DIMAPUR - 797 112
NAGALAND
PHONE : 234186
E-mail : tpepl@ymail.com

Our Ref:- TPEPL/PGCIL-NAG-DMS-01&02/SITE-18009 Dt.26/11/2019

The Sr. General Manager (NERPSIP)
Power Grid Corporation of India Ltd.
Kohima- 797001/Nagaland/Mob#9435567082
Kind. Attn. Mr.L.A.Sharma.

Sub: Submission of Safety Plan.

Package:- NAG-DMS-02
NOA NO. CC-CS/92-NER/REW-3661/1/G5/NOA-I/7596Dt.11.01.2018.(Supply of Goods)
CC-CS/92-NER/REW-3667/1/G5/NOA-II/7697Dt.11.01.2018(Supply of Services)

Dear Sir,

With reference to above we are submitting herewith the following document related to Environment & Health and Safety plan:

1) Safety Plan dt. 14.8.2018 on stamp paper for NAG-DMS-02 Pkg

Thanking you

Yours faithfully
For Techno Power Enterprises Pvt. Ltd.

Nitish .C.Hazra
Vice President

TECHNO POWER ENTERPRISE (P) LTD. SIKKIM

Table of contents

पश्चिमबङ्ग पश्चिम बंगाल WEST BENGAL AA 601605

SAFETY PLAN

THIS SAFETY PLAN is made this 14 th day of August. 2018 by Joint Venture (JV) of M/s Techno Power Enterprises private Ltd, Kolkata (the lead partner) of JV), a company incorporated under the law of Companies Act, 1956 having its Principal place of business and Registered Office at Infinity think tank..., Tower-II, 10th Floor, Sector V, Salt lake City, Kolkata-700091 and M/s Rausheena Udyog Limited, Guwahati (the other Partner of JV), a company incorporated under the law of Companies Act, 1956 having its Principal place of business and Registered Office at TN Road, Guwahati-01, (hereinafter called as 'Contractor' which expression shall include its successors and permitted assign) for approval of Power Grid Corporation of India Limited, a company incorporated under the Companies Act, 1956 having its Registered Office at ,B-9, Qutab Institutional area, Katwari, New delhi-110016 and its Corporate Office at Saudamani, Plot No.2, 'Sector-29, Gurgaon(Haryana)-122001 for its Contract for Package DMS-2 for Nagaland Associated with NER Power System Improvement Project Specification No.CC-CS/92-NER/REW-3661/1/G5 WHREAS Power Grid Corporation of India Ltd.(PGCIL) has awarded to the contractor the aforesaid Contract vide its Notification of Award/Contract No. CC-CS/92-NER/REW/3661/1/G5/NOA-II/7597 dt.11.01.2018(here in after called the Contract) in terms of which the Contractor is required to submit 'Safety Plan' along with certain documents to the Engineer In-Charge/Project Manager of the Employer within Sixty (60) days of Notification of Award for its approval.

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 shali 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 In-charge/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 In-charge/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 Lanyard 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 requirement. The Contractor will have to take action against the workers not using 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 toexecution 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 payable 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.

16. 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 andapproval 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. TECHNO POWER ENTERPRISES PVT. LTD.

WITNESS

1. Signature. Kalyanasis Chaudhuri

   Name. KALYANASIS CHAUDHURI

   Address. Sec-V, Salt Lake City, Kol-91

Signature.

Name. NITISH CHHAPRA

Address. Infinity Think Tank Tower-II, 10th Floor, Block-GP, Sector-V, Salt Lake City, Kolkata-700091

2. Signature. Mamata Dandapat

Name. MAMATA DANDAPAT

Address. Infinity Think Tank, Tower D2, salt lake city, kol- 91

Authorised representative

(Common Seal)

(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	Yes
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	Yes
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	Yes
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	Yes/No	Yes

TECHNO POWER ENTERPRISE (P) LTD.

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	with attachments of light weight such as of aluminium alloy etc. and having a feature of automatic locking arrangement of snap hook 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.) 6. Retractable type fall arrestor (EN360: 2002) for ascending / descending on suspension insulator string etc. 7. 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 9. Dust masks to workers handling cement as per requirement. 10. Face shield for welder and Grinders. IS : 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 wise for stringing activity/as per requirement	Yes/No	Yes
6.	**Annexure – 5A (SP)** List of Qualified Safety Officer(s) along with their contact details	Yes/No	Yes
7.	**Annexure – 5B (SP)** Details of Explosive Operator (if required), Safety 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	Yes/No	
8.	**Annexure – 6 (SP)**		

TWO POWER ENTERPRISE (P) LTD.

9

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	Copy of Safety Policy/ Safety Document of the Contractor's company	Yes/No	Yes
9.	**Annexure – 7 (SP)** '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.	Yes/No	Yes
10.	**Annexure – 8 (SP)** Safety Audit Check Lists (Formats to be enclosed)	Yes/No	Yes
11.	**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	Yes
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	Yes
(ii)	Factories Act 1948 _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	Yes
(iii)	Building & other construction workers (Regulation	Yes/No	Yes

TECHNO POWER ENTERPRISES (P) LTD.

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	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 compliance*]		
(iv)	Workmen Compensation Act 1923 and Rules. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	Yes
(v)	Public Insurance Liabilities Act 1991 and Rules. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	Yes
(vi)	Indian Explosive Act 1948 and Rules. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	Yes
(vii)	Indian Petroleum Act 1934 and Rules. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	Yes
(viii)	License under the contract Labour (Regulation & Abolition) Act 1970 and Rules. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	Yes
(ix)	Indian Electricity Rule 1956 and amendments if any, from time to time. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	Yes
(x)	The Environment (Protection) Act 1986 and Rules.	Yes/No	Yes

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	_____ [*Name of Documentary evidence in support of compliance*]		
(xi)	Child Labour (Prohibition & Regulation) Act 1986. _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	Yes
(xii)	National Building Code of India 2005 (NBC 2005). _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	Yes
(xiii)	Indian standards for construction of Low/ Medium/ High/ Extra High Voltage Transmission Line _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	Yes
(iv)	Any other statutory requirement(s) [*please specify*] _____ [*Name of Documentary evidence in support of compliance*]	Yes/No	Yes
13.	**Annexure – 10B (SP)** Details of Insurance Policies alongwith 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. _____ [*Name of Documentary evidence in support of insurance taken*]	Yes/No	Yes
(ii)	Public Insurance Liabilities Act 1991	Yes/No	Yes

POWER ENTERPRISE (P) LTD. OKHLA

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	[Name of ~~Documentary evidence in support of~~ insurance ~~taken~~]		
(iii)	Any Other Insurance Policies [Name of Documentary evidence in support of insurance taken]	~~Yes~~/No	Yes.

ANNEXURE VII

Safety/Penalty Provisions in Contract Conditions

PC 21.3.4 **Replace the word *'may'* in line no. 10 with *'is'*.**

Addition of New Clauses (PC21.3.5, PC21.3.6) after GC 21.3.4

PC 21.3.5 **Packing**

The Contractor shall provide such packing of the Goods as it is required to prevent their damage or deterioration during transit to their final destination as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods final destination and the absence of heavy handling facilities at all points in transit.

PC 21.3.6 The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract and, subject to any subsequent instruction 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 sub-clauses) 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 causes arising as consequence of his methods of operation.

During continuance of the Contract, the Contractor and his Sub-contractors 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-II**, and (c) allocate the budget required 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 road / 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 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 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;

c. Obtain permission of the Engineer detailing the sockets to which the appliances may be connected.

PC 22.4.3.13 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 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 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.

c) 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.

e) Employees under the influence of any intoxicating beverage, even to the slightest degree shall not be permitted to remain at work.

f) 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 garments. Safety shoes are recommended when working in shops or places where materials or tools are likely to fall. Only experienced workers shall be permitted to go behind guard rails or to clean around energized or moving equipment.

i) The employees must use the standard protection equipment intended for each job. Each piece of equipment shall be inspected before and after it is used.

j) Requirements of ventilation in underwater working to Licenced and experienced divers, use of gum boots for working in slushy or in inundated conditions are essential requirements to be fulfilled.

k) In case of rock excavation, blasting shall invariably be done through Licenced blasters and other precautions during blasting and storage/transport of charge material shall be observed strictly.

PC 22.4.3.22 The Contractor shall follow and comply with all THE EMPLOYER Safety Rules, relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time without any demur, protest or contest or reservations. In case of any discrepancy between statutory requirement and THE EMPLOYER Safety Rules referred above, the latter shall be binding on the Contractor unless the statutory provisions are more stringent.

PC22.4.3.23 If the Contractor fails in providing safe working

environment as per THE EMPLOYER Safety Rules or continues the work even after being instructed to stop work by the Engineer as provided in para GCC 22.4.3.19 above, the Contractor shall promptly pay to THE EMPLOYER, on demand by the Owner, compensation at the rate of Rs.5, 000/- per day of part thereof till the instructions are complied with and so certified by the Engineer. However, in case of accident taking place causing injury to any individual, the provisions contained in para GCC 22.4.3.24 shall also apply in addition to compensation mentioned in this para.

PC 22.4.3.24 If the Contractor does not take adequate safety precautions and/or fails to comply with the Safety Rules as prescribed by THE EMPLOYER or under the applicable law for the safety of the equipment and plant or for the safety of personnel or the Contractor does not prevent hazardous conditions which cause injury to his own employees or employees of other Contractors or THE 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 occurs 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.

PC 22.6 Emergency Work (GC Clause 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.

PC 23.3 Supplementing sub-clause GC 23.3

For notification of testing, four weeks shall be deemed as reasonable advance notice.

PC 23.7 Test and Inspection (GC Clause 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.

ANNEXURE VIII

Approved Labour License & Insurance Policy by Contractor

R-E-410 dt-27/11/18

GOVERNMENT OF INDIA
MINISTRY OF LABOUR & EMPLOYMENT
OFFICE OF THE ASSISTANT LABOUR COMMISSIONER (CENTRAL)
COLLEGE ROAD, SILCHAR-788 004, ASSAM
E-mail alc.sil-as@gov.in
TELEPHONE NO. 03842-267330

No. 46 (113)/2018-S/A Dated – 16. 04. 2018

To

M/s POWER MECH PROJECTS LIMITED
POWER GRID CORPORATION OF INDIA LIMITED CONTRACTOR
REPRESENTED THROUGH:
(1) Shri S. KISHORE BABU, CHARIMAN & MANAGING DIRECTOR
S/O SHESHAGIRI RAO SAJJA
(2) Shri N. BHUPESH CHOWDARY, WHOLE TIME DIRECTOR & CEO
S/O ETHIRAJULU NAGINENI
(3) Shri G.D.V.PRASADA RAO, INDEPENDENT DIRECTOR
S/O KRISHNA RAO GORIJALA
(4) Shri SANTOSH KUMAR SINHA, ASSISTANT GENERAL MANAGER (AGM-SMX) & POWER OF ATTORNEY
S/O SHRIDHAR PRASAD SINHA
REGISTERED & CORPORATE OFFICE: PLOT NO. 77, JUBILEE ENCLAVE, OPPOSITE HITEX MADHAPUR, HYDERABAD – 500081. **E-mail info@powermech.net / M – 09371105842.**

Subject: *Contract Labour (Regulation and Abolition) Act, 1970 and Contract Labour Regulation & Abolition Central Rules, 1971 - Issue of Licence to M/s POWER MECH PROJECTS LIMITED, POWER GRID CORPORATION OF INDIA LIMITED CONTRACTOR, REGISTERED & CORPORATE OFFICE: PLOT NO. 77, JUBILEE ENCLAVE, OPPOSITE HITEX, MADHAPUR, HYDERABAD – 500081.*

Dear Sir,

Please refer to your Application for Licence No. PMPL/PGCIL/NAG/SS-PKG/2018-19/06 dated-10.04.2018 received at this office on 16.04.2018) for issue of Licence under Section-12 (1) of the Contract Labour (Regulation and Abolition) Act, 1970.

I, in accordance with the provisions under Section-12 (1) of the said Act under the Authority vested upon me as the Licensing Officer of the area hereby issue the Licence in FORM-VI prescribed under the Contract Labour Regulation and Abolition) Central Rules, 1971 against the work "Supply of Services Contract for Substation Package-NAG-SS-04 including Transformer for (i) 132/33 KV Pfutsero (New) S/S and (ii) 132 KV Wokha S/S (Extn) under Transmission System for Nagaland State associated with NER Power System Improvement Project. Specification No. CC-CS/92-NER/SS-3622/1/G3 (NAG-SS-04) & NOA No. CC-CS/92-NER/SS-3622/1/G3/NOA-II/7550 dated-13.12.2017".

Licence is issued without prejudice to the legal action taken or to be taken by the Department for not obtaining Licence in the past.

Please acknowledge the receipt of the same.

Enclo: 1 (ONE) LICENCE.

Yours faithfully,

Assistant Labour Commissioner (Central)
Government of India
SILCHAR

Govt. of India
Ministry of Labour & Employment

Copy forwarded to:

(1) The Deputy Chief Labour Commissioner (Central), GUWAHATI.

(2) The Labour Enforcement Officer (Central), LUMDING. A copy of the application for Licence in FORM-II received from the Contractor is enclosed herewith vide Licence No. CLA/106/2018-S/A dated-16.04.2018 has been granted to the Contractor for 50 (FIFTY) labours.

(3) Shri L. A. Sharma, Assistant General Manager, Power Grid Corporation of India Limited, NERPSIP, Nagaland, Upper Chandmari Lane, PWD Road, Opposite PWD Central Store, Kohima-797001, Nagaland for information vide Licence No. CLA/106/2018-S/A dated-16.04.2018 issued to M/s POWER MECH PROJECTS LIMITED for 50 (FIFTY) labours.

Assistant Labour Commissioner (Central)
Government of India
SILCHAR

Asstt. Labour Commissioner (Central)
Silchar & Registering/ Licensing Officer
Under C.L. (R&A) Act. 1970

FORM-VI
(SEE RULE- 25(1)
GOVERNMENT OF INDIA
MINISTRY OF LABOUR & EMPLOYMENT
OFFICE OF THE LICENSING OFFICER
AND ASSISTANT LABOUR COMMISSIONER (CENTRAL)
COLLEGE ROAD, SILCHAR-788004, DIST. CACHAR, ASSAM

LICENCE NO. CLA/106/2018-S/A DATE: 16.04.2018

LICENCE FEE PAID	Rs.38.00 (RUPEES THIRTY EIGHT) ONLY	Deposited through bharatkosh.gov.in vide Transaction Ref. No. 1004180001454 dated – 10.04.2018

LICENCE

1. Licence is hereby granted to M/s POWER MECH PROJECTS LIMITED, POWER GRID CORPORATION OF INDIA LIMITED CONTRACTOR, REPRESENTED THROUGH: (1) Shri S. KISHORE BABU, CHARIMAN & MANAGING DIRECTOR, S/O SHESHAGIRI RAO SAJJA (2) Shri N. BHUPESH CHOWDARY, WHOLE TIME DIRECTOR & CEO, S/O ETHIRAJULU NAGINENI (3) Shri G.D.V.PRASADA RAO, INDEPENDENT DIRECTOR, S/0 KRISHNA RAO GORIJALA (4) Shri SANTOSH KUMAR SINHA, ASSISTANT GENERAL MANAGER (AGM-SMX) & POWER OF ATTORNEY, S/O SHRIDHAR PRASAD SINHA, REGISTERED & CORPORATE OFFICE: PLOT NO. 77, JUBILEE ENCLAVE, OPPOSITE HITEX, MADHAPUR, HYDERABAD – 500081 under Section 12 (1) of the Contract Labour (Regulation and Abolition) Act, 1970 subject to the conditions specified in the ANNEXURE.

2. The Licence is for doing the work – "Supply of Services Contract for Substation Package-NAG-SS-04 including Transformer for (i) 132/33 KV Pfutsero (New) S/S and (ii) 132 KV Wokha S/S (Extn) under Transmission System for Nagaland State associated with NER Power System Improvement Project. Specification No. CC-CS/92-NER/SS-3622/1/G3 (NAG-SS-04) & NOA No. CC-CS/92-NER/SS-3622/1/G3/NOA-II/7550 dated-13.12.2017" in the establishment of Shri L. A. Sharma, Assistant General Manager, Power Grid Corporation of India Limited, NERPSIP, Nagaland, Upper Chandmari Lane, PWD Road, Opposite PWD Central Store, Kohima-797001,Nagaland.

3. The Licence shall remain in force TILL 15. 04. 2019

Date: 16.04.2018

Signature and Seal of Licensing Officer

Asstt. Labour Commissioner (Central)
Silchar & Registering/ Licensing Officer
Under C.L. (R&A) Act. 1970

Govt. of India
Ministry of Labour & Employment
Silchar

RENEWAL
(Rule-29)

Date of Renewal	*Fee paid for Renewal*	*Date of Expiry*	*Signature and Seal of Licensing Officer and Date*

ANNEXURE

THE LICENCE IS SUBJECT TO THE FOLLOWING CONDITIONS:

1. The Licence shall be non - Transferable.

2. The number of workmen employed as Contract Labour in the establishment shall not, on any day, exceed **50 (FIFTY) NOS.**

3. Except as provided in the rules the fees paid for the grant, or as the case may be, for renewal of the licence shall be non refundable.

4. The rates of wages payable to the workmen by the contractor shall not be less than the rates prescribed for the Schedule of Employment under the Minimum Wages Act, 1948 (11 of 1948), and where applicable and where the rates have been fixed by agreement, settlement or award, not less than the rates so fixed.

5. (a) In case where the workmen employed by the contractor perform the same or similar kind of work as the workmen directly employed by the principal employer of the establishment, the wage rates, holidays, hours of work and other conditions of service of the workmen of the contractor shall be the same as applicable to the workmen directly employed by the principal employer of the establishment on the same or similar kind of work; provided that in the case of any disagreement with regard to the type of work the same shall be decided by the Deputy Chief Labour Commissioner (Central) whose decision shall be final.

(b) In other cases the wage rates, holidays, hours of work and conditions of service of the workmen of the contractor shall be such as may be specified in this behalf by the Deputy Chief Labour Commissioner (Central).

6. Every Contract Labour shall be entitled to allowances, benefits, facilities etc. as prescribed in the Contract Labour (Regulation and Abolition) Act, 1970 (37 of 1970) and Rules made there under.

7. In every establishment where 20 (twenty) or more female workmen are ordinarily employed as contract labour there shall be provided 2 (two) rooms of reasonable dimensions for the use of their children under the age of 6 (six) years. One of such rooms would be used as a playroom for the children and the other as bedroom for the children. For this purpose the contractor shall supply adequate number of toys and games in the playroom and sufficient number of cots and beddings in the sleeping room. The standard of construction and maintenance of the crèches may be such as specified in this behalf by the Chief Labour Commissioner (Central) New Delhi.

8. No women shall be employed by any Contractor before 6 A.M. or after 7 P.M.

   Provided that this clause shall not apply to the employment of workmen in pit head baths, crèches and canteen and as mid-wives and nurses in Hospitals and Dispensaries.

9. The licence shall notify any change in the number of workmen or the conditions of work to the Licencing Officer.

10. A copy of the licence shall be displayed prominently at the premises where the contract work is being carried on.

11. The Licence shall, within 15 (fifteen) days of the commencement and completion of each contract work, submit a return to the Inspector appointed under Section 28 of the Contract Labour (Regulation and Abolition) Act, 1970 (37 of 1970) intimating the actual date of the commencement or, as the case may be, completion of such contract work in FORM VII.

12. Renewal of Licence: Every such application shall be in Form-II (in triplicate) and shall be made not less than 30(THIRTY) days before the date on which the licence expires.

Date: 16.04.2018

Asstt. Labour Commissioner (Central) cum Registering / Licensing Officer Under C.L.(R&A) Act. 1970 * Govt. of India Ministry of Labour & Employment Silchar

Assistant Labour Commissioner (Central) and
Licensing Officer and Registering Officer under
Contract Labour (Regulation and Abolition) Act, 1970

Asstt. Labour Commissioner (Central)
Silchar & Registering/ Licensing Officer
Under C.L. (R&A) Act. 1970

GOVERNMENT OF INDIA
MINISTRY OF LABOUR & EMPLOYMENT
OFFICE OF THE ASSISTANT LABOUR COMMISSIONER (CENTRAL)
COLLEGE ROAD, SILCHAR-788 004, ASSAM
E-mail alc.sil-as@gov.in
TELEPHONE NO. 03842-267330

No. 57 (89) / 2018-S/A

Dated: 16.04.2018

To

M/s POWER MECH PROJECTS LIMITED
POWER GRID CORPORATION OF INDIA LIMITED CONTRACTOR
REPRESENTED THROUGH:
(1) Shri S. KISHORE BABU, CHARIMAN & MANAGING DIRECTOR
S/O SHESHAGIRI RAO SAJJA
(2) Shri N. BHUPESH CHOWDARY, WHOLE TIME DIRECTOR & CEO
S/O ETHIRAJULU NAGINENI
(3) Shri G.D.V.PRASADA RAO, INDEPENDENT DIRECTOR
S/O KRISHNA RAO GORIJALA
(4) Shri SANTOSH KUMAR SINHA, ASSISTANT GENERAL MANAGER (AGM-SMX) & POWER OF ATTORNEY
S/O SHRIDHAR PRASAD SINHA
REGISTERED & CORPORATE OFFICE: PLOT NO. 77, JUBILEE ENCLAVE, OPPOSITE HITEX MADHAPUR, HYDERABAD – 500081. **E-mail info@powermech.net / M – 09371105842.**

Subject: *Building and Other Construction Workers (Regulation of Employment and Condition of Service) Act, 1996 and Building and Other Construction Workers (Regulation of Employment and Condition of Service) Central Rules, 1998 – Issue of Registration to M/s POWER MECH PROJECTS LIMITED, POWER GRID CORPORATION OF INDIA LIMITED CONTRACTOR, REGISTERED & CORPORATE OFFICE: PLOT NO. 77, JUBILEE ENCLAVE, OPPOSITE HITEX, MADHAPUR, HYDERABAD – 500081.*

Dear Sir,

Please refer to your Application for Registration No. PMPL/PGCIL/NAG/SS-PKG/2018-19/06 dated-10.04.2018 (received at this office on 16.04.2018) in respect of Registration under Section 7(3) of the Building and Other Construction Workers (Regulation of Employment and Condition of Service) Act, 1996.

I, in accordance with the provisions under Section-7 (3) of the said Act under the Authority vested to me as the Registering Officer of the area hereby issue the Registration in FORM-II prescribed under the Building and Other Construction Workers (Regulation of Employment and Condition of Service) Act, 1996 against the work "Supply of Services Contract for Substation Package-NAG-SS-04 including Transformer for (i) 132/33 KV Pfutsero (New) S/S and (ii) 132 KV Wokha S/S (Extn) under Transmission System for Nagaland State associated with NER Power System Improvement Project. Specification No. CC-CS/92-NER/SS-3622/1/G3 (NAG-SS-04) & NOA No. CC-CS/92-NER/SS-3622/1/G3/NOA-II/7550 dated-13.12.2017".

The Registration is issued without prejudice to the legal action taken or to be taken by the Department for not obtaining Registration in the past.

Please acknowledge the receipt.

Enclo: 1 (One) Registration.

Yours faithfully,

Assistant Labour Commissioner (Central)
Government of India
SILCHAR

Asstt. Labour Commissioner (C) Silchar * Registering Officer * Govt of India Ministry of Labour & Employment Building & Other Construction Workers (Regulation Employment & Condition of Service) Act, 1996

Copy forwarded to:

(1) *The Deputy Chief Labour Commissioner (Central), GUWAHATI.*
(2) *The Labour Enforcement Officer (Central), LUMDING. A copy of the application for Registration in FORM-I received from the Contractor is enclosed herewith vide Registration No. REG/BOCW/89/2018-S/A dated - 16.04.2018 has been granted to the Contractor for 50 (FIFTY) labours.*
(3) *Shri L. A. Sharma, Assistant General Manager, Power Grid Corporation of India Limited, NERPSIP, Nagaland, Upper Chandmari Lane, PWD Road, Opposite PWD Central Store, Kohima-797001, Nagaland for information.*

16/04/18

Assistant Labour Commissioner (Central)
Government of India
SILCHAR

Asstt. Labour Commissioner (Central)
Silchar & Registering Officer Under
B.O.C.W. (R.E. & C.S) Act, 1996

FORM – II
{See Rule – 24(1)}

No. REG/BOCW/89/2018-S/A

Date: 16. 04. 2018

GOVERNMENT OF INDIA
MINISTRY OF LABOUR & EMPLOYMENT
OFFICE OF THE REGISTERING OFFICER &
ASSISTANT LABOUR COMMISSIONER (CENTRAL)
COLLEGE ROAD, SILCHAR-788004, CACHAR, ASSAM

A certificate of Registration is hereby granted under Sub-Section (3) of Section-7 of the Building and Other Construction Workers (Regulation of Employment and Condition of Service) Act, 1996 and the rules made there under to M/s POWER MECH PROJECTS LIMITED, POWER GRID CORPORATION OF INDIA LIMITED CONTRACTOR, REPRESENTED THROUGH:(1) Shri S. KISHORE BABU, CHARIMAN & MANAGING DIRECTOR, S/O SHESHAGIRI RAO SAJJA (2) Shri N. BHUPESH CHOWDARY, WHOLE TIME DIRECTOR & CEO, S/O ETHIRAJULU NAGINENI (3) Shri G.D.V.PRASADA RAO, INDEPENDENT DIRECTOR, S/O KRISHNA RAO GORIJALA (4) Shri SANTOSH KUMAR SINHA, ASSISTANT GENERAL MANAGER (AGM-SMX) & POWER OF ATTORNEY, S/O SHRIDHAR PRASAD SINHA, REGISTERED & CORPORATE OFFICE: PLOT NO. 77, JUBILEE ENCLAVE, OPPOSITE HITEX, MADHAPUR, HYDERABAD – 500081 having the following particulars subject to conditions laid down in the Annexure.

1	Postal address / location where building orother construction work is to be carried on by the Employer	M/s POWER MECH PROJECTS LIMITED, POWER GRID CORPORATION OF INDIA LIMITED CONTRACTOR, Work Site At – Services Contract for Substation Package-NAG-SS-04 including Transformer for (i) 132/33 KV Pfutsero (New) S/S and (ii) 132 KV Wokha S/S (Extn) under Transmission System for Nagaland State associated with NER Power System Improvement Project
2	Name and address of employer including location of the building & other construction work	As above in Sl. No.1
3	Name and permanent address of the establishment.	M/s POWER MECH PROJECTS LIMITED, POWER GRID CORPORATION OF INDIA LIMITED CONTRACTOR, REGISTERED & CORPORATE OFFICE: PLOT NO. 77, JUBILEE ENCLAVE, OPPOSITE HITEX, MADHAPUR, HYDERABAD – 500081
4	Nature of work in which building workers are employed or are to be employed.	Supply of Services Contract for Substation Package-NAG-SS-04 including Transformer for (i) 132/33 KV Pfutsero (New) S/S and (ii) 132 KV Wokha S/S (Extn) under Transmission System for Nagaland State associated with NER Power System Improvement Project. Specification No. CC-CS/92-NER/SS-3622/1/G3 (NAG-SS-04) & NOA No. CC-CS/92-NER/SS-3622/1/G3/NOA-II/7550 dated-13.12.2017
5	Maximum number of building workers to be employed on any day by the employer	50 (FIFTY) NOS.
6	Probable date of commencement and completion of work	30.11.2017 TO 30.05.2020
7	Other particulars relevant to the Employment of building workers	NIL

Place: SILCHAR
Date: 16.04.2018

Signature of Registering Officer with Seal

Asstt. Labour Commissioner (Central)
Silchar & Registering Officer Under
B.O.C.W. (R.E. & C.S) Act, 1996

ANNEXURE

The registration granted herein above is subject to the following conditions, namely:

(a) The certificate of registration shall not transferable.
(b) The number of workmen employed or building workers in the establishment shall not, on any day, exceed the maximum number specified in the certificate of registration.
(c) Save or provided in these rules, the fees paid for the grant of registration certificate shall be non-refundable.
(d) The rates of wages payable to building workers by the employer shall not be less than the rates prescribed under the Minimum Wages Act, 1948 (II of 1948) for such employment where applicable, and where the rates have been fixed by agreement, settlement or award, not less than the rates so fixed AND
(e) The employer shall comply with the provisions of the Act and the rules made there under.

16/04/18

Signature of Registering Officer with Seal

Asstt. Labour Commissioner (Central)
Silchar & Registering Officer Under
B.O.C.W. (R.E. & C.S) Act, 1996

ANNEXURE IX

Safety Checklists

पावर ग्रिड कारपोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)
पावरग्रिड

(NORTH EASTERN REGION POWER SYSTEM IMPROVEMENT PROJECT)
NAGALAND: KOHIMA
NORTH EASTERN REGION

Ref no: NERPSIP/KOH/HSE//1421 **Date: 06.05.2019**

To

M/s Shyama Power India Ltd.
Naga Cottage, Circular Road
Dimapur-797112, Nagaland

Kind Attention: Mr.D.R.K. Ganesh, GM (Projects)

Sub: Safety Check/Audit

Dear Sir,

I have visited construction sites TW-01(220kV) on 23rd April 2019. The safety Check has been carried out along with your Safety Officer & Site Engineer. During the safety check some lapses pertaining to safety related aspects have been observed. The observations are:-

Location no. AP-03, Zhadima under TW-01

1. First Aid Box & Register was not available at construction site.
2. During audit it has observed that Dust Musk is not provided to the workers.
3. Appropriate safety massages/ Safety poster/Warning shall be displayed at prominent locations of the working site.
4. Pep talk/Tool Box talk record is not available at site. Pep talk/Tool Box talk record shall be maintained at site.

Page-01 (Con.)

You are requested to look in to the matter seriously and comply the observations immediately failing of which, action shall be taken as per terms and condition of contract. The compliance report shall be submitted to NERPSIP, Kohima office. Further it is requested to ensure the implementation of proper safety measures at working site to avoid any problematic incidence.

With Regards,

POWERGRID NERPSIP KOHIMA
पावरग्रिड

Your's faithfully,

Ratan Kumar Jena 06.05.2019

Ratan Kumar Jena
FO (ESM), NERPSIP, Nagaland

Copy to:

1. GM, NERPSIP, Nagaland

पंजीकृत कार्यालय : बी–9, कुतब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली -110016, दूरभाष : 26560121फैक्स : 011-26560039
तार : नेटग्रिड

Registered Office : B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi-110 016, Tel.: 26560121 Fax : 011-26560039
Gram : 'NATGRID'

स्वहित एवं राष्ट्र हित में ऊर्जा बचाएं

Save Energy for Benefit of Self and Nation

POWER GRID CORPORATION OF INDIA LTD.,
(CORPORATE OPERATION SERVICES)

SITE SAFETY INSPECTION / AUDIT CHECK LIST

EXCAVATION & FOUNDATION

DATE OF INSPECTION: 23.04.19 **NAME OF THE LINE :** 220 KV line (TW-01) New Kohima – Mokokchung

LOCATION NO: AP-03 **CLASSIFICATION OF SOIL & TYPE OF TOWER:** DD+6 type Towers

NAME OF THE AGENCY: SHYMA POWER INDIA-Ltd.

SITE ENGINEER / SUPERVISOR OF THE AGENCY: Nirmal.

SAFETY OFFICER OF THE AGENCY: EKRAMUL HAQUE.

S.NO:	CHECK LIST	YES / NO	REMARKS, IF ANY
1	Check List to be verified by the Agency's Site supervisor / Gang leader is available at Site and updated.	YES.	
2	Safe Work Procedures / Instructions in the language understood by the workers available with Site supervisor / Gang leader and workers are aware of the safe work procedures.	YES.	
3	Pep talk on safety issues to the workers being done by the Safety Stewards / Supervisor / Engineer / Safety Officer of the Agency.	NO.	No records maintained by Contractor
4	Appropriate safety messages / warnings are displayed at site to caution the workers	NO	
5	Adequate warning / protection to public / children moving nearby ensured (RED FLAGS / CAUTION TAPE / ROPE / BOARDS).	NO	
6	Sufficient Angle of Repose / slope provided to prevent collapse of soil at vulnerable locations.	YES.	
7	Adequate shoring and shuttering provided in colapsible soil conditions.	YES.	
8	(a) Drilling and Blasting, if any, carried out with adequate precautions. (b) Whether the blaster is a valid license holder?	N/A.	
9	Dewatering of the pits is being done, wherever required.	YES.	
10	Clear edges to prevent fall of objects inside the pit – the excavated earth, stones and tools dumped atleast half of the depth of the pit away from the pit edges.	YES	
11	Machines like concrete mixer, vibrator, etc, placed away atleast half of the depth of the pit from the pit to avoid collapse of the pit due to vibrations produced by these machines.	YES	

Contd..2..

12	The steel plate (chute)used for pouring the concrete into the pit properly anchored to prevent the same from falling into the pit, endangering the persons inside the pit.	YES	
13	Jacks used for supporting the template are properly positioned / anchored to avoid sliding down of the template from the jacks and endangering the workers .	YES	
14	All ladders used are of sound construction, appropriate height and free from any defect.	YES.	
15	All the workers are provided with good quality SAFETY HELMETS confirming to BIS Standard IS:2925.	YES.	
16	All the workers engaged in steel work are provided with LEATHER SAFETY GLOVES.	NO.	
17	The workers engaged in concreting work inside the pit are provided with GUMBOOTS.	YES	
18	The workers engaged in handling cement are provided with appropriate DUST MASKS.	NO.	
19	Appropriate SAFETY BELT / fall protection provided to workers working on form box to pour concrete into the form box / ramming in form box.	YES	
20	(a) First aid box with listed items as per BOCW Act, 1996 available. (b) Number of First Aid Trained persons and their names. (c) First Aid Register is available at site. (d) Nearby medical facilities for use during exigencies identified (Location / Phone No.)	N/A.	
21	Atleast one vehicle (four wheeler) is available for use in case of emergencies.	YES	

POWERGRID NERPSIP KOHIMA

Ratan Kumar Sen

SIGNATURE / NAME / DESIGNATION
OF POWERGRID REPRESENTATIVE

EKRAMUL HAQUE. (SAFETY OFFICER)

SIGNATURE / NAME / DESIGNATION
OF AGENCY'S REPRESENTATIVE

Copy To:

(5) Regional In-charge / POWERGRID / _____

(6) Projects In-charge (Region) / POWERGRID / _____

(7) Site Incharge / POWERGRID / _____

(8) Project In-charge / AGENCY / _____

M/S SHYAMA POWER INDIA LTD.

Safety Related Check List during Construction of Substation

Date of Safety Audit: 08.02.2020

Name of Sub Stn. / Switching Stn.: 132/33 kV New Secretariat Complex (NV)

Voltage Level: 132 kV Name of the Agency: M/S Shyama Power India Ltd.

Name of Sub Contractor: M/S Shyama Power India Ltd.

Safety officer of the Agency Not Available for SS-03 package

Site Engineer/Supervisor of the agency Santosh Pandey

E: GENERAL POINTS COMMON FOR ALL ACTIVITIES DURING EXCAVATION, CASTING OF FOUNDATION

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

S.No.	Description of Activity	Feedback Yes / No	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	Yes.
2.	Check availability of First Aid Box with required medicines at site.	Yes / No	Yes
3.	Check Site Instruction register is available at site.	Yes / No	yes.
4.	Ensure Supervisor / Gang Leader always issues instruction to the Workmen including contractor labour before start of work.	Yes / No	yes.
5.	Ensure supervisory staff from Power Grid is available at site during construction.	Yes / No	yes
6.	Check all driver and plant operators are holding valid driving license.	Yes / No	yes.
7.	Check the vehicle for rescue is available at site.	Yes / No	NO.
8.	Ensure engaged labour are aware of the job.	Yes / No	Yes.
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	yes.
10.	Check for availability and to keep a record of nearby Hospital / Doctor in case of emergencies arises.	Yes / No	yes.
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	Yes / No	yes

Santosh Pandey
08/02/2020.

SHYAMA POWER INDIA LIMITED

8.2.20

	failure of brake system of moving machinery is to be checked.		
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	Yes
13.	Check the competence (Qualification / experience) of supervisor / gang leader of contractor.	Yes / No	Yes
14.	Wire mesh rolls shall be secured in order to prevent dangerous recoiling action.	Yes / No	N/A
15.	Proper unloading arrangement has been made at site (Preferably with crane) to unload the material.	Yes / No	Yes
16.	After unloading the material visual inspection of the 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.	Yes / No	Yes.
17.	While transporting the heavy laden equipment like transformer / Reactor by road from Rly Stn. to Substation 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 & 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"	Yes / No	Yes
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	Yes
19	Check proper illumination is provided at the work places and their approaches including passage ways.	Yes / No	Yes
20	Check that the lamps have been protected by suitable guards where necessary to prevent danger, in case the lamp breaks.	Yes / No	Yes
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	No
22	Check all projected nails has been removed or bent over to prevent injury.	Yes / No	Yes

08/02/2020

SHYAMA POWER INDIA LIMITED SHYAMA

8.2.20

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	Yes
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	N/A
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	Yes
26	Check that the PPEs required by the workmen are being utilized by them always.	Yes / No	Yes
27	Check the worker is under constant surveillance by the other person while working at height.	Yes / No	Yes
28	Check construction site has been barricaded for unauthorized persons / animals.	Yes / No	N.O.
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 will be subjected.	Yes / No	Yes
30	Check structures and equipment is being used only for the purpose for which they were intended.	Yes / No	Yes.
31	Check equipment has been operated by the competent person.	Yes / No	Yes.
32	Check portable ladders shall not exceed 9 Mts. in length, otherwise may cause danger while climbing of person and back legs shall be equally braced.	Yes / No	Yes.
33	Check unskilled labour are not utilized for skilled jobs and only experience persons are deployed for erection.	Yes / No	Yes.
34	Check no metallic measuring tapes are being used during expansion of charged bays.	Yes / No	Yes
35	Check metal ladders are not being used in the vicinity of exposed live electrical equipment.	Yes / No	Yes
36	Check one bore well is available for water supply in case Municipal Construction supply is not available.	Yes / No	Yes
37	Check charged area of a yard should be properly fenced off.	Yes / No	N/A.

08/02/2020.

R.K. Jena
8.2.20

38	Check ladders / lengthy articles / lengthy equipment's etc. should always be carried in horizontal position .	Yes / No	Yes
39	Check insurance by contractor for the labour to provide adequate coverage for any accident etc.	Yes / No	Yes

REMARKS IF ANY:

Signature Name: Santosh Pandey. Designation: Site engg. Representative of Contractor	Signature Name: RATAN KU. JENA Designation: E C E (M) Representative of POGERGRID	Signature Name: Designation:

Copy to:

1) Regional in- charge (Region)/POWERGRID/.....
2) Project manager/POWERGRID/.....
3) Site in charge/POWERGRID/.....
4) Project In-charge/AGENCY/.....

ANNEXURE X

Details of Public Consultation

ANNEXURE X

Details of Public Consultations with Various Stakeholders

Project	Place of Consultation	Persons Consulted
33/11 kV Substation at Lalmati (Zubza)	Substation at Lalmati (Zubza)	Contractor, Contractor labor IA Staff and Villagers
132/33 kV Substation New Secretariat Complex	Construction Site	Contractor, Contractor labor IA Staff and Villagers
33/11 kV Substation at Pfutsero (New)	Construction Site and Power Grid office	IA Staff , Contractor labor, Villagers and Chairman Municipal Corporation, Pfutsero
133/33 kV Substation at Pfutsero (New)		
Transmission Line Pfutsero		
33/11 kV Sub Station (New) Chiephobozou	Labour Camp and Construction Site 33/11 KV Sub Station (New) Chiephobozou	IA Staff , Contractor labor, Villagers
132 kV Substation (Existing) Wokha	Sub Station Construction Site	IA Staff , Contractor labor, Villagers
33/11 kV Chukitong Augmentation DMS	Labour Camp and Sub Station Construction Site	IA Staff , Villagers and Contractor staff & labor,
33/11 kV Augmentation Zunheboto	33/11 KV Substation Zunheboto	IA & DPN staff, Contractor staff & labor and Villagers
132/33 kV Substation (New) Zunheboto	Construction Site and Lizo Old Gram Budha residence	IA staff, Contractor staff & labor and Villagers
132/33 kV Mokokchung State Sub Station	Mokokchung State Sub Station Construction Site	IA & DPN staff, Contractor staff & labor and Villagers
33/11 kV Mokokchung Hospital DMS New	Mokokchung Hospital DMS Construction Site	IA staff and Contractor labor
33/11 kV Mokokchung Power House DMS	Mokokchung Power House Site	IA & DPN staff
132/33 kV Lognak Sub Station (New)	Lognak Sub Station Construction Site	IA & DPN staff, Contractor staff & labor and Villagers
33/11 kV Longtho Sub Station (New)	Longtho Sub Station Construction Site	IA staff, Contractor staff & labor and Villagers
33/11 kV Augmentation Industrial Estate, Dimapur	Industrial Estate, Dimapur	IA and Contractor staff
132/66/33 kV Nagarjan Subsation (Existing), Dimapur	Nagarjan Subsation	IA and Contractor staff
33/11 kV Substation (New) Padam Pukhri	Padam Pukhri Substation Construction Site	IA staff, Contractor staff and labor


33/11 kV Substation at Lalmati (Zubza)


132/33 kV Substation at Secretariat Complex


Tower Erection Site and Site Office at Pfutsero


33/11 kV Substation at Chiephobozou

132/33 kV Substation at Wokha

33/11 kV Substation at Chukitong

33/11 kV Substation at Zunheboto

132/33 kV Substation at Zunheboto

Old Lizo Village, Zunheboto

33/11 kV Substation at Changtongya

132/33 kV Substation at Mokokchung (State)

33/11 kV Substation at Mokokchung Hospital Area

33/11 kV Substation at Longtho

132/33 kV Substation at Lognak

33/11 kV Substation at Industrial Estate

33/11 kV Substation at Nagarjan

33/11 kV Substation at Padampukhri

Interaction with GM, POWERGRID at Kohima

Details of Public Consultation with Photographs

Project	Date of Meeting	Venue of Meeting	Mo. of Persons Attended	Persons Attended
132 KV D/C New Kohima (Zhadima) to New Secretariat Complex (NU campus) Line	09.12.2014	Conference hall, DC Office, Kohima	16	Village head, Senior persons and general public, DPN Members, PGCIL representatives
220 KV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha line	18.02.2015	Conference Hall, DC Office, Zunheboto	77	Land Owner, Village head & Residents of Zunheboto districts
	18.03.2015	Conference hall, DC Office, Mokokchung	21	Land Owner, Village head & Residents of Mokokchung town
33/11kV S/s at Pfutsero (New)	20.11.2017	Office of the PD, SPCU NERPSIP, Pfutsero	07	Village head, Senior persons and general public, DPN Members, MSU members (Land owner) & PGCIL representatives.
132 KV D/C New Kohima (Zhadima) to New Secretariat Complex (NU campus) Line	19.04.2018	Conference hall, DC Office, Kohima	14	Village head, Senior persons and general public, DPN Members, PGCIL representatives
220 KV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha line	27.06.2018	EAC Office, Botsa, Kohima	15	Village head, Senior persons and general public, Land owners
	12.07.2018	Conference Hall, DC Office, Zunheboto	09	Village head, Senior persons and general public, Land owners
	19.07.2018	Village council hall of Longkhum, Mokokchung	32	Village head, Senior persons and general public, Land owners
	22.07.2018	Sattsu Village, Mokokchung	14	Project affected person, village headmen, PGCIL & SPIL Representatives.
	28.07.2018	Tseminyu Village, Kohima	15	Project affected person, village headmen, PGCIL & SPIL Representatives.
	22.11.2018	Tesophenyu village, Kohima	11	Project affected person, village headmen, PGCIL & SPIL Representatives.
	24.11.2018	Alichan village, Mokokchung	15	Village headmen, farmers, PAPs etc.
	07.12.2018	Tesophenyu village, Kohima	12	Village council members/ village headmen, project affected persons & PGCIL representatives.

Project	Date of Meeting	Venue of Meeting	Mo. of Persons Attended	Persons Attended
220 KV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha line	27.03.2019	Phisumi Village, Mokokchung	12	Project affected person, village headmen, PGCIL & SPIL Representatives
	29.03.2019	Philimi Village, Mokokchung	11	Project affected person, village headmen, PGCIL & SPIL Representatives
Existing 132/66/33kV Nagarjan s/s to New 33/11kV s/s Padam Pukhri Line	30.05.2019	Office of the Executive Engineer, Dimapur.	12	Village Council Chairman/G. B's of Nharbari & Phaipijan, PGCIL, sterling & Wilson Pvt. Ltd and DoP representatives.
LILO of both ckts of 132kV D/C Kohima-	26.07.2019	DC Office, Phek.	10	Village council members/ village headmen, farmers, project affected persons etc.
Meluri (kiphire) line at Pfutsero	02.08.2019	Additional Deputy Commissioner office Pfutsero.	16	Village head, Village chairman, Land Owners, ADC Phek & PGCIL officials.
132 kV S/C (on D/C tower) Wokha-Zunheboto-Mokokchung line	04.09.2019	Rotomi village, Zunheboto	08	Village council members/ village headmen, farmers, project affected persons etc.
	04.09.2019	Philimi Village, Zunheboto.	15	Village council members/ village headmen, farmers, project affected persons PGCIL & SPIL representatives etc.
220 KV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha line	07.09.2019	Botsa village GB's house, Kohima.	16	Land Owners, Botsa village G.B's SPIL & PGCIL officials
LILO of 132kV S/C Kohima-Wokha at new Kohima Line	22.09.2019	Phezha village, Kohima	09	Land Owners, Phezha village G.B's SPIL & PGCIL officials
	25.09.2019	Zhadima village council hall, Kohima	32	Land Owners, Zhadima village G.B's, Village council members, SPIL & PGCIL officials
Establishment of 33/11 kV substation at Lalmati (Zubza)	25.09.2017	Zubza village community hall, Kohima	11	Village council members/ village headmen, farmers, PAPs
Establishment of 33/11 kV substation at Zhadima (Chiephobozou)	12.10.2017	Chiephobozou, Kohima	10	Villagers mostly women
132 KV D/C New Kohima	20.04.2018	Zhadima village head's house,	10	Village council members/ village headmen, farmers,

Project	Date of Meeting	Venue of Meeting	Mo. of Persons Attended	Persons Attended
(Zhadima) to New Secretariat Complex (NU campus) Line		Kohima		PAPs
	09.05.2018	Zhadima village head's house, Kohima	18	Village council members/ village headmen, farmers, PAPs
220 KV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha line	09.07.2018	Alichan village head's house	5	Village headmen, PGCIL & SPIL Representatives.
	14.07.2018	Teroguuvonou Village, Kohima	12	Project affected persons, village headmen, PGCIL & SPIL Representatives
	25.07.2018	Nsunyu village, Kohima	10	Project affected persons, village headmen, PGCIL & SPIL Representatives
132 KV D/C New Kohima (Zhadima) to New Secretariat Complex (NU campus) Line	11.09.2018	Phezha village, Kohima	08	Project affected persons & PGCIL Representatives.
	19.09.2018	Tsiesema Village, Kohima	06	Project affected persons & PGCIL Representatives.
220 KV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha line	10.01.2019	Teichuma Village, Kohima	06	Project affected persons, PGCIL & SPIL Representatives
132 KV D/C New Kohima (Zhadima) to New Secretariat Complex (NU campus) Line	18.01.2019	Zhadima Village, Kohima	15	Project affected persons, PGCIL Representatives
	20.01.2019	Tsiesema village, Kohima.	04	Project affected persons, PGCIL Representatives
	24.01.2019	Zhadima Village, Kohima	15	Project affected persons, Village head, PGCIL Representatives
	13.02.2019	Zhadima Village, Kohima	5	Project affected persons, Village head, PGCIL Representatives
	15.02.2019	Zhadima Village, Kohima	6	Project affected persons, Village head, PGCIL Representatives
	20.02.2019	Zhadima Village, Kohima	4	Project affected persons, Village head, PGCIL Representatives
	10.04.2019	Zhadima Village, Kohima	4	Project affected persons, Village head, PGCIL Representatives
220 KV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha line	25.04.2019	Teichuma village, Kohima	6	Project affected persons, PGCIL Representatives
132 KV D/C New Kohima (Zhadima) to New	06.05.2019	Zhadima Village, Kohima	03	Project affected persons, PGCIL Representatives

Project	Date of Meeting	Venue of Meeting	Mo. of Persons Attended	Persons Attended
Secretariat Complex (NU campus) Line				
220 KV S/C (On D/C Tower) New Kohima-Mokokchung via Wokha line	11.05.2019	Ehunnu Village, Kohima	06	Project affected persons, PGCIL Representatives
	08.06.2019	Ehunnu Village, Kohima	04	Project affected persons, PGCIL Representatives
	20.06.2019	Ehunnu Village, Kohima	05	Project affected persons, PGCIL Representatives
	25.06.2019	Nsunyu Village, Kohima	10	Project affected persons, PGCIL & SPIL Representatives
	11.07.2019	Nsunyu Village, Kohima	11	Project affected persons, PGCIL & SPIL Representatives
	24.07.2019	Chiechama village, Kohima	10	Project affected persons, PGCIL & SPIL Representatives
	26.07.2019	Chiechama village, Kohima	06	Project affected persons, PGCIL Representatives
132 KV D/C New Kohima (Zhadima) to New Secretariat Complex (NU campus) Line	29.07.2019	Zhadima village, Kohima	04	Project affected persons, PGCIL Representatives
	08.08.2019	Phezha village, Kohima	04	Project affected persons, PGCIL Representatives
LILO of 132kV S/C Kohima- Wokha at new Kohima line	10.09.2019	Phezha village, Kohima.	04	Project affected persons, PGCIL Representatives
	16.09.2019	Phezha village, Kohima	03	Project affected persons, PGCIL Representatives

DEPT. OF POWER, GOVT. OF NAGALAND
A.G. Colony, Kohima, Nagaland 797005

Minutes of Public Consultancy Meeting held on 09th Dec 2014 at DC Office Kohima, Nagaland

Subject - Construction of 132 KV D/C New Kohima- New Secretariat Complex Transmission Line, and 220 KV New Kohima – Mokokchung via Wokha Transmission Line and associated Distribution Network under NERPSIP in Kohima, Nagaland.

Annexure - Members of the village council/general public and officials of Dept. of Power, Govt. Of Nagaland and Power Grid Corporation of India Limited (PGCIL) who attended the meeting.

The public and officials of Dept. of Power, Nagaland and PGCIL who attended the meeting is enclosed in Annexure.

Public relation Meeting matise at DC Court, Kohima dt : 09/12/2014, dangor manuh ADC aru Power Dept. Nagaland laga Superintendent Engineer Khose Sale Sir , tai khan meeting matise.

Ami khan basti laga GB(Gaun Bura), basti laga Chairman aru Secretary aru basti laga manuh vi ahise.

Power Dept. laga Sale Sahab eitu Project nimite pura kothatu basti manuh khan ke bujai dise aru tai khan koise e Project laga Poisa tu World Bank aru Central Government of India mili kena eitu Project banai ase.

Power Dept. laga Sale sahib Powergrid Dept. manuh ke ek bar Village manuh ke bujai dibole koise.

Powergrid laga Barman Sahab Village manuh khan ke sob khuli kini koise aru Village laga manuh pora Cooperation bisarise.

Barman sahib e Line laga pura Description Village manuh khan ke bujai dise je ekta 132 KV D/C New Kohima- New Secretariat Complex T/L hobo aru ekta 220 KV S/C New Kohima – Mokokchung via Wokha T/L hobo aru ekta dangor Substation 132 KV New Kohima te hobo.

Ei Project tu North Eastern Regional Power System Improvement Project (NERPSIP) for Nagaland laga hoi ase.

Ei line banabo time te manuh laga ghor olop man beya hobo pare, ami jiman ta pare manuh laga ghor te bachai kini jabo. Ghor karubar beya hole, Government laga niyomte POWERGRID poisa di dibo.

Alag alag Village laga GB, Chairman aru aha manuh khan eitu huni khena besi khusi hoise, aru village manuh khanke koise jiman paribo tai khan ke pura madad koribo, aru Poisa lagile vi ami khan Capacity te jiman paribo olop olop madad koribo.

ADC Village pora aha manuh khan ke dhonyabad dise, aru jiman pare Project laga help koribo koise, aru eitu Project te hole Nagaland Power Scenario bhal hobo buli koise.

Khose Sale
Superintendent Engineer

Dept. of Power, Nagaland

ATTENDANCE SHEET FOR THE PUBLIC CONSULTANCY MEETING HELD AT KOHIMA ON 09/12/2014, REGARDING THE NERPSIP PROGRAM UNDER WORLD BANK ASSISTANCE.

VENUE: KOHIMA.

DATE: 09-12-2014.

Sl. no	Name.	Signature	Name of the Representing Organisation/Village
1.	Nu'depfü	[signature]	Thizama Village
2.	Väyiezhou	[signature]	Tsiesema
3.	Kinyawelie		Tsiesema
4.	Thinuokhrehie	[signature]	Merema
5.	Neelhoulie	[signature]	Merema
6.	Theppelueanyie	[signature]	Heroma
7.	VEKUTO VERO	[signature]	EAC ADC office Chuphobozou.
8.	Vilieo Pusta	[signature]	President IYAPO
9.	Tepuhoziil	[signature]	Power Dept. Nagaland.
10.	Lobosang Jamir	[signature]	Dept of Power.
11.	Kashe Chishi	[signature]	Deptt. of Power, Nagaland
12.	K. C. Barman	[signature]	POWERGRID
13.	H. R. Choudhury	[signature]	Powergrid
14.	P. K. Sutradhar	[signature]	Powergrid, Dimapur
15.	Lithrongla Tongpi	[signature]	ADC, Kohima.
16.	KHOSE SALE	[signature]	SE Power Deptt.

Photographs of Public Consultation held on 09.12.2014 at DC Office Kohima

DEPT. OF POWER, GOVT. OF NAGALAND

A.G. Colony, Kohima, Nagaland 797005

Minutes of Public Consultancy Meeting held on 18th Feb, 2015 at Conference Hall, DC Office Zunheboto, Nagaland

Subject - **COSTRUCTION OF 132 KV WOKHA- ZUNHEBOTO- MOKOKCHUNG LINE AND ASSOCIATED DISTRIBUTION LINES (WITH FINANCIAL ASSISTANCE OF WORLD BANK) UNDER NERPSIP PROJECT.**

The meeting was presided over by –

Dept. of POWER, Govt. of Nagaland-

1. Sikato – Chief Engineer (Zunheboto Divison)
2. T. Lotha – SDO/Civil- TL (Zunheboto Divison)

NAGALAND GOVERNMENT

1. T. Longkumer – DC / Zunheboto
2. Shanavas C - SDO/Civil

POWERGRID OFFICIALS -

1. P.K.Sutradhar – Manager/ NERPSIP- Nagaland
2. Deep Sarkar – Engineer/ NERPSIP- Nagaland

INTRODUCTION -

The DC began the Proceedings by thanking the people for coming out in huge numbers to attend the Meeting.

After that Mr. Sikato Chief Engineer_Zunheboto of Power Dept./Nagaland, took over. A brief introduction was given to the assembled People about the details of the Project. The NORTH EASTERN REGION POWER SYSTEM IMPROVEMENT PROJECT (NERPSIP) details were given so as to make the people understand the need and urgency for setting up New Transmission Lines and Distribution Network to address the much existing Power Shortage in the Region thereby depleting their Social and Financial Growth.

Then Mr. Sutradhar, Manager/NERPSIP_Nagaland Of Powergrid, made the people aware of the Lines that will be drawn through Zunheboto, and the concerned Villages it will affect and appealed to their good sense for extended Cooperation for successful Implementation of the Project.

DC laga manuh nimite besi ke thanks koise, Public Meeting laga attend koribo ahise.

Tar pise Power Dept. laga Sikato Saheb e NERPSIP laga details manuk kahn ke bujai dise. Bujai se je amar Current laga Problem, solve koribo bisarise. Tar babe manuh Socially and Financially Independent hobo paribo.

Tar pise Powergrid laga Sutradhar Sahab e Zunheboto laga Transmission Lines aru Distribution Network bhal kine bujai dise.

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QUERIES -

The public were keen on the project, and also discussed about the earlier cases when such Projects were taken up by State Govt. and the general public related issues associated with it. someThe various concerns/issues raised by the public were as below:-

- What will be the compensation policy adopted for this project? Whether land value compensation for tower footing will be paid. What will be the basis of tree/crop compensation for this Project?
- Whether the proposed project will enhance the quality of power supply in the villages. Whether this project will help in reducing load shedding problem in the villages?
- Whether local employment opportunity will be generated in this Project

Power Deptt. Nagaland /POWERGRID have addressed the various concerns of the public by explaining that a very transparent compensation policy have been adopted for any damages during the Project. For Tower footing, land compensation to the tune of market value of land as decided by the State Govt/DC will be paid. For other damages for tree/crops, adequate compensation will be paid as per the rate assessed by the District Authority. In all cases, the owner will be taken in to confidence and the concerned Village Council will be consulted. POWERGRID representative explained that the completion of the project will help in reliable power supply in the State and the construction of various distribution lines will help in reliable and uninterrupted power supply to the villages. It was also ensured by POWERGRID in the project, sufficient temporary employment opportunity will be generated for the local people during construction stage. Apart from the above, some of the retired govt. officials who were present in the meeting also raised the issue of safety and protection from transformer/line installed in habitated area and wanted assurance to be given to the public for periodic maintenance of transmission/distribution lines by Power Department Nagaland/POWERGRID in order to ensure reliability and safety. Officials of Power Deptt. Nagaland /POWERGRID appreciated his suggestion and informed that same shall be taken care through contract condition/safety plan.

Manuh khan Project laga kam karone bohut furti paise aru agote State Govt. pora aneka project laga ki ki kotha ase take koi ase. Manuh khan question hudha bilak tu tolote likhise.

- *Manuh khan hudhise je project laga compensation policy ki ase. Tower bonabo laga mati compensation dibo ki nidia. Mahuh laga gos/kheti compensation dibo ki nidia.*
- *Transmission laga line bonale gaote power supply bhal hobo ki nai. Load shading problem thik ho ni nohobo.*
- *Ai project laga local manuh khan ki ki sakori pabo/ gaor mahuh khan ki ki hubidha pabo.*

Power Deptt. Nagaland /POWERGRID manhu khan hudha question bilake bhal kori explain korise aru take koise je Project laga compensation policy sobe bujibo porake bonua hoise aru project laga kiba mati/gos/kheti kharab hole take compensation dia hobo. Transmission Tower laga matir compensation, D/C sahib thik kori dia hisape dia hobo. Aru kheti/gos laga compensation bilak bhi D/C Office laga mahuh fix kori dia dhorone dia hobo. Matir malik bilak ke confidence te loi kine he compensation amount decide kora hobo. Aru dorokar hole village council ke bhi discuss kora hobo. POWERGRID manuh khan ke bujai dise je, ai project bhal kori complete hole Nagaland State laga bohut bhal hobo. Gao bilakte bhal power ahibo aru load shedding problem bilak komi jabo. POWERGRID aru koise je, ai project laga bohut temporary sakori ba kam ulabo aru gaor manuh khan take kori bo paribo. Kisuman retired employee laga manuch janibo bisarise je bosti laga jagate transformer aru line bonale manuh khanor kiba problemhobo pare niki. Tai khan bisarise je Power Deptt. /POWERGRID tai khan ke kotha dibo lagibo. Power Deptt. /POWERGRID tai khan raise kora kotha tuke bhal paise aru manuh khan ke koise je project laga sob kamote safety bilak loi kam kora hobo.

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CONCLUSION –

The Meeting ended on a very Positive Note with the Local People satisfied with the Queries being answered and happy that such Project was coming up, to address their needs.

They assured their full Cooperation in relation to the Project.

Meeting te aha manuh besi khusi hoike jaise, tai khushi hoise je ami tai khan ke help koribo ahise. Tai khan ke e vi koise je kiba problem thakile tai khan kea ami khan ke Help koribo.

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ATTENDANCE FOR THE PUBLIC CONSULTANCY MEETING HELD AT ZUNHEBOTO, NAGALAND ON 18 FEB, 2015, UNDER NERPSIP PROGRAM NAGALAND. (1-21)

Sl No.	NAME		SIGNATURE	VILLAGE
1.	V. C. Khutovi G.B.			SHICHIMI
2.	Mikhoto G.B.			Lumithsami
3.	Khekuto Council, Chairman,		Kgsuomi	Liguomi
4.	Khehovi			L/Avionato
5	Vikheto			Asukhomi
6.	Phuhovi			Asukhomi
7.	Khenoto			Shichimi
8.	Hushito			Lumithsami
9.	Nikheshe	GB		Ligu Nard
10	Toniho	GB		Ligu Nagmito
11	Kiyekhu			Ligu Nam
12.	Homoto	Hd G.B.		Lumami
13.	Shitovi jr	V. Chairman		Lumami
14.	Khehovi	Council	Khevi	Lumami
17	Nikishe	GB		
18	Vitoyi	G.B		Lumami
19	Kiyeh	Hd/Gb	Kiyeh	Lumami
20	Yetishe	VC		Settsumi
21	Ihato	VCC	member	Settsumi
21	Kiyhoto	VC, member		—"—

ATTENDANCE FOR THE PUBLIC CONSULTANCY MEETING HELD AT ZUNHEBOTO, NAGALAND ON 18 FEB, 2015, UNDER NERPSIP PROGRAM NAGALAND. (23-42)

Sl. No.	NAME	SIGNATURE	VILLAGE
23	Khichoshe	[signature] 18/2/2015	Alaphimi
24	Ghotoni	[signature]	,,
25	Kiyeni	[signature]	,,
26	Aelhana	[signature]	,,
27	Vikishe	[signature]	Vekuho (O)
28	Lhoshe	[signature]	,, ,,
29	Tonaho	[signature]	,, ,,
30	Hovishe	[signature]	VEKUHO OLD
31	Sukaho	[signature]	,, ,,
32	Nihoto	[signature]	Phuhun
33	Vihoto	[signature]	Phuhun
34	Pitoni	Pitoni	Phuhun
35	Hanito	[signature]	Khrimto
36	Tokishe	[signature]	Asukhuto Village
37	Ghokheto	[signature]	Khrunitoni
38	Tokiho	[signature]	Rotomi
39	Aholo	Aholo	Rotomi
40	Vashito	[signature]	yeshalutoni
41	Xuzhekhu	[signature]	yesholutomi
42	Xezheto	[signature]	Rotomi

(43-65)

Sl	Name	Signature	Village
43	Khetovi	[signature]	Likami
44	Kughato	[signature]	Likami
45	Hotoi	[signature]	Likami
46	Hekhevi	[signature]	Likami
47	Dohori	[signature]	Likami
48	Vighito	[signature]	Khrimto
49	VINITO	[signature]	Khrimto
50	Tsaryato	[signature]	Asukhuto vil
51,	Mulato chopy	[signature]	Lumami
52,	Vikuto [illegible]	[signature]	-do-
53.	ISATO sumi	[signature]	Lumithsami
54.	L. Khuto sumi	[signature]	Lizu old, village
55	Lukevi [illegible]	[signature]	Philimi
56	[illegible]	[signature]	Lizu
57.	Khuhato	[signature]	Lizu old
58-	Vihozu	Vihozu	Lizu Naghuto
59-	Khuito	[signature]	Lizu Naghuto
60-	Shihoi	Shi	Lizu Arigato
61-	Ihozu GB	[signature]	Lizu Old
62-	Lutovi G.B	[signature]	Asukhomi Village
63-	Vikato H.D.G.B.	[signature]	Asukhomi village
64.	Kihoto [illegible] secy	[signature]	Lizu old [signature]
65,	Vikhei - C/secy	[signature]	Philimi Village.

(66-77)

Sl. No	NAME	SIGNATURE	VILLAGE
1	Hokivi	[signature]	NAGHUTO (OLD)
2	Lozutovi	[signature]	Naghutomi
3.	Kikheho Khulu	[signature]	Naghuto old
4.	Ghukalo Khuyu	[signature]	Asukhomi
5.	Yehelo Sema	[signature]	Lizu Awokato
6	Kaleito Zhimomi	[signature]	Lizu Old
7	Vikuto Chishi	[signature]	Naghuto (old)
8.	Akhlumi Chishi	[signature]	A-EOZBG.
9.	H. T. Singh.	[signature]	
10.	Shanavas. C	[signature] 18/2/10	SDO (Civil) Zbto.
11,	Thonngeno Lotha	[signature]	A.E (Trans)

Photographs of Public Consultation held on 18.02.2015 at Zunheboto


"Department of Power, Govt. of Nagaland"
"PUBLIC MEETING"
Sub: Construction of Transmission Line &
associated distribution lines under WORLD BANK assistance
PROJECT: CONSTRUCTION OF 132 KV S/C (on DIC Tower) WOKHA–
ZUNHEBOTO-MOKOKCHUNG T/L AND ASSOCIATE DISTRIBUTION LINES
Date: 18/02/2015
Venue: Zunheboto

MOM- PUBLIC CONSULTANCY MEETING_ MOKOKCHUNG /NAGALAND

COSTRUCTION OF :-

- **220 KV S/C (ON D/C TOWER) NEW KOHIMA- MOKOKCHUNG T/L**
- **132 KV S/C (ON D/C TOWER) WOKHA – ZUNHEBOTO- MOKOKCHUNG T/L**
- **(LILO OF 132 KV S/C MOKOKCHUNG - MARIANI AT LONGNAK) T/L**

VENUE- CONFERENCE HALL, DC OFFICE, MOKOKCHUNG, NAGALAND.

The meeting was presided over by –

Dept. of POWER, Govt. of Nagaland-

1. Shikato Sema – Executive Engineer/ TL (Mokokchung Division)
2. T. Lotha – SDO/Civil- TL (Mokokchung Division)
3. Shilu – SDO/TL (Mokokchung Division)

NAGALAND GOVERNMENT

1. Sushil Kumar Patel – DC / Mokokchung
2. Moa Aier - Executive Engineer/Electrical.

POWERGRID OFFICIALS -

1. P.K.Sutradhar – Manager/ NERPSIP- Nagaland
2. Deep Sarkar – Engineer/ NERPSIP- Nagaland

INTRODUCTION -

The DC began the Proceedings by thanking the people for coming out in huge numbers to attend the Meeting.

After that Mr. Sikhato Executive Engineer/Mokokchung of Power Dept./Nagaland, took over. A brief introduction was given to the assembled People about the details of the Project. The NORTH EASTERN REGION POWER SYSTEM IMPROVEMENT PROJECT (NERPSIP) details were given so as to make the people understand the need and urgency for setting up New Transmission Lines and Distribution Network to address the much existing Power Shortage in the Region thereby depleting their Social and Financial Growth.

Then Mr. Sutradhar, Manager/NERPSIP_Nagaland Of Powergrid, made the people aware of the Lines that will be drawn through Mokokchung, and the concerned Villages it will affect and appealed to their good sense for extended Cooperation for successful Implementation of the Project.

DC laga manuh nimite besi ke thanks koise, Public Meeting laga attend koribo ahise.

Tar pise Power Dept. laga Sikhato Saheb e NERPSIP laga details manuk kahn ke bujai dise. Bujai se je amar Current laga Problem, solve koribo bisarise. Tar babe manuh Socially and Financially Independent hobo paribo.

Tar pise Powergrid laga Sutradhar Sahab e Mokokchung laga Transmission Lines aru DISTRIBUTION Network bhal kine bujai dise.

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QUERIES -

People were keen, and discussed about the earlier cases when such Projects were taken up by State Govt. and the problems they faced.

Some QUESTIONS/ CONCERNS that were brought forward by the local public were –

1. **How will the Power Supply benefit them ?**
2. **What is the Compensation Policy of the Organization for the Project ?**
3. **What are the Safety Measures that will be undertaken ?**

THE POWERGRID OFFICIALS AND POWER DEPT./NAGALAND OFFICIALS addressed the Issues/Concerns in the following manner :

- ⇨ Mr. Sikato of POWER DEPT. had to explain them about the crisis they were facing in Power, and the MegaWatt requirement, that needs to be fulfilled for averting the frequent Power Cuts.

- ⇨ Mr. Sutradhar of POWERGRID explained that for the Trees and Crops that are damaged, Compensation will be given as per the Norms by District Revenue Authority.

- ⇨ Mr. Sutradhar stressed that Proper and Adequate Safety Measures like maintaining a Proper Ground Clearance, Safe Installation and Periodic Quality Maintenance will be taken up in the Project so that the People working in the nearby fields or dwellers do not face problem.

Manuh khan question vi hudise-

1. **Transmission laga line Nobonale ki Problem ase?**
2. **Ami laga Compensation Laga Problem keneke solve koribi?**
3. **Ami laga Safety dibi ki nai ?**

Manuh khan jobab bhal kine di dise sahib bilake –

- ⇨ Sikato sahib laga manuh khan ke bujai dise je Nagaland te Zunheboto laga aru baki District te besi Power laga shortage aru Load Shedding hoise. Heitu nimite amake better Future dibo.

- ⇨ Sutradhar, Powergrid laga Sahab e bujale je Compensation amount District revenue laga Sahab bilake Offer koribo. Amar Trees aru Crops nimite damage Compensation dibo .

- ⇨ Sutradhar, Powergrid laga manuh khan ke bujai dise je, safety bhal pine sabo.... Ground pora sufficient distance ot Line tanibo, aru Tower laga area tu Protection , maintenance dibo.

==========

CONCLUSION –

The Meeting ended on a very Positive Note with the Local People satisfied with the Queries being answered and happy that such Project was coming up, to address their needs.

They assured their full Cooperation in relation to the Project.

Meeting te aha manuh besi khusi hoike jaise, tai khushi hoise je ami tai khan ke help koribo ahise. Tai khan ke e vi koise je kiba problem thakile tai khan kea ami khan ke Help koribo.

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ATTENDENCE FOR PUBLIC MEETING AT MOKOKCHUNG ON DATED 18-03-2015

NERPSIP : NAGALAND

Sl.No.	NAME	Signature	Village Name
01	Imlik ozukshi		Longkhum
02	Kikayangba CKM.		"
03	Mangyang James		Longkhum.
04	S. Sendangtemba		"
05	Impuren.		Ungma
06	Tenzing Lotha		Ungma
07	R. Murphi Jr C/chairman		Ungma
08	Kaputemjen		Ungma.
09	Tiakaba VCC		Sekisi
10	Secretary CAD		Sekisi
11	Aaguwati		Sekisi
12	Kalemsangba		Longkhum
13	Imodangba		Chongpi.
14	Mayangjemba		Changki.
15	Siiboneymeren.		Changki.
16	Kendimemba Ansi		Changki
17	Er. Thungbemo Lotha		Trans MKG.
18	Er. SHILU LKR		SDO (Trans) Mkg.
19	Er. Moa Aier		EE(E) Mkg
20	Er. Shikato Soma.		EE(T) Mkg.
21	Sushil Kr Patel, IAS		DC, MKG
22			
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PROJECT SUMMARY

DEPARTMENT OF POWER, GOVT. OF NAGALAND

In order to strengthen the power scenario of the North Eastern States including Nagaland, the Government of India with the financial assistance of the WORLD BANK, has formulated the **North Eastern Region Power System Improvement Project (NERPSIP)** which envisages in construction of new power Sub-stations, Transmission & Distribution lines and simultaneously augmentation/expansion of the existing Sub-stations and Transmission lines. The NERPSIP in the state of Nagaland broadly aims at:-

- Load enhancement of the transmission and distribution network of Nagaland as well as reducing the transmission and distribution (T & D) loss.
- To adequately address the demand side management for ensuring adequate supply of electricity.

Department of Power, Govt. of Nagaland is the owner for the projects in the state of Nagaland under NERPSIP. Under the scope of NERPSIP, inter-alia, construction of

220 KV S/C (On D/C Tower) New Kohima- Mokokchung T/L

132 KV S/C (On D/C Tower) Wokha – Zunheboto- Mokokchung T/L.

(LILO Of 132 KV S/C Mokokchung – Mariani at Longnak) T/L

***and associated Distribution* System** will be taken up by **POWERGRID** on behalf of **Dept. of Power, Nagaland** and handed over to the State after completion of the project. The construction of the above transmission line doesn't require any permanent land acquisition and the temporary damages caused will be compensated.

We hope that implementation of the North Eastern Power System Improvement Project (NERPSIP) in the state of Nagaland will definitely contribute in the socio-economic development of the state.

Department of Power, Govt. of Nagaland

* Kohima & Mokokchung meeting

PROJECT SUMMARY

DEPARTMENT OF POWER, GOVT. OF NAGALAND

In order to strengthen the power scenario of the North Eastern States including Nagaland, the Government of India with the financial assistance of the WORLD BANK, has formulated the **North Eastern Region Power System Improvement Project (NERPSIP)** which envisages in construction of new power Sub-stations, Transmission & Distribution lines and simultaneously augmentation/expansion of the existing Sub-stations and Transmission lines. The NERPSIP in the state of Nagaland broadly aims at:-

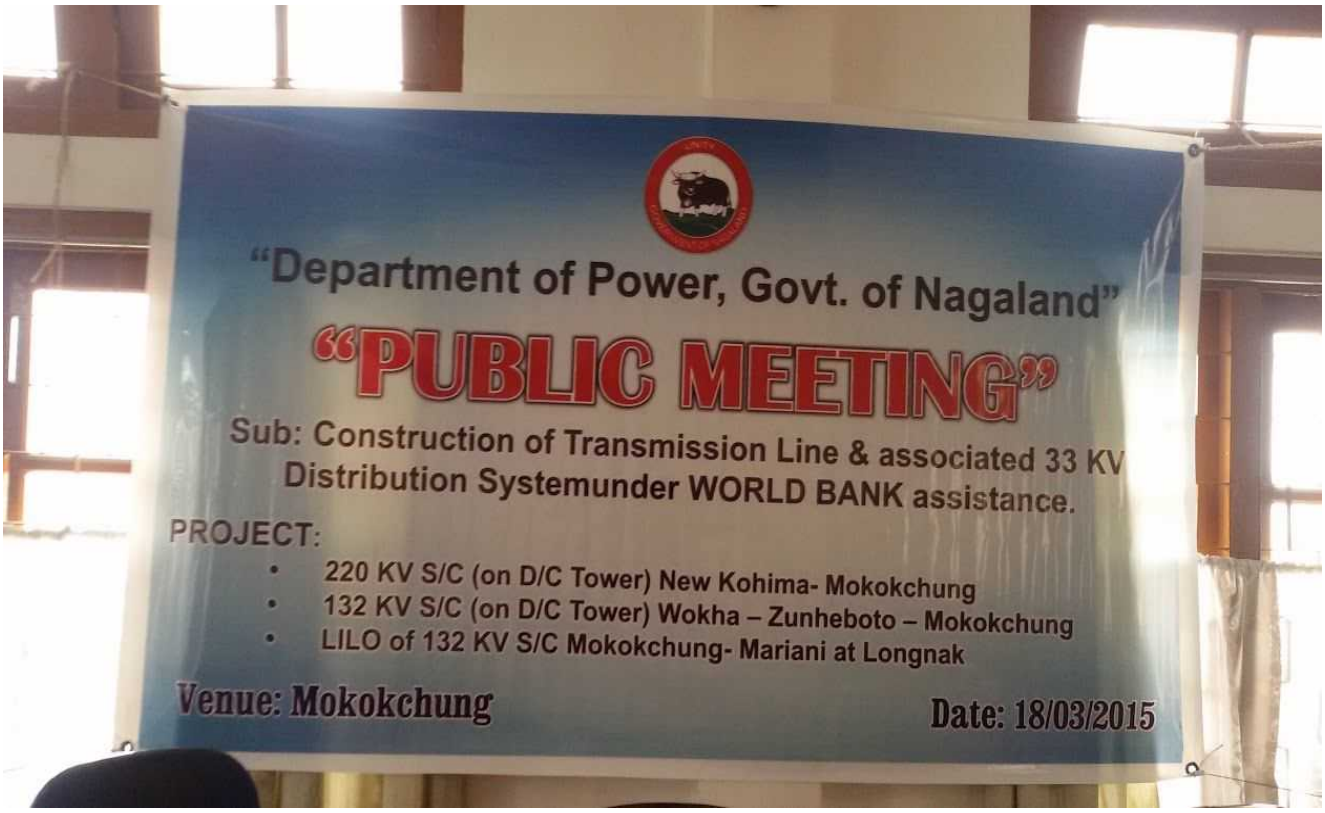
- Load enhancement of the transmission and distribution network of Nagaland as well as reducing the transmission and distribution (T & D) loss.
- To adequately address the demand side management for ensuring adequate supply of electricity.

Department of Power, Govt. of Nagaland is the owner for the projects in the state of Nagaland under NERPSIP. Under the scope of NERPSIP, inter-alia, construction of **132 KV S/C (on D/C Tower) WOKHA- ZUNHEBOTO- MOKOKCHUNG T/L and associated Distribution lines connecting to 33 KV Zunheboto South Point S/s (NEW)** will be taken up by **POWERGRID** on behalf of **Dept. of Power, Nagaland** and handed over to the State after completion of the project. The construction of the above transmission line doesn't require any permanent land acquisition and the temporary damages caused will be compensated.

We hope that implementation of the North Eastern Power System Improvement Project (NERPSIP) in the state of Nagaland will definitely contribute in the socio-economic development of the state.

Department of Power, Govt. of Nagaland

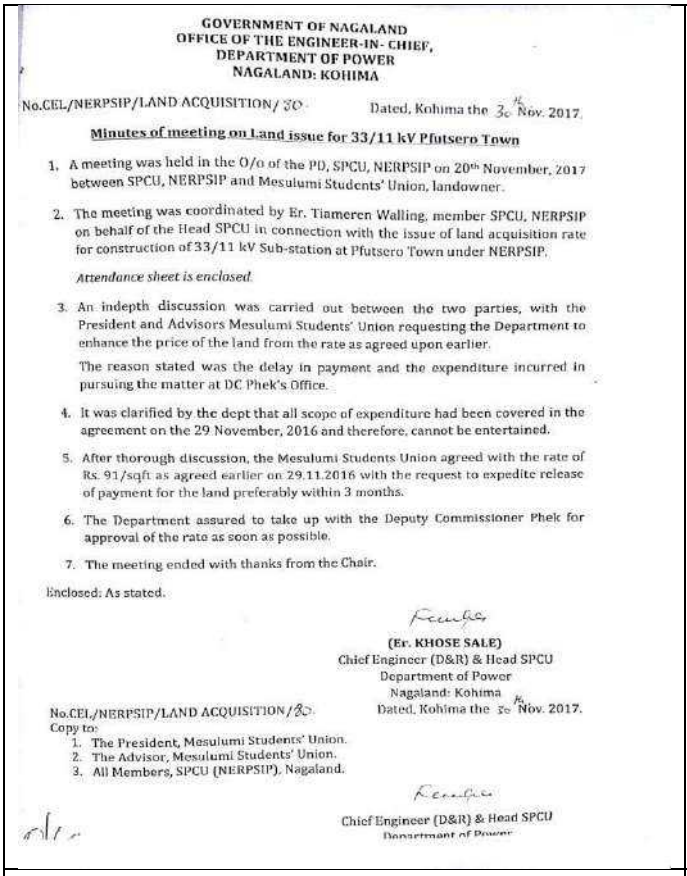
Photographs of Public Consultation held on 18.03.2015 at Mokokchung




"Department of Power, Govt. of Nagaland"
"PUBLIC MEETING"
Sub: Construction of Transmission Line & associated 33 KV
Distribution Systemunder WORLD BANK assistance.
PROJECT:
DC MKG


"Department of Power, Govt. of Nagaland"
"PUBLIC MEETING"
PROJECT:


"Department of Power, Govt. of Nagaland"
"PUBLIC MEETING"



GOVERNMENT OF NAGALAND
OFFICE OF THE ENGINEER-IN- CHIEF,
DEPARTMENT OF POWER
NAGALAND: KOHIMA

No.CEL/NERPSIP/LAND ACQUISITION/ 80 Dated, Kohima the 30th Nov. 2017.

Minutes of meeting on Land issue for 33/11 kV Pfutsero Town

1. A meeting was held in the O/o of the PD, SPCU, NERPSIP on 20th November, 2017 between SPCU, NERPSIP and Mesulumi Students' Union, landowner.
2. The meeting was coordinated by Er. Tiameren Walling, member SPCU, NERPSIP on behalf of the Head SPCU in connection with the issue of land acquisition rate for construction of 33/11 kV Sub-station at Pfutsero Town under NERPSIP.

   Attendance sheet is enclosed.
3. An indepth discussion was carried out between the two parties, with the President and Advisors Mesulumi Students' Union requesting the Department to enhance the price of the land from the rate as agreed upon earlier.

   The reason stated was the delay in payment and the expenditure incurred in pursuing the matter at DC Phek's Office.
4. It was clarified by the dept that all scope of expenditure had been covered in the agreement on the 29 November, 2016 and therefore, cannot be entertained.
5. After thorough discussion, the Mesulumi Students Union agreed with the rate of Rs. 91/sqft as agreed earlier on 29.11.2016 with the request to expedite release of payment for the land preferably within 3 months.
6. The Department assured to take up with the Deputy Commissioner Phek for approval of the rate as soon as possible.
7. The meeting ended with thanks from the Chair.

Enclosed: As stated.

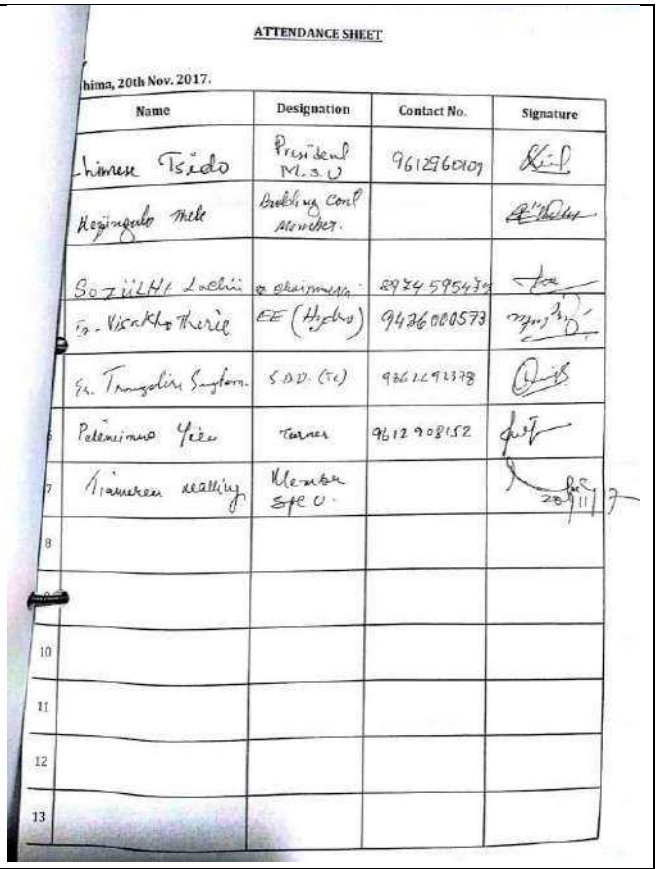
(Er. KHOSE SALE)
Chief Engineer (D&R) & Head SPCU
Department of Power
Nagaland: Kohima

No.CEL/NERPSIP/LAND ACQUISITION/80 Dated, Kohima the 30th Nov. 2017.

Copy to:
1. The President, Mesulumi Students' Union.
2. The Advisor, Mesulumi Students' Union.
3. All Members, SPCU (NERPSIP), Nagaland.

Chief Engineer (D&R) & Head SPCU
Department of Power

Attendance of meeting held on 20.11.2017 at Pfutsero



ATTENDANCE SHEET

hima, 20th Nov. 2017.

	Name	Designation	Contact No.	Signature
	Chimese Tsiedo	President M.S.U	9612960109	
	Hezingulo Mele	Building Cont. Member.		
	Sozülhü Lachü	Chairman	2934595473	
	Er. Vikatho Therie	EE (Hydro)	9436000573	
	Er. Tsungolim Sangtam	S.D.O. (Tc)	9862492378	
	Petemimo Yeze	Turner	9612908152	
7	Tiameren walling	Member SPCU.		20/11/17
8				
9				
10				
11				
12				
13				

Attendance of meeting held on 20.11.2017

Interaction with the village people in connection with the construction of New 33/11 KV Pfutsero S/S.

Interaction with the Land Owner in connection with the construction of New 132/33 KV Pfutsero S/S

Public consultation with Land Owner at Pfutsero on 20.11.2017

Public awareness at Zubza (Lalmati) SS on 25.09.207

Department of Power, Govt. of Nagaland
"Public Meeting"

Sub: Public Awareness meeting for construction of 33/11 KV new sub-station at Zubza, Nagaland under World Bank Assistance.

Venue: Zubza ; **District:** Kohima, Nagaland. Dated: 25.09.2017

List of Participant attended in the meeting

Sl No.	Name & Designation (If any)	Signature	Mobile No.
01	K. LAWRENCE MIASALHOU Nd DB	[illegible]	9436809445
02	Zaseriezo mor DB	[illegible]	8014658048
03	Kelnokera DB	[illegible]	9612002999
04	Lhlhu Meyase DB	[illegible]	9615936351
05	Neichiituo B. B	[illegible]	9856726509
06	Susmita Kumari	[illegible]	9774652140
07	Kelevilie Kehie	K. Lucas.	
08	Thenuneiu Kehie	Thuosa	
09	Zhovinguzhno Kehie	[illegible]	
10	Rajendra Saini	[illegible]	
11	KHRUZO	Khruzo Rhakho (AET)	9612358921
12			
13			
14			
15			
16			

Public awareness meeting held on 25.09.2017(list of participants)

Department of Power, Govt. of Nagaland
"Public Meeting"

Sub: Public Awareness meeting for construction of 33/11KV New Chiephobozou sub-station at Kohima, Nagaland under World Bank Assistance

Venue: Chiephobozou ; **District:** Kohima Dated: 12.10.2017

List of Participant attended in the meeting

Sl No.	Name & Designation (If any)	Signature	Mobile No.
01	PEIINEIKUO KERHÜ-O G.B	[illegible]	9612823922
02	ZAKIELHOULIE GB	[illegible]	8974397210
03	Vilakuolie. Member	[illegible]	9862010955
04	Tsikuo "	[illegible]	9402800809
05	Neikeduo Chadi Head GB	[illegible]	9612328549
06	Rajendra Saini	S/W [illegible]	7085877145
07	Visakuolie Kiewhu	[illegible]	9862969648
08	Susil Kumar Sura.	S/O [illegible]	9668604400
09	KHRUZO	Khruzo Rhakho (AET)	9612358921
10	P.K. Sutradhar	[illegible]	9436275942
11			
12			
13			
14			
15			
16			

Public awareness meeting held on 12.10.2017(list of participants)

Public consultation at Chiepobouzo on 12.10.2017

GOVERNMENT OF NAGALAND
OFFICE OF THE DEPUTY COMMISSIONER
KOHIMA: NAGALAND

MEETING NOTICE
Dated Kohima the April 2018

NO. REV/33/11/KV/2010/___/// It is hereby informed to all concerned that a meeting is convened on the 19th April 2018 at 11:00 Am, in the Conference hall of the Deputy Commissioner, Kohima for discussion of acquisition of land at Ziezou, Zhadima, Phezha, Cieswema, and Nagaland University for setting up of 132 kV D/C transmission line.

Therefore, all concerned are requested to be present on the date without fail.

Sd/-
(RAJESH SOUNDARARAJAN)IAS
Deputy Commissioner
Kohima: Nagaland
Dated Kohima the April 2018

NO. REV/33/11/KV/2010/___///

Copy to:

1. The DGM (NERSIP), Power Grid Corporation of India Limited, Nagaland. For information and necessary action.
2. The Land Records & Survey Officer, Kohima for information and necessary.
3. The Village Council Chairmen, Ziezou / Zhadima / Phezha / Cieswema / Registrar, Nagaland University, Kohima for information and necessary action.
4. The Head DB to cause service of the notice and return the same.
5. Office copy.

10/5/18
(ANYET WALLIEMP)
Revenue Officer
Kohima: Nagaland

Meeting Notice for 132kV TL at DC office, Kohima

GOVERNMENT OF NAGALAND
OFFICE OF THE DEPUTY COMMISSIONER
ZUNHEBOTO: NAGALAND.

No. Dev -10/2018 Zbto Dated the, 5th July'2018

CIRCULAR

In continuation to this office Circular No. Dev-10/2018/223 Zbto Dated the, 30th June 2018 a consultative meeting has been rescheduled on 12/7/18 at 11 AM in the Conference hall of Deputy Commissioner, Zunheboto to discuss the matter pertaining to construction of 220 KV S/C (or D/C Tower) New Kohima (Zadima)-Mokokchung (PGCIL) Transmission line under the North Eastern Region System Improvement Project (NERPSIP) in Nagaland and permission of Right of Way (ROW).

Hence, all affected villages concerned Administrative officers, Transmission Engineer and manager, Power Grid Mokokchung are to attend the meeting as scheduled.

(SHANAVAS.C) IAS
Deputy Commissioner,
Zunheboto; Nagaland.

No. Dev -10/2018 Zbto Dated the, 5th July'2018

Copy to:-

1. The Addl. Deputy Commissioner, Pughoboto/Eac Saptiqa/EAC V.K for information and necessary action.
2. The village council Chairman i) Asukiqa ii) Kitami iii) Council Hall iv) Doyang Chati v) Shena Old vi) Philimi vii) Doyang viii) V.K Town.
3. The Transmission Engineer, NERPSIP for information and necessary action.
4. The Manager, Power Grid Mokokchung for information and necessary action.
5. Office copy.

5/7/18
Deputy Commissioner,
Zunheboto; Nagaland.

Meeting Notice for 220kV TL at DC Zunheboto, Kohima

GOVERNMENT OF NAGALAND
OFFICE OF THE DEPUTY COMMISSIONER
KOHIMA : NAGALAND

NO.REV/132/33kV/2016/ Dated Kohima, the 24th April, 2018

MINUTES OF THE MEETING HELD ON 19TH APRIL, 2018 REGARDING CONSTRUCTION OF 132 kV D/C ZHADIMA – NU CAMPUS TRANSMISSION LINE

A meeting was held on 19th April, 2018 in the Conference Hall of the Deputy Commissioner, Kohima regarding acquisition of land and issue of Right of Way (RoW) for construction of 132 kV D/C New Kohima (Zhadima) – New Secretariat (Nagaland University Campus, Kohima) transmission line.

The meeting was chaired by Shri. Sangmai Imlong, Additional Deputy Commissioner (ADC), Chiephobozou and attended by Officials from the Power Grid Corporation of India Limited and the Village Councils of Ziezou, Zhadima, Phezha and Tsiesema Basa. The Deputy Commissioner, Kohima could not attend the meeting due to another official engagement.

The ADC, Chiephobozou welcomed all the members to the meeting and expressed that the project is a boon to the people for which everybody should be grateful. He requested the village councils to cooperate in giving their land and assist the Power Grid officials in every way possible.

The Power Grid officials gave a brief presentation on the nature of the project and also put forward their requirements including issue of RoW for a successful implementation of the project. The Extra Assistant Commissioner (Revenue), Kohima explained the procedures involved in the acquisition of land and also clarified that RoW permission would be issued only after the acquisition of land is completed.

The Village Councils of Ziezou, Zhadima, Phezha and Tsiesema Basa extended their full cooperation to the project and approved the acquisition of land from their end. However, since the land belonged to private individuals, they sought information regarding which individuals' lands would be acquired. They also enquired about the compensation rates to which it was clarified that a separate meeting would be called regarding that.

Representatives from the Nagaland University were not present. But the Power Grid Officials informed the house that the University has given their assurance in providing the land required for the project.

The meeting decided that the Power Grid officials and the Village Councils would first coordinate and find out the individuals whose lands would have to be acquired. The approval

from the concerned individuals would be taken by the Village Councils on behalf of the Government. Thereafter, the survey of the identified plots would start. It was further decided that the next meeting would be convened after all the aforementioned actions were completed.

The meeting ended with thanks from the Chair.

SD/-

RAJESH SOUNDARARAJAN, IAS
Deputy Commissioner
Kohima, Nagaland

NO.REV/132/33kV/2016/ Dated Kohima, the 21 April, 2018

Copy to:-

1. The Additional Deputy Commissioner, Chiephobozou for information.
2. The DGM (NERPSIP), Nagaland, Kohima for information and necessary action.
3. The Registrar, Nagaland University, Meriema Campus for information.
4. The LRSO, Kohima for information and necessary action.
5. The Village Council Chairman, Ziezou/Zhadima/Phezha/Tsiesema Basa for information and necessary action.
6. The Head DB to cause service of the meeting minutes to all concerned in Sl. No. 5 and return the same.
7. Office copy.

21/4/18

(WEKU ZHIEMI)
Extra Assistant Commissioner (Revenue)
Kohima, Nagaland

Page-2 19th April meeting

Date: 19.04.2018 MEETING ATTENDANCE TIME: 11:00 AM

ACQUISITION OF LAND AT ZIEZOU, ZHADIMA, PHEZHA, TSIESEMA, NAGALAND UNIVERSITY FOR SETTING OF 132 KV/D/C TRANSMISSION LINE

Sl.	NAME	DESIGNATION	CONTACT NO	SIGNATURE
1.	SANGMAI DALONG	ADC, CHIEZOU	–	[signature]
2.	L. A. Sharma	DGM NERPSIP, Powergrid	9435567082	[signature]
3.	P. K. SUTRADHAR	Chief Manager NERPSIP, Nagaland, Powergrid	9436175942	[signature]
4.	S. SARKAR	SR. MANAGER SPIL.	9830583812	[signature]
5.	KHRUZO	AET, POWERGRID	9612358921	[signature]
6.	Ratan Kumar Jena	FC(E/M) Powergrid	7005474646	[signature]
7.	Sukhri Hektam	Supervisor	8974316407	[signature]
	Nirmal Kumar	Sr. Supervisor	09604256824	[signature]
8.	Kiehulue Iseu	Phezha V.C.C.	9436401712	[signature]
9.	Kruzomere	Tsiesema Basa VCC	9436142708	[signature]
10.	Zhinuoneio Sote.	Ziezou Village	7640182590	[signature]
11.	[illegible]	Zhadima Village VCC	[illegible]	[signature]

Attendance sheet of 19th April Meeting

Meeting held on 19th April 2018 at DC office, Kohima



Meeting held on 20th April for 132kV TL at Zhadima village to identify land owner

132 KV Regarding ROW

Date - 20.04.2018
Place - Zhadima, Kohima

AP 28 - AP 19
Attendance Sheet

Sl. No	Name	Dept	Sig	Contact No.
1.	Vibiethou	GB, Zhadima village		9612370237
2.	Kedilezo	GB, Zhadima village		9402723395
3.	KHRUZO	AET (PGCIL)		
4	Rafan Ku. Jena	EO(ECM) PGCIL	R.K Jena	
5	SPIL Surendra Reddy	SPIL	SPIL	8974318909
6	Unito Yepthe	J.E (WEEPSIS)		9402015798

Attendance sheet of meeting held on 20.04.2018



Meeting held on 30th April 2018 for132kV at Tsiesema village



Meeting held on 09th May 2018 at Zhadima with village council member & Landowners

132KV TL Land Identification — Date – 09.05.2018

Attendance sheet AP 18 – AP-13

Sl no	Name	Dept	Sig	Ph
1.	Nileksie-o	V.D 13, members Zhadima vill.		9612637251
2	Thimo Khruzo	V.C.M. Zhadima Village		
3	KHRUZO	AE(T) PGCIL	Khruzo Rhoho	
4	Rafan Ku Jena	FO(ESM) PGCIL		
5	SPIL	SPIL	SPIL	8974318409
6	Unito Yeptho	JE (NERPSIP) Kath		9402025798

Attendance sheet of meeting held in 09.05.2018



Meeting held on 30th May 2018 at Zhadima village council hall for 132kV RoW

Meeting held on 27th June at conference hall of EAC Botsa for 220kV TL.

GOVERNMENT OF NAGALAND
OFFICE OF THE EXTRA ASSISTANT COMMISSIONER
BOTSA: KOHIMA
NAGALAND

NO.BOTSA/VC/2014/.22../ Dated Botsa the 28th June, 2018

CIRCULAR

In pursuance of DC Kohima letter No. REV/PWR/2014/1359 dated Kohima the 11th June, 2018 (a copy of which has been enclosed) survey works relating to the construction of 220 Kv S/C New Kohima (Zhadima) - Mokokchung (PGCIL) transmission lines under Kohima District will be conducted shortly.

In this connection, all the Village Councils of the ear-marked villages under EAC , Botsa circle are requested to kindly extend full co-operation ,including prompt issuance of NOC (No Objection Certificate) to the survey team members.

Enclosed: As stated

(BENDANG LONGKUMER)
EAC Botsa

NO.BOTSA/VC/2014/.22../ Dated Botsa the 28th June, 2018

Copy to:
1. The ADC Chiephobozou for information.
2. The DGM Power Grid Kohima for information.
3. The Chairman, Teichuma Village Council for information & necessary action
4. The Chairman, Tsiemekhuma Bawe Village Council for information and necessary action.
5. The Chairman , Botsa Village Council for information and necessary action..
6. The Chairman Tsiemekhuma Bawe Village for information & necessary action.
7. The Hd. G.B Tsiemekhuma Basa Village for information & necessary action
8. Notice Board.
9. Office Copy

(BENDANG LONGKUMER)
Extra Assistant Commissioner
Botsa , Kohima

Issuance of NOC by EAC, Botsa regarding 220kV TL

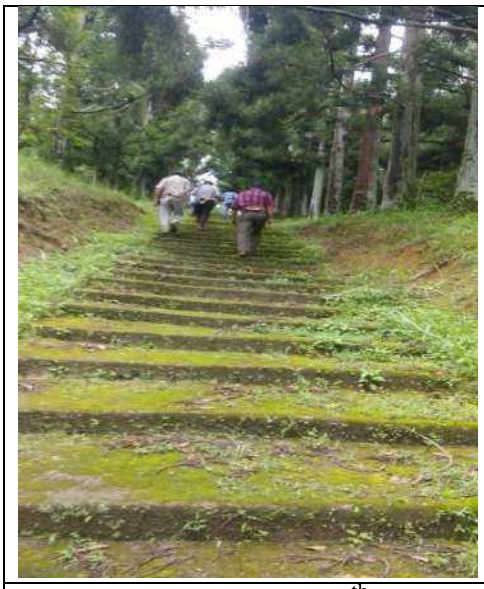
EXTRA ASSISTANT COMMISSIONER
Botsa : Kohima
Nagaland

ATTENDANCE SHEET

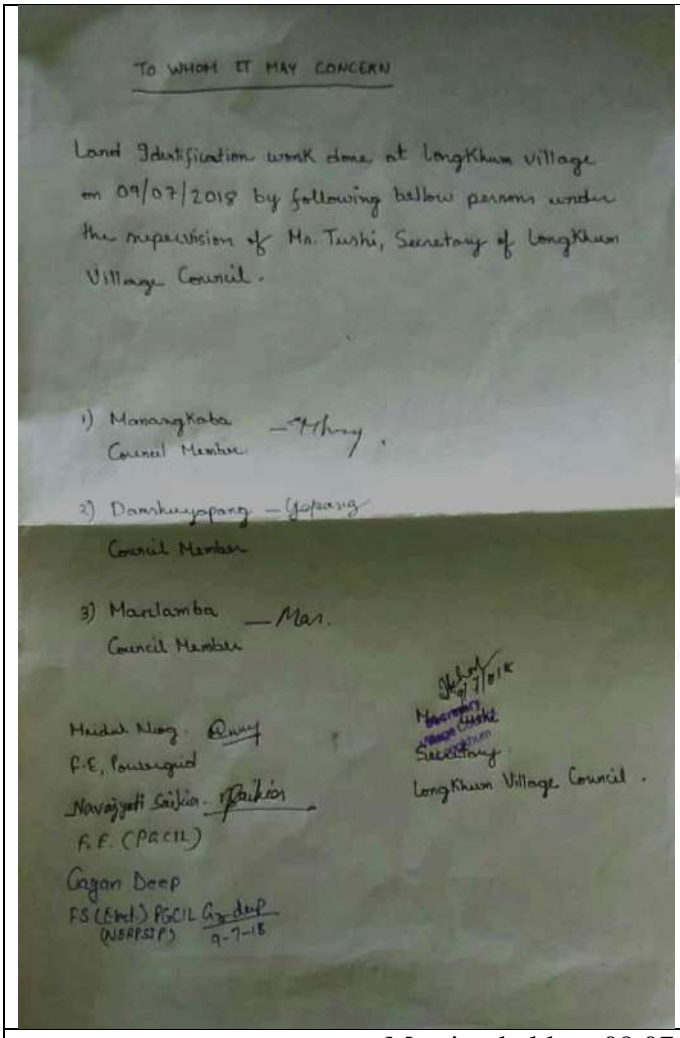
Date 27/6/18

1. BENDANG LONGKUMER — EAC BOTSA
2. L. Amarjit Sharma - DGM, POWERGRID
3. TEPUHOSUL — CEO Kohima Transmission Division. Dept. of Power
4. KUVESU HESUH - FE(CIVIL) POWERGRID - Kuvesu
5. PRAMOD KUMAR FS (Electrical) powergrid Pramod Kumar
6. Tenjen Ao (Division) Powergrid
7. Terisovi-O D.B
8. Lhoulietuo G.B Tsiemekhu Basa.

Attendance sheet of meeting held on 27.06.2018



Meeting held on 09th July at longkhum, Mokokchung (220kV Land identification)



TO WHOM IT MAY CONCERN

Land Identification work done at LongKhum Village on 09/07/2018 by following bellow persons under the supervision of Mr. Tushi, Secretary of LongKhum Village Council.

1) Manangkaba — Council Member.

2) Damkuyapang — Council Member

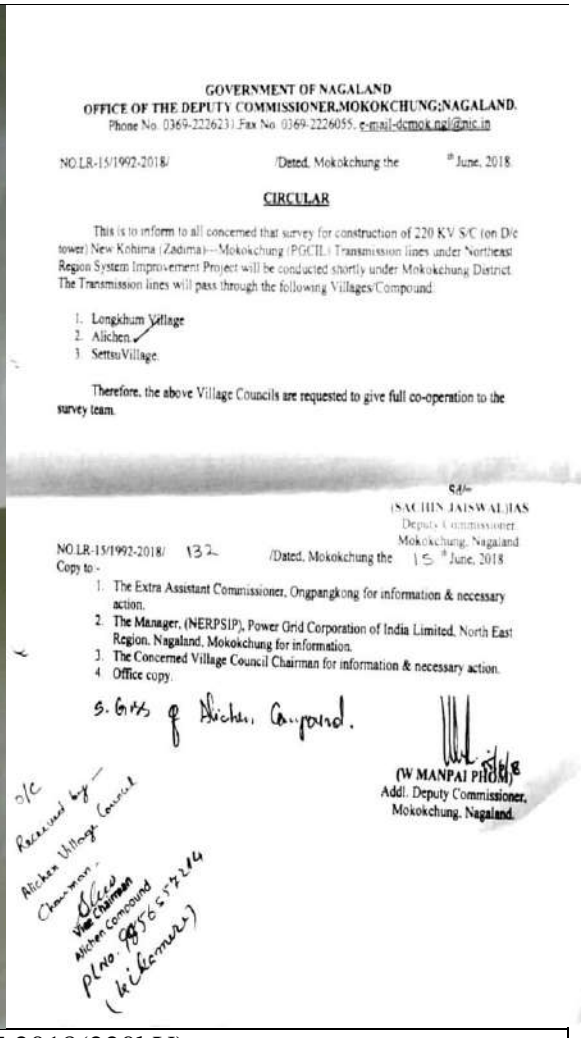
3) Marlamba — Council Member

Hridul Neog. — F.E, Powergrid

Navajyoti Saikia. — F.E. (PGCIL)

Gagan Deep — FS (Retd.) PGCIL (NERPSIP) 9-7-18

Secretary, Village Council, LongKhum Village Council.



GOVERNMENT OF NAGALAND
OFFICE OF THE DEPUTY COMMISSIONER,MOKOKCHUNG;NAGALAND.
Phone No. 0369-222623 | Fax No. 0369-2226055. e-mail-dcmok.nal@nic.in

NO.LR-15/1992-2018/ /Dated, Mokokchung the 8th June, 2018.

CIRCULAR

This is to inform to all concerned that survey for construction of 220 KV S/C (on D/c tower) New Kohima (Zadima)---Mokokchung (PGCIL) Transmission lines under Northeast Region System Improvement Project will be conducted shortly under Mokokchung District. The Transmission lines will pass through the following Villages/Compound:

1. Longkhum Village
2. Alichen.
3. SettsuVillage.

Therefore, the above Village Councils are requested to give full co-operation to the survey team.

Sd/-
(SACHIN JAISWAL,IAS)
Deputy Commissioner,
Mokokchung, Nagaland

NO.LR-15/1992-2018/ 132 /Dated, Mokokchung the 15th June, 2018.

Copy to -

1. The Extra Assistant Commissioner, Ongpangkong for information & necessary action.
2. The Manager, (NERPSIP), Power Grid Corporation of India Limited, North East Region, Nagaland, Mokokchung for information.
3. The Concerned Village Council Chairman for information & necessary action.
4. Office copy.

S. Gaon of Alichen Compound.

(W MANPAI PHOM)
Addl. Deputy Commissioner,
Mokokchung, Nagaland.

D/C
Received by —
Alichen Village Council
Chairman
Alichen Compound
Ph no. 9856572214
(Kilometer)

Meeting held on.09.07.2018(220kV)

GOVERNMENT OF NAGALAND
OFFICE OF THE DEPUTY COMMISSIONER
ZUNHEBOTO: NAGALAND.

No.DEV-10/2015-16 Zbto Dated the, 5th Sept'2018

CIRCULAR

This is to inform all concerned that servey for construction of 220KV S/C (on D/C Tower) New Kohima(Zhadima)- Mokokchung (PGCIL) Transmission lines under North East Region System Improvement Project will be conducted shortly under Zunheboto District.
The transmission lines will pass through the following villages:

1.Askiqa 2. Kitami 3. Ghokimi 4. Shena Old 5. Rotomi 6. Philimi 7. Mukhami 8. Phishumi 9. Ajiqami 10. V.K Town 11. Izheto 12. Sumi Settsu 13. Mapulumi 14. Khrimtomi 15.Sukomi16. Ghukiye 17. Shoipu 18. Nunumi 19. Kichilimi 20. Usutomi 21. Zhevishe 22. Sastami 23. Saptiqa.

Therefore, the above village council are requested to give full co-operation to the survey team.

Sd/-
(SHANAVAS.C)IAS
Deputy Commissioner
Zunheboto; Nagaland.

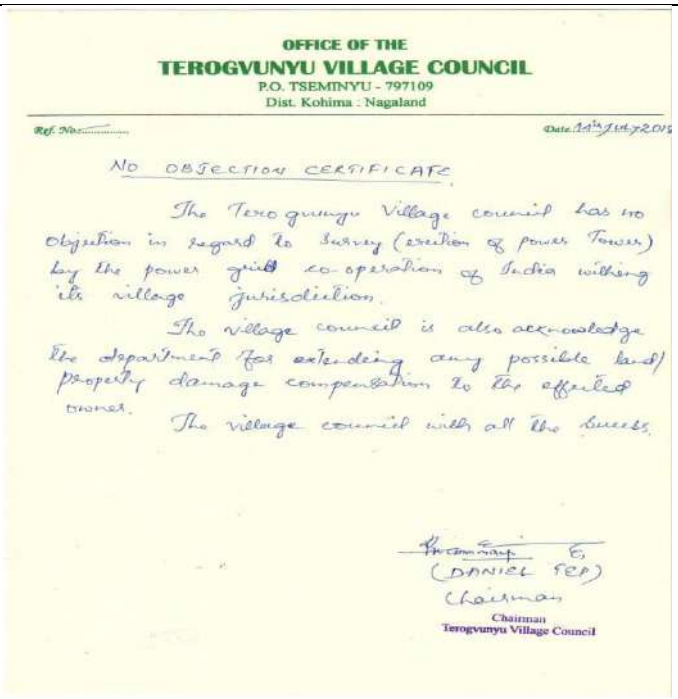
No.DEV-10/2015-16/212 Zbto Dated the, 5th Sept'2018

Copy to:-

1. The Addl. Deputy Commissioner, Pughoboto/Satakha/Atoizu for information and necessary action.
2. The Sub-Divisional Officer(C) Zunheboto Sadar/Akuluto for information and necessary action.
3. The Extra Assistant Commissioner V.K/Akuhaito/Ghathashi/Saptiqa for information and necessary action.
4. The DGM (NERPSIP) Power Grid Corporation of India Ltd, Northeast Region Nagaland, Kohima for information.
5. The Chairman_____village Council for information and cooperation to the survey team.
6. Office copy.

6/9/18
(NAMANG SEPONG CHANG)
Sub-Divisional Officer (Civil)
Office of the Deputy Commissioner
Zunheboto, Nagaland

Circular Came after Meeting held on 12th July2018



OFFICE OF THE
TEROGVUNYU VILLAGE COUNCIL
P.O. TSEMINYU - 797109
Dist. Kohima : Nagaland

Ref. No:..... Date: 14th July 2018

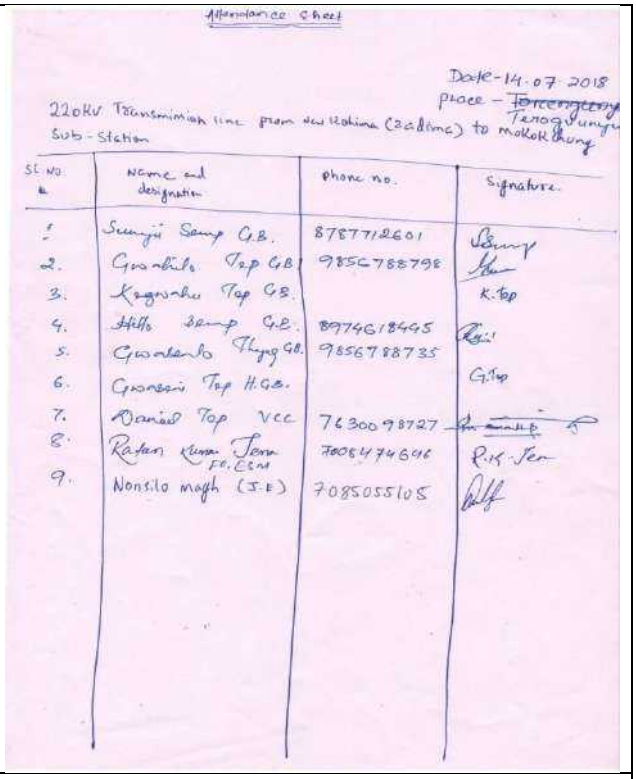
NO OBJECTION CERTIFICATE

The Terogvunyu Village council has no objection in regard to Survey (erection of power Tower) by the power grid co-operation of India within its village jurisdiction.

The village council is also acknowledge the department for extending any possible land/property damage compensation to the affected owner.

The village council with all the success.

(DANIEL YEP)
Chairman
Chairman
Terogvunyu Village Council



Attendance Sheet

Date-14.07.2018
place - ~~Terogvunyu~~ Terogvunyu
220KV Transmission line from new Kohima (220kms) to Mokokchung Sub-Station

Sl. No.	Name and designation	Phone no.	Signature
1.	Seungji Semp G.B.	8787712601	
2.	Gwabilo Top GB	9856788798	
3.	Kaggwabu Top GB.		K.Top
4.	Hillo Semp G.B.	8974618495	
5.	Gwabenlo Thyng GB.	9856788735	
6.	Gwaseni Top H.GB.		G.Top
7.	Daniel Top VCC	7630098727	
8.	Ratan Kumar Jem FO. ECM	7005474646	R.K. Jem
9.	Nonsilo magh (J.E)	7085055105	

14th July 2018 meeting held at Teroguuvonou Village, Kohima

19th July meeting held at Longkhum Village, Mokokchung

Today on 22/07/2018, ~~thursday~~ Sunday at 04:00 PM a meeting was held among Power Grid Corporation of India Limited(PGCIL) and people of Settsu Village at ~~Settsu Community hall~~, Mokokchung regarding the Land identification for Tower location and corridor for the upcoming 220 KV Transmission line from New Kohima Sub-Station to Mokokchung Sub-Station. Hn. Sari, VC & Council hon.

The main moto of this meeting was to inform the villagers about this new line and get consent from them for getting ROW clearances and construction of line.

After the metting it comes to the conclusion that the Settsu's people will give full support for construction of this upcoming line and they have no objection for this work.

Below are the noted Village and PGCIL representatives who were present at the meeting :

For Powergrid:

RAJKUMAR
Manage[illegible]ERPSIP)
Power Grid, Mokokchung
Nagaland-798601

22.07.2018
FE(Electrical)

For Village :

Settsu Village Council

22/7/18
Secretary
Settsu Village Council

YANGER
Yabey
Ruoyabang
LANU -
Repalemba
NOKSHUMEREN

22nd July meeting held at Sattsu Village, Mokokchung


25th July meeting held at Nsunyu Village, Kohima


28th July meeting held at Tseminyu, Kohima

11th Sep.2018 meeting held at Phezha Village, Kohima


19th Sep.2018 meeting held at Tsiesema Village, Kohima


22nd November 2018 meeting held at Tesophenyu, Kohima


24th November 2018 meeting held at Alichan, Ungma village of Mokokchung


07th December 2018 meeting held at Tesophenyu, Kohima

Attendance of the Members Present for the construction of 220kV S/C(on D/C) New Kohima(Zhadima) to Mokokchung held at Tesophenyu on 22/11/2018

SL.No	Name	Designation	Signature
1.	Aham Magh	VCC Sewanu 9366081592	[signature]
2.	N.R. MASH	VCC. Tesophenyu 9383045732	[signature]
3	Sutewar Woch	VCC New Tesop Benyu 9366082689	Sueorms
4.	Aqrralo Nuny	Head G.B.	[signature]
5.	Samuel Seb	VCC Ziphenyu	[signature]
6.	Sapum Chung	Hd GB Tesophenyu	[signature]
7.	Shentheyi Kath	Ex. Chairman Mud Tesophenyu	[signature]
8.	SUBRATA SARKAR	SPIL	[signature]
9.	SUNGKUMLEMBA JAMIR	PGCIL	Sungkum
10.	KHRUZO	PGCIL	Khruzo Rhakho
11	Nonsilo magh	PGCIL	[signature]

Attendance of the Members Present for the construction of 220kV S/C(on D/C) New Kohima(Zhadima) to Mokokchung held at New Tesophenyu on 27/11/2018

SL.No	Name	Designation	Signature
1.	Kezhushe Kath Alnozu	Vanthon land owner	[signature]
2	Sapum Chung	HG.B. Tesophenyu	[signature]
3.	Gwaching Chung	Tesophenyu & land owner	Chung
4.	Bisayi Ted	Ieneles Land owner	[signature]
5.	VIHOZHE	UBC	[signature]
6.	Thonwalo Jame (Apha Benyu)	Land owner	[signature]
7.	Achondoi Key.	land owner	[signature]
8.	Shentheyi Kath	Land owner	[signature]
9.	Nyiklo Key.	Land owner	N Key
10	SUBRATA SARKAR	S.Sarkar (SPIL)	S.Sarkar
11	Nonsilo magh	J.E	[signature]
12.	KHRUZO	ENGINEER	Khruzo Rhakho
13			

OFFICE OF THE

NSUNYU VILLAGE COUNCIL

P.O/P.S. Tseminyu, Kohima - Nagaland - 797109

Ref. No..... Date. 23/01/2019.....

NO OBJECTION CERTIFICATE

This is to Certify that the Land owners and Village Council of Nsunyu have no objection for installation of hydro Power Line.

(JESSE SEB)
Chairman
Nsunyu Village Council

Chairman
Nsunyu Village Council

OFFICE OF THE

NSUNYU VILLAGE COUNCIL

P.O/P.S. Tseminyu, Kohima - Nagaland - 797109

Ref. No..... Date. 23/01/2019.....

SL NO.	LOCATION	NAME	PHONE NO.
1.	AP-105	LOTSUTHANG THONG	9862386446
2.	AP-105A	NYIPENLO SEB	9366813767
3.	AP-106	THANCHAYAMO SEB	8729922045
4.	AP-107	TEZENMO THONG	7005615866
5.	AP-108	NTHANGMO MAGH	8414858812
6.	AP-109	PYUYALO SEMY	8787577710
7.	AP-110	LHOJOMO TEP	8974039342
8.	AP-111	PFUGHAN SEMY	9383235790

(JESSE SEB)
Chairman
Nsunyu Village Council

Chairman
Nsunyu Village Council

NOC From village council

POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

पावरग्रिड

(NORTH EASTERN REGION POWER SYSTEM IMPROVEMENT PROJECT)
NAGALAND
NORTH EASTERN REGION

Today on 24/11/2018, Saturday at 02:00 PM a meeting was held among Power Grid Corporation of India Limited (PGCIL) and people of Alichen Village at Alichen Community Hall regarding the Land Identification for Tower Location and Corridor for the upcoming **220 KV Transmission Line** from **New Kohima Sub-Station** to **Mokokchung Sub-Station.**

The main moto of this meeting was to inform the villagers about this new line and get consent from them for getting ROW clearances and construction of line.

After the meeting, it comes to the conclusion that the Alichen's people will give full support for construction of this upcoming line and they have no objection for this work.

Below are the noted Village and PGCIL representatives who were present at this meeting:

For POWERGRID & SPIL:

1) Maidul Neog
F.E, MKg.

2. (S.S. BORO)
Engineer, NERPSIP, MKG
24/11/18

3. Gr dep
FS (NERPSIP)
24-11-18

4. S. Sarkar
(SUBRATA SARKAR)
SPIL
24.11.18

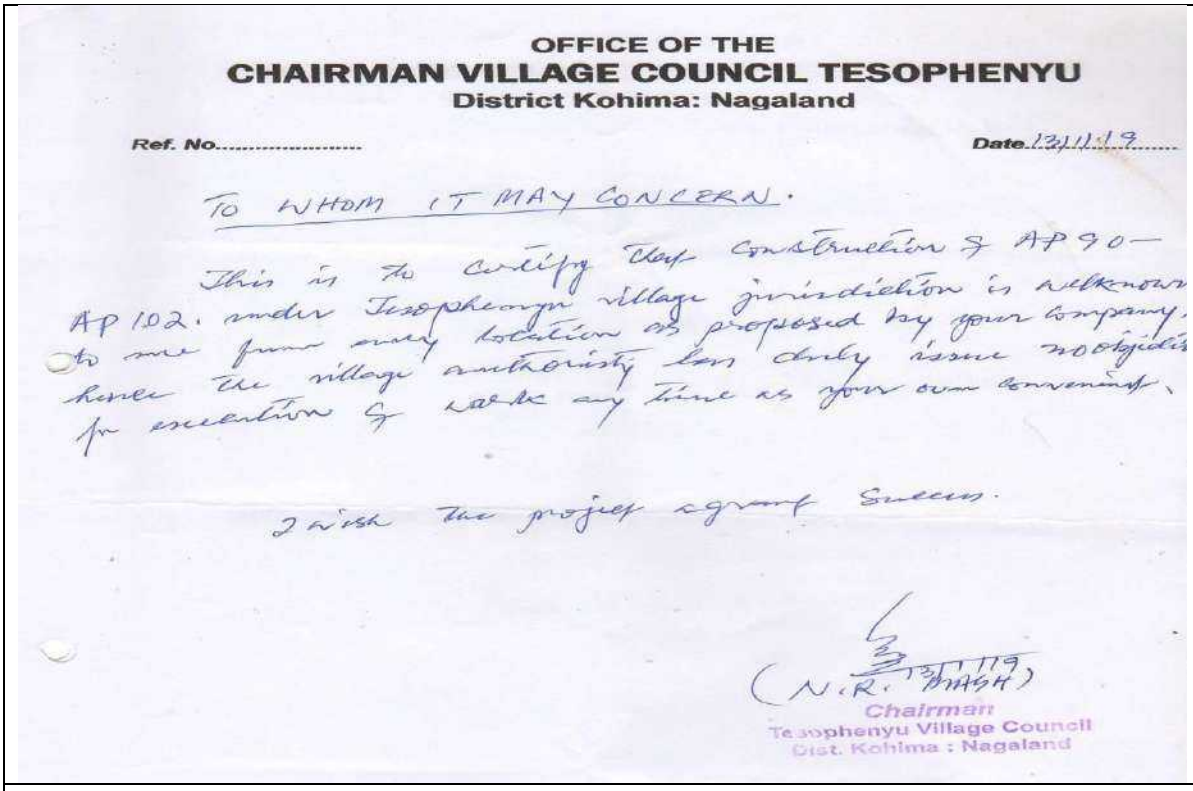
For Village:

1. CHAIRMAN.
Vice Chairman
Alichen Compound -

2. 24/11/2018.
(T. MERANG LONGCHAR)
G.B.
Alichen Compound

3. Secy.
24/11/2018
C. Atsiang

Save Energy for Benefit of Self and Nation



OFFICE OF THE
CHAIRMAN VILLAGE COUNCIL TESOPHENYU
District Kohima: Nagaland

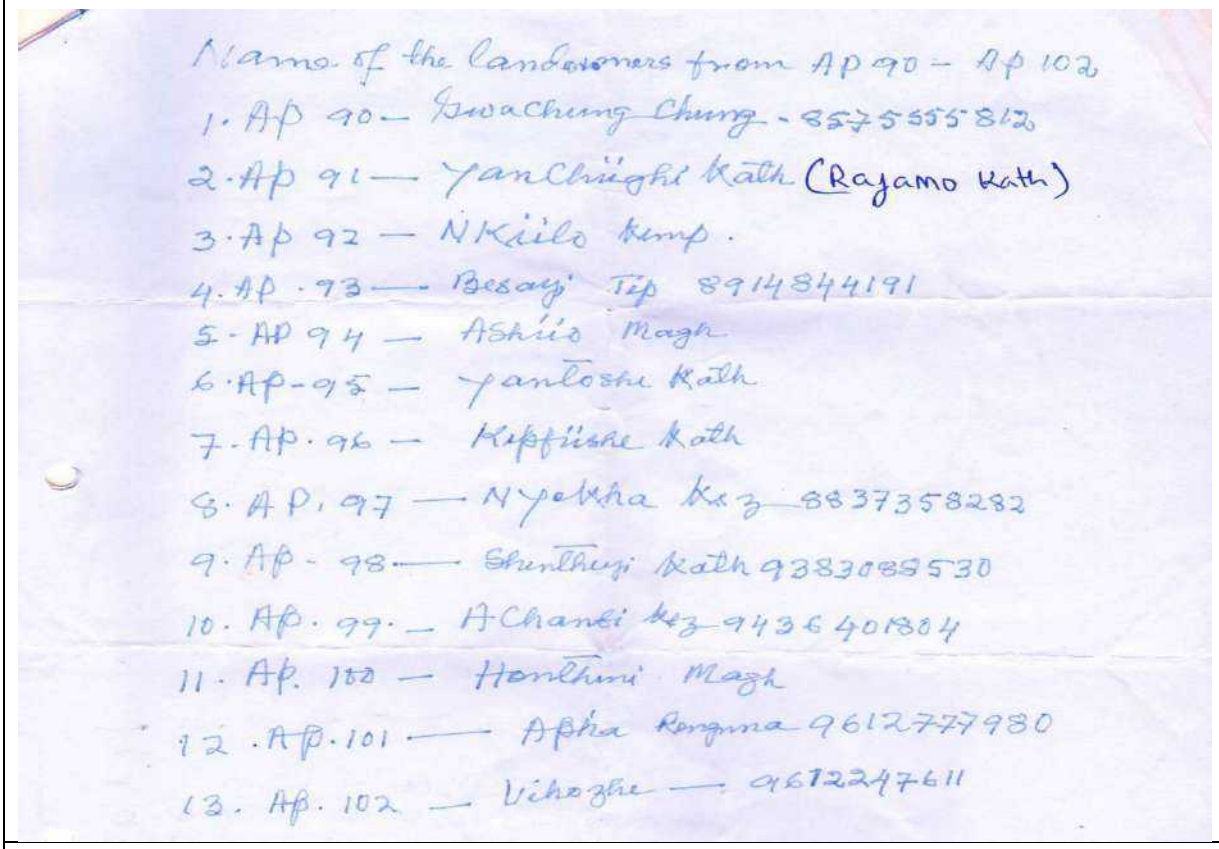
Ref. No..... Date 13/11/19

TO WHOM IT MAY CONCERN.

This is to certify that construction of AP 90 – AP 102 under Tesophenyu village jurisdiction is welcome to me from any location as proposed by your company, however the village authority has duly issue no objection for execution of work any time as your own convenient.

I wish the project a grand success.

(N.R. [illegible])
Chairman
Tesophenyu Village Council
Dist. Kohima : Nagaland



Name of the landowners from AP 90 – AP 102

1. AP 90 – Iswachung Chang - 8575555812
2. AP 91 – Yanchüghi Kath (Rajamo Kath)
3. AP 92 – NKüilo Kemp.
4. AP 93 – Besayi Tip 8914844191
5. AP 94 – Ashüo Magh
6. AP-95 – Yanloshi Kath
7. AP. 96 – Kepfüshe Kath
8. AP. 97 – Nyekha Kez 8837358282
9. AP - 98 – Shenthesi Kath 9383085530
10. AP. 99. – AChanki Kez 9436401804
11. AP. 100 – Henthuni Magh
12. AP. 101 – Apha Rongma 9612777980
13. AP. 102 – Vihozhe – 9612247611

NOC from Village Council

27th March 2019 Public consultation meeting held at Phisumi Village, Mokokchung.

29th March 2019 Public consultation meeting held at Philimi Village, Mokokchung.

20th June 2019 Informal meeting held at Ehunnu Village, Kohima.

24th July 2019 Informal meeting held at Chiechama, Kohima

2nd August 2019 formal meeting held at Additional Deputy Commissioner office Pfutsero.

4th September 2019 formal meeting held at Rotomi village & Philimi Village, Zunheboto




7th September 2019 formal meeting held at Botsa, Kohima(NAG-TW-01)

10th September 2019 Informal meeting held at Phezha, Kohima

Meeting held on 25.09.2019 at Zhadima village council hall, Kohima

MAPS

MAP - 1

TOPOGRAPHIC MAP SHOWING ROUTE DETAILS OF 132 kV D/C NEW KOHIMA (ZHADIMA) - NEW SECRETARIAT COMPLEX (NU COMPLEX) TL AND LILO OF 132 kV S/C KOHIMA - WOKHA AT NEW KOHIMA TL

220/132 kV New Kohima Substation (Extension)

132/33 kV Secretariat Complex Kohima Substation (New)

Nagaland University Campus Gantry

NewKohima Gantry Bay

Tower - 132 kV D/C New Kohima (Zhadima) to New Secretariat Complex TL and 132 kV S/C Kohima - Wokha at New Kohima

RoW - 132 kV D/C New Kohima (Zhadima) to New Secretariat Complex TL and 132 kV S/C Kohima - Wokha at New Kohima

Kilometers

0 0.5 1 2 3

94°2'50"E

94°5'0"E

25°50'0"N

25°48'0"N

25°46'0"N

25°44'0"N

MAP - 2

TOPOGRAPHIC MAP SHOWING ROUTE DETAILS OF 220 kV S/C NEW KOHIMA - MOKOKCHUNG VIA WOKHA TL AND 33 kV PUGHOBOTO - TOROGONYU DL

- Poles - 33 kV Pughoboto to Torogonyu DL
- Tower - 220 kV S/C (on D/C Tower) New Kohima - Mokokchung via Wokha TL
- RoW - 33 kV Pughoboto to Torogonyu DL
- RoW - 220 kV S/C (on D/C Tower) New Kohima - Mokokchung via Wokha TL

94°9'40"E

N

94°19'50"E

26°10'N

132/33 kV Mokokchung (State) Substation (Extension)

220/132 kV Mokokchung (PGCIL) Substation (Extension)

33/11 kV Chukitong Substation (Augmentation)

33/11 kV Wokha Power House Substation (Augmentation)

132/33 kV Wokha Substation (Extension)

33/11 kV Tseminyu Substation (Augmentation)

33/11 kV Pughoboto Substation (Augmentation)

33/11 kV Botsa Substation (Augmentation)

220/132 kV New Kohima Substation (Extension)

Kilometers

0 1 2 4 5 6

25°50'0"N

94°9'40"E

94°19'50"E

25°50'0"N

132/33 kV Mokokchung (State) Substation (Extension)

220/132 kV Mokokchung (PGCIL) Substation (Extension)

MAP - 3

TOPOGRAPHIC MAP SHOWING ROUTE DETAILS OF 132 kV S/C WOKHA - ZUNHEBOTO - MOKOKCHUNG TL 33 kV SURUHUTO - AKULOTO AND 33 kV ZUNHEBOTO - ZUNHEBOTO SOUTH POINT DL

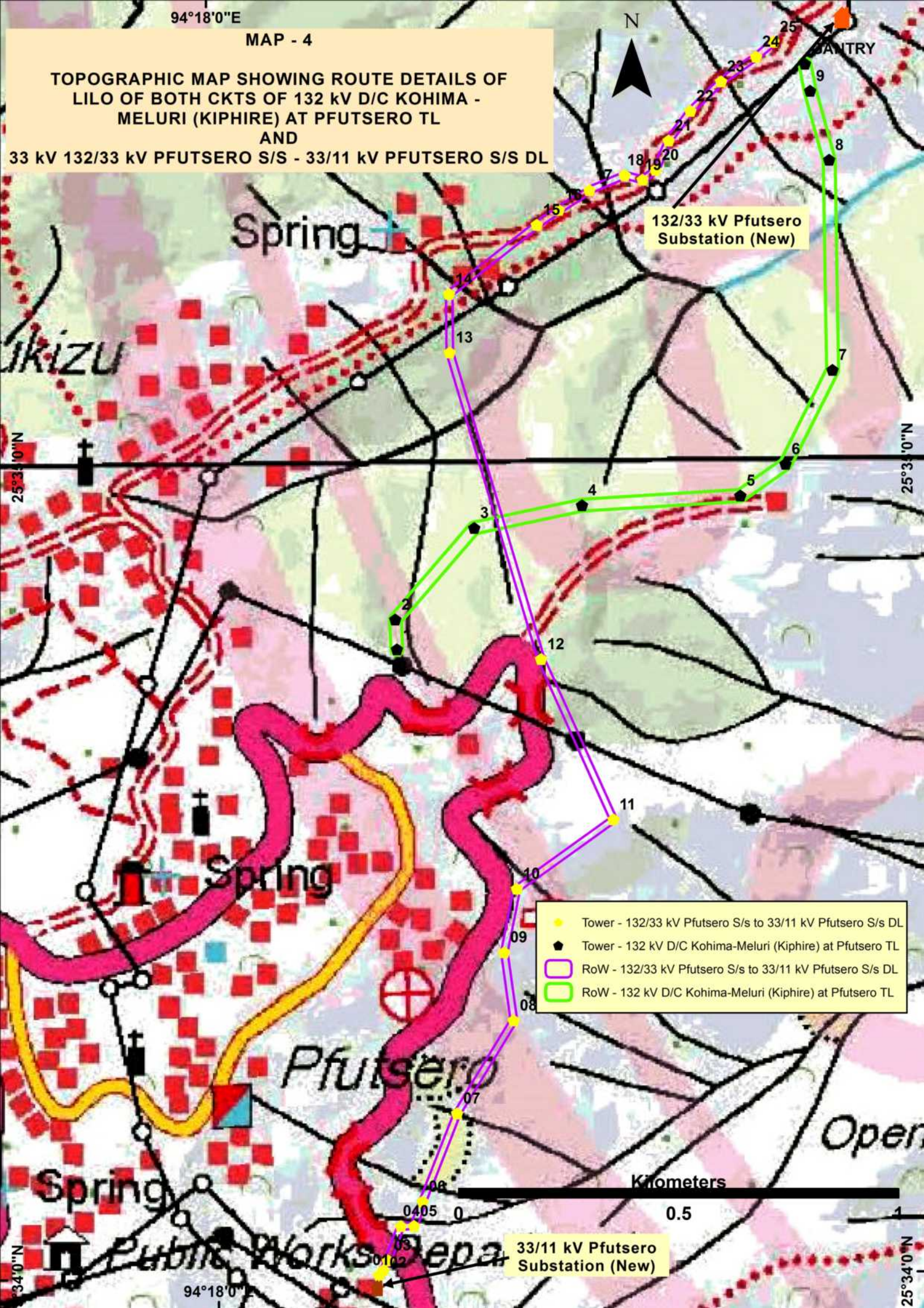
- Poles 33 kV Suruhuto to Akuloto DL
- Poles 33 kV Zunheboto to Zunheboto South Point DL
- Tower 132 kV Wokha-Zunheboto-Mokokchung TL
- RoW 33 kV Suruhuto to Akuloto DL
- RoW - 33 kV Zunheboto to Zunheboto South Point DL
- RoW - 132 kV Wokha-Zunheboto-Mokokchung TL

33/11 kV Suruhuto Substation (Augmentation)

132/33 kV Zunheboto Substation (New)

Kilometers 0 1 2 4 6 8

94°25'0"E 94°30'0"E 94°35'0"E 26°15'0"N 26°10'0"N 26°5'0"N


MAP - 4
TOPOGRAPHIC MAP SHOWING ROUTE DETAILS OF LILO OF BOTH CKTS OF 132 kV D/C KOHIMA - MELURI (KIPHIRE) AT PFUTSERO TL AND 33 kV 132/33 kV PFUTSERO S/S - 33/11 kV PFUTSERO S/S DL
94°18'0"E
N
132/33 kV Pfutsero Substation (New)
33/11 kV Pfutsero Substation (New)
Tower - 132/33 kV Pfutsero S/s to 33/11 kV Pfutsero S/s DL
Tower - 132 kV D/C Kohima-Meluri (Kiphire) at Pfutsero TL
RoW - 132/33 kV Pfutsero S/s to 33/11 kV Pfutsero S/s DL
RoW - 132 kV D/C Kohima-Meluri (Kiphire) at Pfutsero TL
Kilometers
0
0.5
1
25°33'0"N
25°34'0"N
94°18'0"E

MAP - 5

TOPOGRAPHIC MAP SHOWING ROUTE DETAILS OF 66/33 kV MOKOKCHUNG S/S - 33/11 kV MOKOKCHUNG TOWN POWER HOUSE DL AND 66/33 kV MOKOKCHUNG S/S - 33/11 kV MOKOKCHUNG TOWN HOSPITAL AREA DL

N

94°29'0"E

94°31'0"E

26°19'0"N

26°18'0"N

Tsuza Ayong

33/11 kV Mokokchung Power House Substation (New)

33/11 kV Mokokchung Hospital Area Substation (New)

132/33 kV MokokchungState Substation (Extension)

Covered Tank

Dense scrub

Dense scrub

Akkāng Ayong

Tsuadeb Āyong

Covered tank

Ungma

176

175

174

Tower - 66/33 kV Mokokchung S/s to Mokokchung Town Power House
and
66/33 kV Mokokchung S/s to Mokokchung Town Hospital Area

RoW - Tower - 66/33 kV Mokokchung S/s to Mokokchung Town Power House
and
66/33 kV Mokokchung S/s to Mokokchung Town Hospital Area

Kilometers

0 0.5 1 2

MAP - 6

TOPOGRAPHIC MAP SHOWING ROUTE DETAILS OF
132/66/33 kV NAGARJAN S/S - 33/11 kV PADAMPUKHRI S/S DL