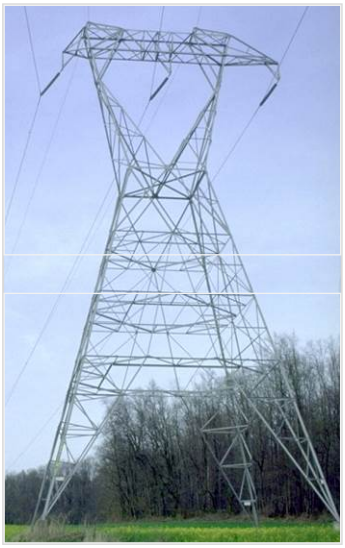

Environment and Social Impact Assessment Report (Scheme S, Volume 2)

Jharkhand Urja Sancharan Nigam Limited

Final Report

January 2018

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FINAL REPORT

Jharkhand Urja Sancharan Nigam Limited

Environment and Social Impact Assessment Report (Scheme S, Volume 2)

31 January 2018

Reference # 0402882

Reviewed by:	**Avijit Ghosh** *Principal Consultant*	
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TABLE OF CONTENTS

LIST OF TABLE

LIST OF FIGURE

LIST OF ANNEXURE

ABBREVIATIONS

BMTPC - Building Material and Technology Promotion Council of India
CEA – Central Electricity Authority
CFC - Chlorofluorocarbon
CGWB – Central Groundwater Authority Board
CPCB – Central Pollution Control Board
dB – Decibel
DG –Diesel Generator
DVC - Damodar Valley Corporation
EA – Environmental Assessment
EMP – Environmental Management Plan
ERM – Environmental Resources Management
ESIA – Environmental and Social Impact Assessment
ESIA- Environmental and Social Impact Assessment
ESMF- Environmental and Social Management Framework
ESZ – Eco-Sensitive Zone
GCC- General Conditions of Contract
GM – Gair Mazrua
GOI – Government of India
GPS – Global Positioning System
GSS – Grid Sub Station
IESE - Initial Environmental and Social Examination
IMD – India Meteorological Department
IS – Indian Standard
IUCN – International Union for Conservation of Nature
IWPA – Indian Wildlife Protection Act
JPSIP- Jharkhand Power System Improvement Project
JUSNL - Jharkhand Urja Sancharan Nigam Limited
KL- Kilo Litre
KLD – Kilo Litre per Day
Km – Kilometer
KVA – Kilo-Volts-Ampere
MVA – Mega-Volts-Ampere
NBWL – National Board of Wildlife
NH- National Highway
PCB – Pollution Control Board
PCB – Polychlorinated Biphenyls
PfA – Power for All
PPP – Public Private Partnership
PUCC – Pollution Under Control Certificate
SCC- Special Conditions of Contract
SF6 –Sulfur Hexafluoride
TCE – TATA Consulting Engineer
TL – Transmission Line
WPR- Work Participation Ratio

The Jharkhand Urja Sancharan Nigam Limited (JUSNL) with financial assistance from the World Bank is implementing the transmission infrastructure development/upgradation under the Jharkhand Power System Improvement Project (JPSIP) and will include: (a) Creation of 25 new 132 kV substations, and (b) Development of associated 132 KV transmission lines of around 1800 kms. These 25 substations and associated transmission lines have been organised into 26 schemes. This ESIA covers the transmission line i.e., LILO of 132 kV DC 3 Ph. Dumka-Deoghar Transmission line at GSS Jarmundi which is part of Scheme S and is to be covered under Phase I of the project. The ESIA has been undertaken based on the outcome of initial walk over survey which identified a preferred alignment based on analysis of three potential alternatives associated with the Bee-line between the two end-points. The level of detail captured in the ESIA is primarily based on the inputs of the walk-over survey; and attempt is being made to include some of the detail emerging from the detailed survey exercise, which is being conducted in parallel by the Design Consultant at this time. More detailed information about the accurate alignment of the transmission line, specific parcels of land which the RoW will intersect, and the exact footprint of the transmission towers would be available during the next phase of project planning, involving Check Surveys is not covered in this ESIA.

The transmission line is planned to extend for distance of 5.004 Km and would fall in the districts of Dumka and Deoghar. As per plan, the RoW of the alignment would be 27 m and transmission towers are expected to be setup every 300 m (approx. 2-3 towers per km depending on terrain and other technical, environmental and social considerations), each occupying a land footprint of about 22 m square. Overall, they will run cross country and cover a physical, environmental and social landscape which is typical to the state of Jharkhand – combination of plateau land exhibiting minor undulations and interspersed with flat terrain and hilly stretches. From the land use point of view, the line alignments would primarily cover agricultural and barren/waste land use types. The ends of the transmission lines would originate from respective substations of Dumka-Deoghar, which have access through road. At several other points along the route, crossings with roads, national or state highways (The National Highway 114 A, connecting Dumka-Deoghar runs parallel with the Dumka-Deoghar Transmission line), other than this there is no major roads which crosses the transmission line alignment and no railway lines are expected to occur. For access to other points of the proposed transmission lines, access would have to be obtained through existing village roads and open terrain.

The construction phase of the project would involve the following activities: (a) Site clearance –Ground vegetation and/or crops on field would be cleared and trees would be lopped or felled, to the extent required, for gaining access

to the corridor and to allow for tower construction and wire stringing activities; (b) For setting up towers within the 22 square m area, limited excavations would be undertaken for footings, concrete foundation developed, framework inserted, and the tower frame would be erected after hauling components to a nearby laydown area using existing roads and the transmission corridor RoW; (c) Mechanical stringing of conductors between towers would be done using a winching machine. The construction activities are anticipated to involve 15-20 people during construction of tower foundation and tower erection and 20-30 people would be involved in tower erection and stringing. Mostly the labour would be staying in fly camps while remaining workers would be staying in laydown areas (comprising of labour quarters and material storage areas). Typical vehicles on site at construction site would include 2 trucks, 2-3 excavators and 6 light duty vehicles (LDV), puller and tensioner.

After construction is over, there would be certain restrictions on future development and on height of trees along the width of the corridor (per guidelines - IS 5613/MoEFCC, GoI Circular 7-25/2012-FC dated 5th May 2014) for the owners of the land parcels which get intersected. At the points where the transmission towers are to be set up, the right of the land for about 22 sq m of land would be obtained by JSUNL, though farmers can continue to pursue agricultural activities within the footprint, without causing any physical damage to the tower structure. Future access to the corridor can be sought by JSUNL for transmission line maintenance and subject to any damages to crops/property caused by such activity being compensated.

The baseline studies have profiled the environmental and social conditions along the transmission line (TL) alignment, covering in general a buffer distance of 500 m on either side of the RoW and up to 10 kms where any significant environmental sensitivity is identified. The studies were designed to collect information from secondary sources and to obtain primary information through site visits and consultations with local communities and other related stakeholders. Overall, the baseline is reflective of the environmental and social landscape of the districts through which the alignment would pass. Corridor specific environmental and social baseline for the TL alignment is described below:

- The Dumka –Deoghar TL alignment passes through the blocks of Jarmundi (Dumka district) and Sonaraithari (Deoghar district). Major part of the TL alignment passes through rural areas of the said blocks. 11 villages located within the study area of Dumka Deoghar transmission line, In the study area, Tetaria (841) has the highest population lived in 135 household and the lowest populations were recorded in Domanwadih (79). No township is located within the 10 km radius of the proposed TL alignment.
- No forest patches is located on the proposed TL alignment. Also, no Protected Area (PA)/ National Park or Wild life Sanctuary is located within 10 km of the alignment.
- As per the Survey of India Toposheet and satellite imagery it was observed that the LILO Dumka-Deoghar Transmission line is part of the

Ganga River Basin. However, there are no major river or water body or water channels near the alignment. Only there are first order streams near the alignment.
- The transmission line transverses through Dumka and Deoghar district, which are Schedule V area as specified in the Indian Constitution.

Community consultations were undertaken in villages (Bahinga and Pahridih) adjoining to the TL alignments to understand the perceptions of the local people with respect to the proposed project, problems faced by local people due to any existing transmission line (if any), livelihood pattern of the villagers etc. During community consultations following observations were recorded:

- Damages to crop in case stringing of transmission line during harvesting period;
- Expectation of employment opportunity arising from the project; and
- Compensation for trees, incase felled for the project

The potential and associated impacts of the proposed transmission line projects have been identified and evaluated using standard procedures. Source references including past project experience, professional judgment and knowledge of both the project activities as well as environmental and social setting of the site and surroundings were used in the assessment.

The uptake of land for transmission line corridor, in sections which will pass through privately owned land, may lead to an adverse impact on the value of land parcels falling in the RoW in two ways: one, for parcels in which the towers are to be located, there is a physical obstruction to use of land falling under the tower footprint. The land owner is unable to use the land under the tower for alternative uses, other than agriculture, potentially leading to a reduction of land value, often for the entire parcel. Two, because of restrictions imposed with regard to undertaking any structural construction(s) above a stipulated safe height (depending on the height of the conductor), as per provisions of the Electricity Act 2003, for all land parcels falling within the RoW, the land value also diminishes. It must be noted however, that as per existing practice, only the rights to the use of land for the tower footprint is obtained from the land owners (typically by invoking the provisions of the Indian Telegraph Act, 1885) on whose lands the towers are to be constructed – no land purchase or acquisition leading to a transfer of ownership is involved in the process. At present, there has been no empirically estimated value or evidence as to the % reduction in land value for parcels falling within the RoW of transmission lines.

For stretches of the corridor which would pass through agricultural land, there is expected to be a loss of crops and consequent economic losses to farmers if the construction phase is timed to a pre-harvest time. Other than that, because of the limited use of heavy vehicles and equipment during construction, it is unlikely that there would be any long-term impact related to compaction of soil or loss of fertility in top soil. Efforts would be made to

ensure that the transmission lines do not pass over any habitat or village dwellings.

With the construction phase at a particular location along the transmission corridor expected to last about 3-4 weeks, construction related activities are expected to cause local level impacts on environmental quality due to re-entrainment of dust in air from earth works and construction dumps, air and noise emissions from vehicles and construction equipment, discharge of domestic waste water from labour camps and generation of construction and domestic wastes. In the construction phase, there are expected to be health and safety related issues due to involvement of labour in construction activities. Influx of people (migrant workers, subcontractors and suppliers) may lead pressure on existing social infrastructure and their interactions with nearby rural communities or potentially lead to cultural conflicts, and result in additional vulnerability to women and population belonging to scheduled castes or tribes. At the same time, positive socioeconomic impacts are also expected with scope for business opportunities for local subcontractors, skill acquisition for local workforce and employment opportunities arising from recruitment of local construction labour and staff, improvement of roads and access.

In order to ensure that the mitigation measures developed for the significant impacts of the proposed project are implemented and maintained throughout the project duration, an Environmental and Social Management Plan (ESMP) has been developed. It needs to be highlighted here that the overall approach for transmission line planning already takes into account the scope for minimising the stretch falling under forest land through the exploration of alternate alignments where forest land is encountered during the initial walk over surveys. The ESMP outlines management strategies for managing all associated and potential impacts that could affect the environment and living conditions of people in the area. These mitigation measures and plans include:

- Arrange for appropriate compensation for loss of biodiversity.
- Provide appropriate compensation for the loss of value of land falling within the tower footprint or along the corridor RoW. In addition, for any temporary loss to crops, vegetation, trees, potentially caused by construction activities, arrange for compensation to the affected land owners.
- Adopt appropriate engineering and associated mitigation measures and plans to minimise adverse impacts to local communities during construction activities.
- Adopt appropriate EHS safeguards and good practices to be adopted by construction contractors to ensure that occupational health and safety risks of labours are maintained at acceptable levels. The labour force should also undergo compulsory training on work related health and safety measures.
- Where possible, ensure local suppliers and contractors implement local employment and procurement policies to the benefit neighbouring communities along the alignment.

As part of the ESMP, it is proposed to arrange for necessary approvals for cutting of trees and obtaining consent from land owners through whose land the RoW would be passing. In order to ensure that the ESMP is implemented during construction phase, specific conditions of contract for Site Contractors to be engaged have been laid down which would be made part of the Bidding document. A ESMP monitoring plan would also be implemented to be enable JSUNL to ensure that the planned mitigation measures are being implemented and adverse impacts are kept to the minimum possible level.

For the implementation of the JPSIP Project JUSNL has developed a Project Implementation Unit (JPSIP PIU) headed by the Chief Engineer (Transmission O&M).The JPSIP PIU would also be responsible for driving the implementation of the E&S safeguards in JPSIP. At the field level, the Chief Engineer cum GM of the Dumka Zone of JUSNL would be responsible for implementing the technical aspects of the JPSIP with respect to the sub-project and would be responsible for overseeing the implementation of the ESMP and the E&S safeguards adopted by the contractor. In addition, it is recommended that the Contractor implementing the subprojects would induct Environment and Social personnel to supervise implementation of the E&S safeguards on the ground.

Through the process of consultation and disclosures, JPSIP would ensure that the project information is communicated to the stakeholders and the feedback from the community is integrated into the execution phases of the project. A Consultation Framework has been prepared to ensure involvement of stakeholders' at each stage of project planning and implementation. In addition, a three-tier Grievance Mechanism has been proposed for handling any grievances of community related to the project i.e. Tier 1 -Circle level, Tier 2 -Zone level, Tier 3- Grievance Redresses Cell located centrally at the JPSIP PIU in Ranchi.

1 INTRODUCTION

1.1 BACKGROUND

The Government of Jharkhand with active support of the Government of India has planned for implementing 24X7 Power for All (PfA) in Jharkhand. The program is aimed at achieving 24x7 reliable powers for all the households by FY 2019. The PfA roadmap includes interventions in generation, transmission, distribution, renewable energy and energy efficiency/ proposed to be implemented during FY16 to FY19. Government of Jharkhand through Jharkhand Urja Sancharan Nigam Limited (JUSNL) has planned to develop the transmission infrastructure in the State. This transmission infrastructure development is being funded from different sources e.g. domestic fund, Public Private Partnership (PPP) and multilateral funding. The Jharkhand Urja Sanchar Nigam Limited (the state run power transmission utility company) has approached the World Bank for assistance to fund a part of the transmission infrastructure under the Jharkhand Power System Improvement Project (JPSIP). The project would include creation of 25 new 132 kV substations and associated 132 KV transmission lines of around 2000 Kms.

JUSNL would like to develop the projects in a sustainable manner. Towards this objective, an Environmental and Social Management Framework (ESMF) has been developed to lay out a mechanism for integrating environmental and social concerns into the planning, designing and implementation phase of JPSIP. Based on the higher level guidance provided in the ESMF, each project component is undergoing a project specific Environmental and Social Impact Assessment (ESIA). Based on the outcome of the assessment, a project specific Environmental and Social Management Plan (ESMP) is laid down for all the sub-projects.

1.2 PROJECT OVERVIEW

As part of the JPSIP, JUSNL has planned for development of 25 new substations and associated transmission lines. These substations and transmission lines have further been consolidated into schemes. For the purpose of implementation these schemes are divided into 3 Phases. The subprojects in each of the schemes are presented as ***Annexure 1***.

In Phase I there are 9 schemes. Three (3) nos of these schemes are located in Ranchi District while three (3) nos of scheme are located in Dumka District and three (3) nos in East Singhbhum district.

This Environment and Social Impact Assessment Report deals with the construction of LILO of 132 kV D/C 3 Ph. Dumka–Deoghar Transmission line at GSS Jarmundi. The detail of the interlinked subproject associated with this transmission line is presented in ***Table 1.1***.

Table 1.1 Details of the substation and interlinked project (Scheme S)

Sl. No	Details of Scheme S	Capacity (MVA)	Length (km)
1.	132/33 Kv GSS Jarmundi (2x50 MVA)	100	
2.	LILO of 132 kV DC 3 Ph. Dumka-Deoghar Transmission line at GSS Jarmundi.		5.004*

Source: JUSNL; * Two transmission lines, each 132kV D/C line, will run parallel from LILO tower to proposed Jarmundi GSS (each of 2.502km) to constitute the LILO connection at Jarmundi on Deoghar-Dumka D/C line

As part of the Scheme the Environmental and Social Impact Assessment of the grid substation at Jarmundi is presented as separate volume: **Scheme S Volume 1.**

1.3 PURPOSE AND SCOPE OF THIS ESIA

The ESIA process involves the identification of the potential environmental issues in the project and trying to address them through design interventions. The ESIA further carries out impact prediction and evaluation of residual environmental and social issues of a Project. It then goes on to outline the proposed mitigation measures for residual impacts and enhancement measures for positive impacts which the Project will implement.
The objectives of this document are to:

- Identify all potentially significant adverse and positive environmental and social issues of the Project. Enumerate the design modification which has been influenced by the ESIA process and define the final alignment of the transmission lines;
- Gather baseline data to inform the assessment of impacts on the environment as a result of the Project;
- Suggest appropriate mitigation measures to effectively manage potential adverse impacts; and
- Developing an Environmental Management Plan (EMP) to implement suggested mitigation measures to minimize adverse impacts through effective management systems including formulation of monitoring and reporting requirements.

1.4 STRUCTURE OF THE REPORT

The report has been organized considering the following:

- Chapter 1 above contains a brief background of JPSIP. It also presents a broad context to the ESIA Study;
- Chapter 2 presents the regulations and polices applicable and actions which are required by JUSNL;
- Chapter 3 presents the description of the proposed substation and interaction with the bio-physical and socio-economic environment;
- Chapter 4 provided methodology adopted for the ESIA study;

- Chapter 5 outlines the environmental and social setting of the proposed substation which forms the basis for assessment of potential impacts;
- Chapter 6 presents the likely impacts from the proposed substation over the lifecycle of the project along with its severity levels;
- Chapter 7 elaborates on the stakeholder identification process adopted and a brief of the public consultations under taken to capture the local residents / stakeholders perceptions;
- Chapter 8 presents the mechanism of the implementation of the proposed mitigation measures complete with responsibility and resources requirements; and
- Chapter 9 presents the Conclusions and Recommendations

1.5 LIMITATION

Project planning for proposed transmission line has been undertaken by Tata Consulting Engineer (Hereinafter referred to as "Design Consultant") based on desktop studies and a Detailed Project Report has been developed based on the same. Detailed field survey of the project components like tower footing and the RoW is currently being undertaken by Design Consultant. The present draft of the ESIA therefore considers the project configuration as has been outlined in Design Consultant's Report and impacts for the same has been accordingly assessed.

1.6 *USES OF THIS REPORT*

The Client acknowledges that report provided by ERM in relation to the provision of Services is delivered to the Client solely for the Client's benefit. ERM, its officers, employees, contractors, and agents shall owe no duties, obligations or liabilities to any persons in connection with any use of or reliance on the Project information provided by JUSNL. We make no warranties, express or implied, including without limitation, warranties as to merchantability or fitness for a particular purpose.

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foreclosure proceedings or otherwise will not expose the lender to potential environmental or social liability.

The ESMF identifies all the national and state level legislation rules and guidelines which would be applicable to JPSIP. It has also identified all the World Bank Policies and guidelines which are applicable in JPSIP. This section highlights only the relevant environmental and social policies and regulations, World Bank guidelines which are applicable for this sub-project.

2.1 APPLICABLE LAWS AND STANDARDS

The applicable regulations and relevant policies in the context of the project are presented in below table.

Table 2.1 Regulations Triggered for the Project

Sl. No.	Acts/Rule/Policy	Applicability & Action Required	Responsibility
A.	**Electricity Related Regulation**		
1.	Electricity Act 2003, Indian Telegraph Act 1885 and Department of Power, Government of Jharkhand notification dated 15th December 2017	Under the provisions of Section 68(1):-Prior approval of the Govt. of Jharkhand (GoJ) is a mandatory requirement to undertake any new transmission project 11 kV upward in the State which authorizes JUSNL to plan and coordinate activities to commission a new Transmission project. Under Section 164:- GoJ, may by order in writing, authorize JUSNL for the placing of electric line for the transmission of electricity confer upon licensee (i.e. JUSNL) in the business of supplying electricity under this act subject to such conditions and restrictions, if any, as GoJ may think fit to impose and to the provisions of the Indian Telegraph Act, 1885, any of the power which the Telegraph authority possesses. The Electricity Act and Telegraph Act provide guidance on the compensation payable for damages to crops/ trees and structures for setting up of transmission line. As per the provision of the above mentioned Acts, JPSIP would require to pay compensation for any damage or loss due to its projects. Based on a Notification dated 15th	JUSNL,JPSIP

Sl. No.	Acts/Rule/Policy	Applicability & Action Required	Responsibility
		of December, the Jharkhand Government has notified the following arrangement for compensation: • Compensation at the rate of 85% of land value as determined by District Magistrate or any other authority based on Circle rate/ Guideline value/ Stamp Act rates for tower base area (between four legs) impacted due to installation of tower/pylon structure; Compensation towards diminution of land value in the width of RoW Corridor (27m for 132 KVA transmission line) due to laying of transmission line and imposing certain restriction would be decided by the States as per categorization/type of land, at 15% of land value, as determined based on prevailing Circle rate /Stamp Act rate.	
2.	Technical Standards for Construction of Electrical Plants and Electric Lines Regulations, 2010; Measures relating to Safety and Electric Supply Regulations, 2010	Both the Regulations are framed by Central Electricity Authority (CEA) of India under Indian Electricity Act, 2003. These regulations provide technical standard for construction of electrical lines and safety requirements for construction/ installation/protection/operation/ maintenance of electric lines and apparatus. JPSIP and its contractors would comply with the requirements of these regulations.	JPSIP, Contractor
B.	**Environment/Social Legislation**		
1.	Environment Protection Rules, 1986 and applicable standards	The standards for discharge/emission from different type of pollution source (e.g., DG sets) and industries have been laid down by CPCB under EP Rule, 1986. JPSIP would ensure that all these standards are complied during the planning, construction and operation of the project.	JPSIP, Contractor
2.	Jharkhand Timber and Other Forest Produce (Transit and Regulation) Rules, 2004 as amended	For felling of trees in the forest land identified for the substation location, permission need to be obtained from DFO or authorized ACF.	JPSIP, Contractor
3.	Ancient Monuments & Archaeological Sites and Remains Act, 1958;	Proposed substation site is not located near or inside archaeological site. Thus National	JPSIP, Contractor

Sl. No.	Acts/Rule/Policy	Applicability & Action Required	Responsibility
	Indian Treasure Trove Act, 1878; Jharkhand Ancient Monuments and Archaeological Sites, Remains and Art Treasures Act, 2016.	and State level Acts on Ancient Monuments and Archaeological Sites will not be triggered for this project. However, treasure, archaeological artefacts can be found during excavation work; for which procedure laid down in Indian Treasure Trove Act, 1878 would be followed.	
4.	Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016	Generation of waste oil and used transformer oil at site would attract the provisions of Hazardous Waste and other waste Rules, 2016. The hazardous wastes have to be disposed through CPCB/SPCB approved recyclers only. JPSIP would obtain authorization for hazardous waste under this Rule. JPSIP would also maintain record of hazardous waste and submit the desired return (Form 4) in prescribed form to JSPCB.	JPSIP
5.	E-Waste (Management) Rules, 2016	JPSIP, being the bulk consumer of electrical and electronic equipment will ensure that e-waste generated is channelized through collection center or dealer of authorized producer or dismantler or recycler or through the designated take back service provider of the producer to authorized dismantler or recycler.	JPSIP
6.	Central Ground Water Authority (CGWA) Public Notice dated 4th January 2017	Permission need to be obtain from State Level Ground Water Resources Development Authority and Central Ground Water Authority for installation of bore well and abstraction of ground water resource.	JPSIP
C.	**Labour related Legislation**		
1.	The Child Labour (Prohibition and Regulation) Act, 1986	This Act prohibits engagement of children in certain employments and regulates the conditions of work of children in other certain employments. JPSIP and its contractors would comply with the requirements of these regulations.	JPSIP, Contractor
2.	Contract Labour (Regulation & Abolition) Act 1970	This Act regulates the employment of contract labours in certain establishments and prohibits for its abolition in certain circumstances. JPSIP and its contractors would comply with the requirements of these regulations.	
3.	Minimum Wage Act, 1948	Under this Act, Jharkhand State government has notified minimum wage rate f0or the workers. JPSIP's contractors would provide minimum wage to its workers as per the minimum wage rate provided in the said	

Sl. No.	Acts/Rule/Policy	Applicability & Action Required	Responsibility
		notification.	
4.	Bonded Labour System (Abolition) Act, 1976	This Act abolished bonded labour system to prevent the economic and physical exploitation of the weaker sections of the people. JPSIP and its contractors would comply with the requirements of these regulations.	
5.	Grievance Redressal Machinery under Industrial Disputes Amendment Act, 2010	This Act provides mechanism for setting up of grievance redressal committee in industrial establishment. JPSIP and its contractors would comply with the requirements of these regulations.	
6.	Employees' Provident Fund and Miscellaneous Provisions Act, 1952	This Act provides for the institution of provident funds, pension fund and deposit-linked insurance fund for employees in factories and other establishments. JPSIP and its contractors would comply with the requirements of these regulations.	
7.	The Payment of Wages Act, 1936, amended in 2005; Workmen's Compensation Act, 1923	This Act provides for timely disbursement of wages payable to employed persons covered by the Act. JPSIP and its contractors would comply with the requirements of these regulations.	
8.	Maternity Benefit Act, 1961;	This Act regulate the employment of women in certain establishments for certain periods before and after child-birth and to provide for maternity benefit and certain other benefits. JPSIP and its contractors would comply with the requirements of these regulations.	
9.	Employees State Insurance Act, 1948	This Act provides certain benefits to employees in case of sickness, maternity and ' employment injury '. This Act is applicable to employees earning Rs 15,000 or less per month. JPSIP and its contractors would comply with the requirements of these regulations.	
10.	Inter-state Migrant Workmen Act, 1979	This Act regulates the employment of inter-State migrant workmen and provides for their conditions of service. JPSIP and its contractors would comply with the requirements of these regulations.	
11.	Intimation of Accidents (Forms and Time of Service of Notice) Rules, 2004	This Rule comes in force for occurrence of accident in connection with the generation, transmission, supply or use of electricity and electric line. JPSIP would incorporate requirements of these regulations in contract document of procurement.	

2.2 *WORLD BANK SAFEGUARD POLICY*

The implementation of the World Bank Operational Policies seek to avoid, minimize or mitigate the adverse environmental and social impacts, including protecting the rights of those likely to be affected or marginalized by the proposed project. Based on the information gathered during the study,

following Policies are triggered and would require adequate measures to address the safeguard concerns.

Table 2.2 World Bank Policies Triggered for the Project

Sl. No.	World Bank Policies/Guidelines	Applicability	Responsibility
1.	OP 4.01 Environmental Assessment	The Bank requires environmental assessment (EA) of projects under Bank financing to help ensure that they are environmentally sound and sustainable. EA takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources); and transboundary and global environmental aspects. As per requirement of the OP 4.01, environmental assessment is being carried out for this project.	Environmental and Social Consultant of JPSIP
2.	BP 4.11 Physical Cultural Resources	This policy requires Bank financing projects to assess impacts on physical cultural resources at the earliest possible stage of the project planning cycle. Environmental assessment involves the preparation of a physical cultural resources management plan that includes (a) measures to avoid or mitigate any adverse impacts on physical cultural resources; (b) provisions for managing chance finds; (c) any necessary measures for strengthening institutional capacity for the management of physical cultural resources; and (d) a monitoring system to track the progress of these activities. Though presently there are no physical cultural resource found to be affected by the project, possibility of "chance finds" cannot be ruled out. If something is found at later stage of the project (construction phase), procedures laid down in "Indian Treasure Trove Act, 1878". The ESIA Study for the transmission line would be carried out to have a better understanding of physical and cultural resources present in the site (if any).	Environmental and Social Consultant of JPSIP
3.	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. For projects which are likely to have impact on the tribal community a Tribal Development Plan would be developed and implemented.	Environmental and Social Consultant of JPSIP/JPSIP
4.	IFC/WB General EHS Guidelines	Recommendations of these guidelines would be incorporated in ESMP and Bidding document for this project.	Environmental and Social Consultant and Technical Consultant
5.	IFC/WB		

Sl. No.	World Bank Policies/Guidelines	Applicability	Responsibility
	Guidelines for Power Transmission and Distribution		of JPSIP

3 PROJECT DESCRIPTION

3.1 PROJECT LOCATION

The LILO Dumka – Deoghar transmission lines passes through the districts of Dumka and Deoghar. The administrative districts through which each of the alignment passes are presented in ***Table 3.1*** and ***Figure 3.1***.

Table 3.1 Administrative divisions through with the Transmission lines traverse

Sl. No	Line	District	Block	Approx. segment [Angle Point-AP from -to]
1	LILO of 132 kV DC 3 Ph. Dumka-Deoghar Transmission line	Dumka	Jarmundi	Gantry- AP 4, AP 6- AP 7
		Deoghar	Sonaraithari	AP 4 – AP 6

Source: ERM Survey

3.2 ACCESSIBILITY

The National Highway 114 A (connecting Dumka- Deoghar) runs parallel with the Dumka-Deoghar Transmission line. This NH 114 A traverses within 500 of the transmission line alignment connecting the alignment at number of locations by rural roads. There are no major roads which crosses the transmission line (TL) alignment.

As discussed above, TL alignment is connected with NH 114 A by several rural roads. Thus for the purpose of transmission line construction these existing roads would be used for approaching the tower footing. However in case at some of the tower location there are issues with regards to access the construction vehicle would ply over the agricultural field and no access road would be constructed. Accessibility map of the transmission line alignment is depicted in ***Figure 3.2***.

Figure 3.1 *Administrative Setting of LILO of 132 kV DC 3 Ph. Dumka-Deoghar Transmission line*

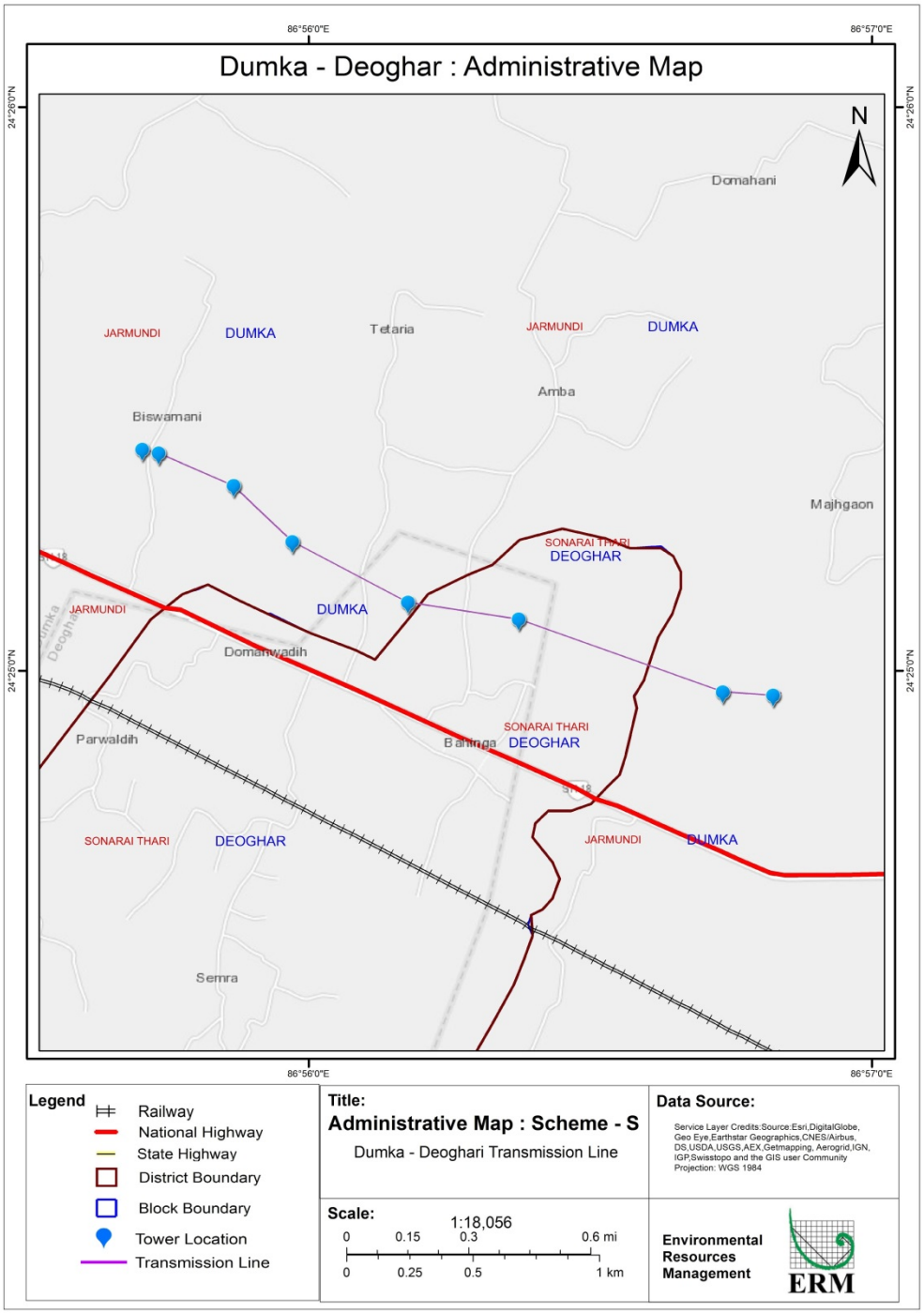
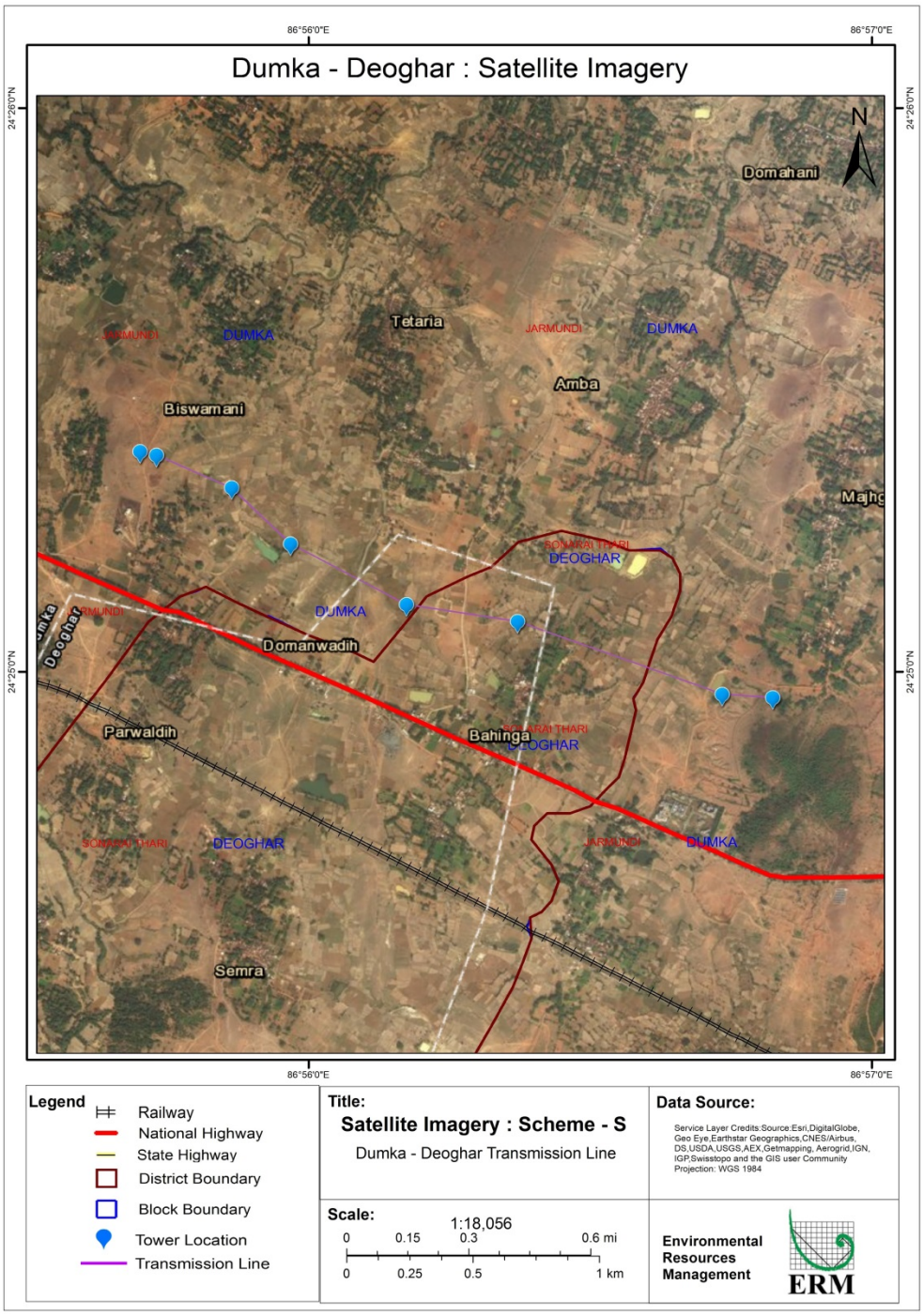


Figure 3.2 Dumka-Deoghar TL Alignment on Satellite Imagery



3.3 TRANSMISSION LINES PROJECT PHASES AND ACTIVITIES

Different phases of transmission line projects are described below.

3.3.1 *Project Planning*

During the stage the route planning for the transmission line takes place. At planning stage three alternative routes for each of the transmission line are identified avoiding sensitive areas such as the major settlements, forests etc.

and based on other technical considerations. A preliminary level analysis is carried out to identify the best alternative. The typical activities which would be carried out during the project conceptualisation phases include:

- Walkover surveys of the alternative alignment;
- Techno-economic and Environmental and Social Analysis of the alternative alignment for deciding on the final ;
- Detailed survey of the final alignment; and
- Soil investigation of the tower locations at regular interval to ascertain the type of foundation.

3.3.2 Project Construction Activities

The construction of the transmission line route includes carrying out check surveys, site clearing, access road establishment, foundation construction, structure installation and finally energising. This phase is expected to take between 12-18 months to complete. The project construction activities would include a number of activities including:

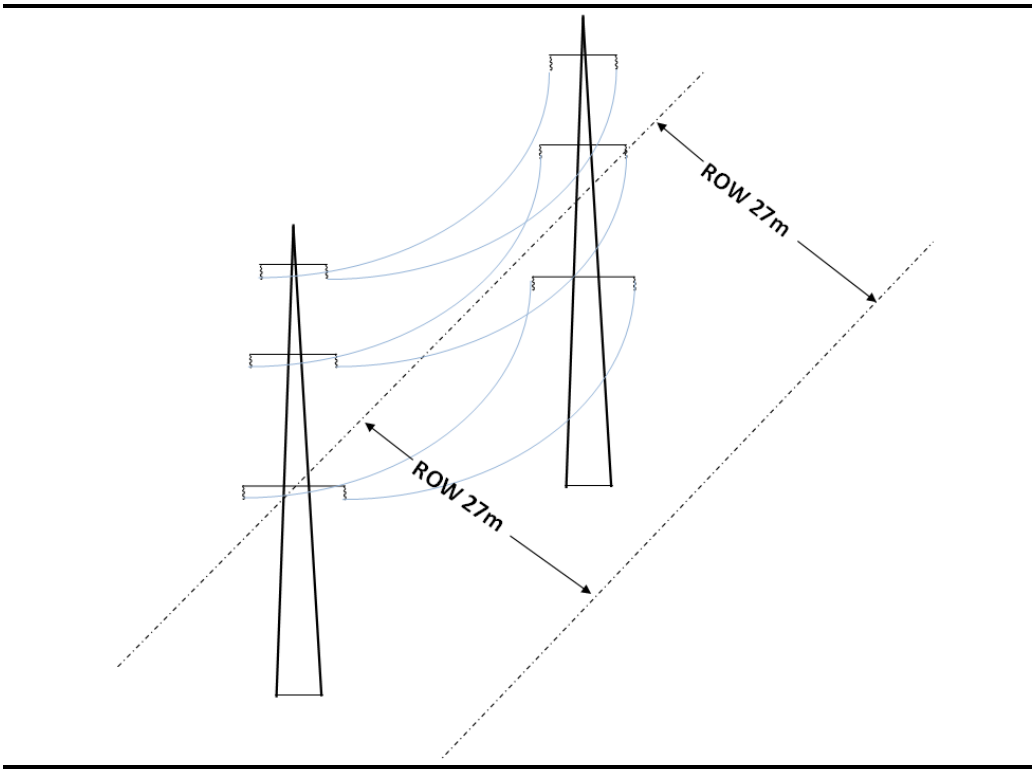
- Check Surveys;
- Site Clearing including vegetation removal and tree felling;
- Excavation for tower foundation, construction of the concrete bases for the transmission line pylons;
- Hauling in of the pylon components and other raw materials;
- Assembly and erection of the towers;
- Stringing of the transmission line; and
- Site rehabilitation.

Check Surveys

The check surveys are carried out by the contractor at the initiation for fixing the tower locations. At this point of time once the tower locations are known, the ownership of the land is identified by the Contractor with the help of the Revenue Department. Civil construction work would be initiated after the land owner has provided his/her consent and the compensations for damages have been paid.

All construction activities would be carried out within the Right of Way for the safe operation of the transmission lines. The right of way for the 132 KV D/C transmission line is 27 m as per IS 5613.

Figure 3.3 Right of Way for 132 KV Transmission Line



Clearing of Sites

At the tower footing site all vegetation in the footprint of the tower base and the working area of approximately 2 m on each side of the base are cleared of vegetation.

Excavations

The total depth of foundation, below ground level shall generally be 3.0 to 3.5 m (1). However, depth of tower foundations will vary depending on the soil condition and tower type. Excavations would be carried out for the foundations of the towers using an excavator. Each excavation would be inspected and tested to confirm its suitability. The foundations would be filled up with concrete. As per Annexure 2.0 of the DPR a typical suspension tower (2) would require 4.7m X 4.7 m area.

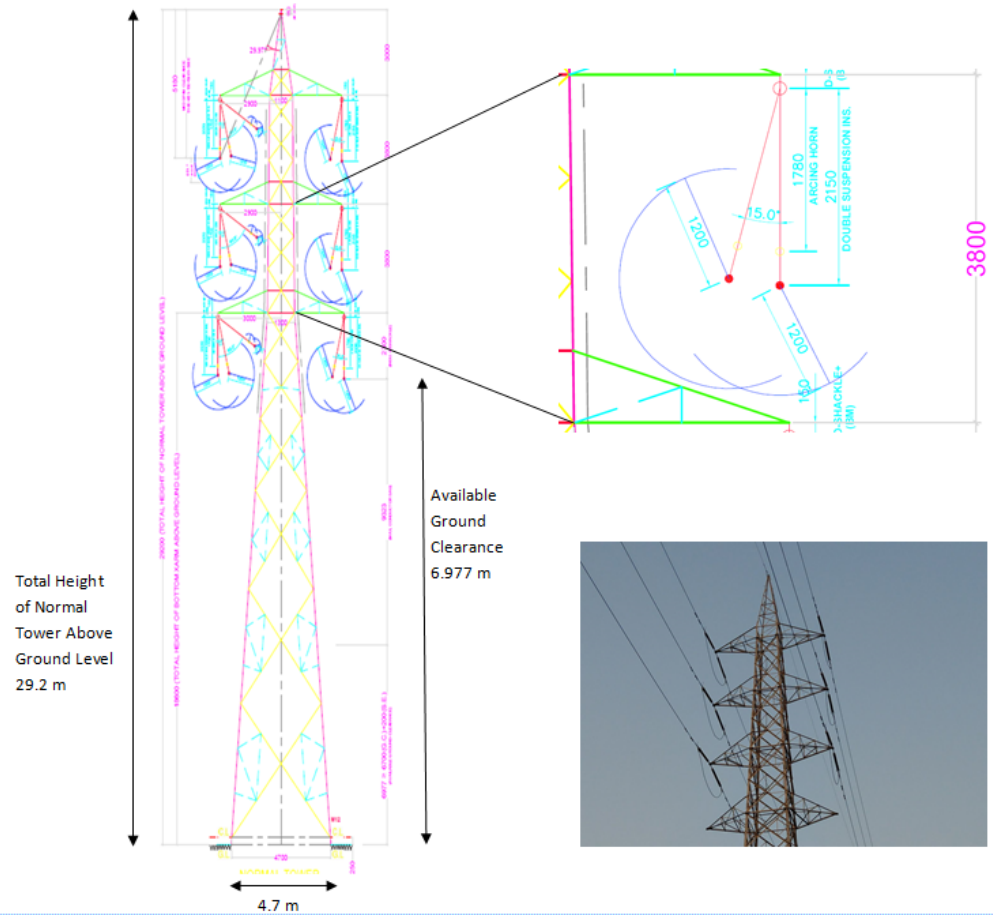
The framework, reinforcing bars, embedded of the tower and any earthing elements would be placed in the pits. A 50 mm thick pre-stressed concrete cement pad is laid at the base of the foundation. Concrete will be sourced from a 'ready-mix' truck which will access the site or concrete will be mixed on site using a portable concrete mixer.

Approximately, 80-100 m3 of concrete is required per tower. The steel used for the tower foundation would conform to IS 456-2000. The casting of the

(1) Section 5.6.2.6 of Detail Project Report (DPR)
(2) Annexure 2.0 of DPR considers Type 2 tower in Wind zone 2.0 Category 2 with single ASCR conductor as a typical conductor.

foundation would take approximately 15- 30 days and would involve 15- 20 labours depending on the terrain and soil conditions. Approximately, 60 m3 of water is required daily for the purpose of construction and allied activities. Once the excavations have been filled, the concrete requires 28 days for curing. The excavated soil would be backfilled and compacted as per the good engineering practices.

Figure 3.4 ***Typical Electrical Clearance Diagram for Tower Type – DD2 (Suspension Tower)***



Note- Information derived from Annexure 2.0 of Detail Project Report prepared by Design Consultant

Erection of Tower

The material for the construction of the tower would be delivered directly from the storage yard/lay down area directly to the tower construction site. The material would be brought to the site directly either by tractor trailer or manually depending on the accessibility. The tower construction would start after the setting of the concrete is complete. The setting time, as specified in the Indian Standards (usually 28 day) would be maintained before the construction of the tower can begin. About 50 litres of water would be required at each of the tower site for the purpose of curing. It is estimated that in Scheme S 20 towers would be constructed ass presented in ***Table 3.2***.

Table 3.2 ***Estimated number of towers in Scheme S***

Sl. No	Name of Alignment	No of Towers (nos)

Sl. No	Name of Alignment	No of Towers (nos)
1.	LILO of 132 kV DC 3 Ph. Dumka-Deoghar Transmission line	20

Source: DPR

The erection of the tower is done manually by assembling the prefabricated component of the lattice structure. The components are also hoisted manually by using a pulley system. Approximately 10-15 people are involved in the erection of the tower.

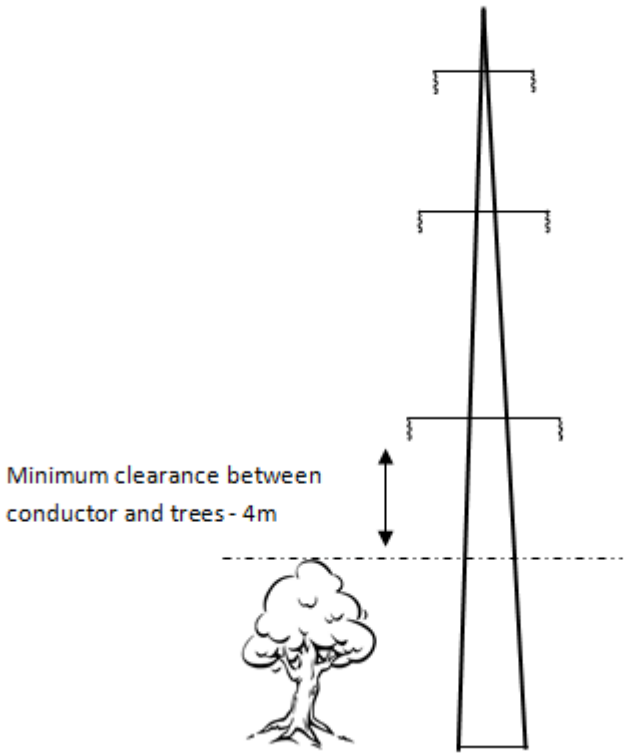
Stringing of Conductors

The stringing of the conductors can be done by either manual or tension method. Usually tension methods are used for stringing as this method keeps the conductor surface safe during stringing process. In this method, the conductor is kept under tension during the stringing process to keep the conductor clear of the ground. A pulling line is initially pulled into the travellers which are then used to pull the conductor from the reel stands using specially designed tensioners and pullers. There are basically two types of pulling machines used in the construction of transmission lines being strung under tension. These are defined as bull wheel and drum/reel-type. Pullers would be equipped with load-indicating and load-limiting devices. Tensioners would be equipped with tension indicating devices. The capacities of the puller and tensioner would be based on the conductor, span length, terrain, and clearances required above obstructions. Sag tensions can never exceed during stringing. Required capacity for both puller and tensioner can be calculated as mentioned in IEEE 524 (1) .Positive braking systems will be required for pullers and tensioners to maintain conductor tension when pulling is stopped.

Tree felling/lopping: Within the width of Right of Way (RoW), trees will be felled or lopped to the extent required, for preventing electrical hazard. As per Government of India Circular 7-25/2012-FC dated 5th May 2014, minimum clearance between conductor and trees would be 4m for 132 KV transmission line. The maximum sag and swing of the conductors are to be kept in view while working out the minimum clearance mentioned of 4m. In the case of transmission lines to be constructed in hilly areas, where adequate clearance is already available, trees will not be cut except those minimum required to be cut for stringing of conductors.

(1) Guide for the Installation of Overhead Transmission Line Conductors

Figure 3.5 Minimum clearance between conductor and trees



Note: *Information derived from Government of India Circular 7-25/2012-FC dated 5th May 2014*

3.4 RESOURCE REQUIREMENT

3.4.1 Land Requirement

Land will be required both for transmission line tower footing and 27 meter Right of Way for the 132 kV transmission line. As the detail survey of route alignment is not yet completed, exact land requirement is yet finalized. As stated earlier in Environmental and Social Management Framework for this project no land will be acquired for this project. However, there would be restriction on use of land falling within right of way and tower base. As per the regulation of Government of Jharkhand[1], due to restriction of land use, compensation at the rate of 85% of land value would be paid to land owners for tower base area. For RoW, compensation at the rate of 15% of land value would be paid to land owners towards diminution of land value in the width of RoW Corridor.

3.4.2 Manpower

The construction activity would be carried out by primarily three teams i) foundation ii) tower erection iii) stringing. The foundation construction team would have around 15-20 labours while the tower erection team which would

1) Department of Power, Government of Jharkhand notification dated 15th December 2017

follow would have 10-15 people. Finally the stringing team would also have around 20-30 people involved in the job.

Since these teams would travelling along the transmission line they would preferably be staying on fly camps setup along the transmission corridor transmission line alignment. However for storage on the material a laydown area would be constructed. The area would also be used for housing of labours.

3.4.3 Water use

The water usage would include water for both construction and domestic activity. During tower foundation approximately 60 m^3 of water (60 KL) will be required daily while in the tower erection phase approximately 50 L of water would be required daily. During stringing phase the water requirement would be primarily for domestic activity only and would be in the tune of 25 L per day.

3.4.4 Vehicle usage

Typical vehicles on site at all transmission lines include 2 trucks, 2-3 excavators and 6 light duty vehicles (LDV), puller and tensioner.

3.4.5 Major material required During Construction

Equipment and material necessary for the construction of the transmission line is presented in ***Table 3.3.***

Table 3.3 Equipment and Material required for transmission line

Sl. No	Activity	Equipment Required
1	Foundation of Towers	Stub of Towers
		Stub Setting Templates
		Stub Setting jacks
		From boxes for concreting Wooden planks for shuttering
		Concrete mixer machines , Vibrating Machines, Dewatering Pumps
		Back hoe Excavator
		Sand Cement Aggregate
		Metal Screens and other tools and tackles related for excavation , concreting and backfilling
2	Erection of Tower	Tower steel Members , nuts, bolts and rivets
		Derrick Poles for lifting of the tower members
		Poly propylene rope for Guying purpose
		Pulleys tools and tackles
3	Stringing of Conductor and earth wire	Conductors and earth wire drums
		Insulator discs hardware filings and accessories
		Tensioner and puller machine for stringing purpose
		Pilot wires for paying off earth wire

Sl. No	Activity	Equipment Required
		Hydraulic compressor machine for making joints of conductors Pulley and sheaves , roller , clamps wires , ropes etc for stringing purpose

3.5 WASTE GENERATION

3.5.1 Wastewater

The wastewater generated at the construction phase would be primarily domestic wastewater from construction camp and laydown areas. These would be treated through septic tank and soak pit. In case of fly camp for the construction of the transmission bio-toilets would be provided.

3.5.2 Solid Waste

The solid waste generated from the construction activities would be primarily municipal solid waste.

3.6 PROJECT TIMELINE AND COST

The estimated cost for the Scheme S is INR 70.71 crore while that of the transmission line is INR 5.62 crores. The time estimated for the construction period is envisaged to be 18 months. Most of the construction activity would be carried out during the non-monsoon, since most of the areas are single cropped.

4 METHODOLOGY OF ESIA

A project level Environmental and Social Impact Assessment (ESIA) is method of systematic identification and evaluation of the potential impacts (effects) of the proposed transmission line project relative to the physical, biological and socioeconomic components of the environment. The ESIA study can be considered as an important project management tool that can assist in collecting and analyzing information on the environmental effects of a project and ultimately identify actions which can ensure that the projects benefits outweigh the impact on the bio-physical and social environment. The activities which have been undertaken in each of these steps/stages are presented in the subsection below.

4.1 SCREENING & SCOPING

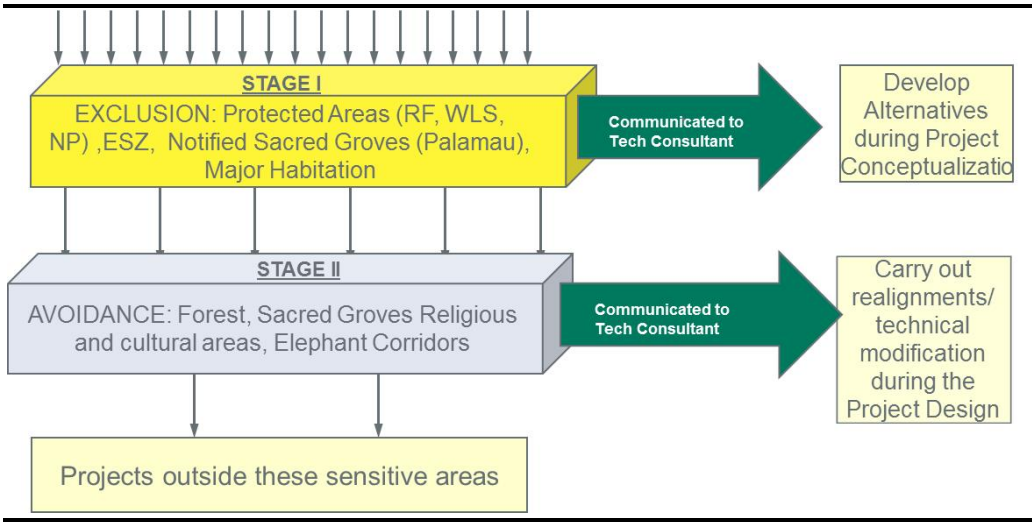
An initial reconnaissance was conducted along the TL alignment to understand prevailing environment and social setting in its immediate vicinity and use it as a basis of screening and scoping exercise for the ESIA.

As defined in the ESMF, a two stage screening process was followed for transmission line project (refer ***Annexure 2***). The first level of screening was carried out with the analysis of the alternative. While developing the alternatives JUSNL had taken into consideration the following criteria:

- Exclusion of protected areas such as Wildlife Sanctuary, National Park, Eco-Sensitive Zones etc.
- Forest land as identified on the Survey of India toposheet should be as less as possible;
- Settlement along the alignment should be as low as possible;
- Technical constraints such as crossing e.g. rivers, railways , roads should be as low as possible

The second stage of screening was carried out to identify and avoid forest land (wherever possible) on the best alternative. During this stage the best alignment was scanned for identifying any stretch of the alignment which has passed through any forest land. These were communicated to the Design Consultant for further consideration during the detailed survey stage. Moreover, during detail survey stage, it would be ensure by the Design Consultant that no houses are falling within the RoW of the transmission line. The results of the second stage screening are presented in ***Annexure 2.***

Figure 4.1 Two Stage Screening Process



As per the ESMF, an initial environmental and social examination (IESE) was conducted to determine whether or not there would be key environmental and social impacts from the construction and operation of the transmission lines. The results of the IESE has been recorded in an Environmental and Social Impact Identification Matrix presented in the IA Section (**Chapter 6**) and was used as a tool for scoping the ESIA to potential environmental and social issues of concern. The IESE also helped in determining the requirement for other specialized studies e.g. Biodiversity Action Plan and Tribal People Plan.

4.2 BASELINE STUDIES

Establishing baseline helps in understanding the prevailing environmental and socio economic status of the study area. It provides the background environmental and social conditions for prediction of the future environmental & social characteristics of the area due to the operation of the proposed project during its life cycle.

Considering the project activity described in **Chapter 3** it is anticipated that scale and magnitude of project related impacts are likely to be perceived in an area within 500 m both side of the alignment and has been considered to be the study area for the ESIA. Site surveys were conducted in the study area understand the environmental setting of the alignments and the study area, understanding of the drainage patterns, presence of physiographic features e.g. hillocks, rocky outcrops, location of the habitations with respect to the alignment etc. Ecological surveys and community consultations were also conducted to collect the information related to the local community and biological environmental conditions of the study area. Secondary baseline data collection involved identifying and collecting available published material and documents on relevant environmental and social aspects (like soil quality, hydrogeology, hydrology, drainage pattern, ecology, meteorology and socio-

economic conditions) from veritable sources including Govt. Departments, Research papers, etc.

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4.3 IMPACT ASSESSMENT

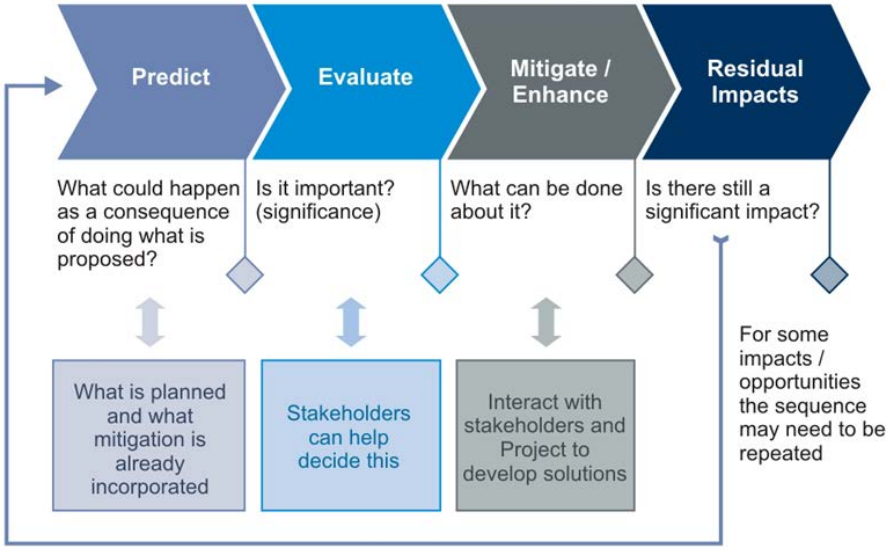
The key aim of the impact assessment process was to characterize and evaluate potential environmental and social impacts arising out of the project and prioritize them so that they can be effectively addressed through Environment & Social Management Plans (ESMPs). The potential impacts have been identified through a systematic process wherein the activities (both planned and unplanned) associated with the project, across the construction and operational phases have been considered with respect to their potential to interact with environmental and social resources or receptors. Thereafter, sequential impact assessment steps involving impact prediction, evaluation, mitigation and enhancement and evaluation of residual impacts have been followed in a phased manner.

Prediction of impacts was undertaken as an objective exercise to determine what could potentially happen to the environmental and social receptors as a consequence of the project and its associated activities and took into account baseline conditions at site, stakeholder's opinion and expert judgement. The evaluation of impacts was done using a semi-quantitative, based on the delineation of a set of criteria as follows:

- *Scale*: Degree of damage that may be caused to the environmental & social components concerned.
- *Extent*: The extent refers to spatial or geographical extent of impact due to proposed project and related activities.
- *Duration*: The temporal scale of the impact in terms of how long it is expected to last.
- *Magnitude:* Degree of change caused by a project activity is a function of Scale, Extent and Duration, as applicable.
- *Vulnerability of Receptor:* Represents the sensitivity of the receptor based on the relationship between the project and present baseline environment (the receptor).

Once magnitude of impact and sensitivity/ vulnerability/ importance of resource/ receptor have been characterized, the significance was assigned for each impact using an impact score for each criteria, following a systematic rating method, leading to the qualification of significance of impact as Negligible, Minor, Moderate and Major. The overall impact assessment methodology is presented in below figure.

Figure 4.2 Impact Assessment Process



4.4 *ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN PREPARATION*

The Environmental & Social Management Plan (ESMP) along with a Monitoring Plan has been prepared for the construction and operation of the transmission line. The ESMP would act as a guidance document for JPSIP to ensure that they can implement the project in an environmentally sound manner where project planners and design agencies, contractors, relevant government departments and stakeholders of concern understand the potential impacts arising out of the proposed project and take appropriate actions to properly manage them.

5 DESCRIPTION OF THE ENVIRONMENT

5.1 INTRODUCTION

This section establishes the baseline environmental and socio economic status of the study area to provide a context within which the impacts of the Project are to be assessed.

Establishing baseline helps in understanding the prevailing environmental and socio economic status of the study area. It provides the background environmental and social conditions for prediction of the future environmental characteristics of the area based on the operation of the new/ expansion activity of the project during its life cycle. It also helps in environmental and social management planning and strategy to minimise any potential impact due to the Project activities on surrounding environment.

5.2 TERRAIN

The landscape of Dumka district is to a large extent comprises of long undulation ridges forming rugged and coarsely dissected topography between which runs the drainage channels. Geomorphologically the district can broadly be divided into three well defined, physically identifiable and genetically significant units viz. (i) the hilly area, (ii) the rolling country or (Valleys) and (iii) the pediplained flat country.

In general the area of Deoghar district shows a general slope from north to south. The land surface is rugged and uneven ranging from flat lands to almost steep slopes. However, in general the slopes are gradual and these have been worked into terraced paddy fields at several places.

A review of the relief [(1)] of the areas along the transmission lines indicate that the alignment in both Dumka and Deoghar district passes through the areas of very gentle slope.

5.3 LANDUSE & LAND COVER

The landuse land cover was assessed within of 500 m each side from the proposed alignment. The Dumka-Deoghar Transmission line primarily passes through the single crop agricultural line (Kharif cropped) except for small patches of barren land (AP 3-AP 4, AP 2- AP 1), scrub land (AP 8) and built-up area. Thus the major landuse in the area is primarily Single crop agricultural land. Photograph of land cover near transmission alignment is presented in .

(1) Nearly Level: 0-1% (Class A), Very Gentle Sloping : 1-3% (Class B); Gentle Sloping 3-5% (Class C); Moderately Sloping : 5-10% (Class D); Strongly Sloping : 10-15% (Class E);Moderately Steep Sloping : 15-20% (Class F), Steep : 25-33% (Class G); Very Steep (Class H), Very Very Steep : Over 50% (Class I): Soil Survey Manual 1960.All India Soil and Land Survey Organisation

Figure 5.1 Photographs of Land cover near Transmission Alignment

5.4 SOIL

Soils in Dumka district has formed as a result of in-situ – weathering of crystalline basement. Climate, topography and vegetation have all contributed to the formation of soil. Soils are sandy loam to clay loam, non-calcareous, slightly to moderately acidic and have location exchange capacity. The soils are generally shallow on the ridges and plateaus and deep in the valleys. The fertility of soil is poor due to extensive erosion, acidic character and low retaining capacity.

The surface lithology has exercised profound impact on the development of soil types in Deoghar district. The district is characterized by a wide variety of soils, which can be classified as clayey, loamy, sandy loam and lateritic. Sandy loams to loamy sands are common in uplands whereas loam to sandy loam is common in lowlands.

5.5 CLIMATE AND METEOROLOGY

The climate of Dumka district represents a transition between the dry and extreme climate of northern India and the warm and humid climate of West Bengal. Winter commences from mid-November and extends up to the middle of March, December and January being the coldest months. The winter is characterised by heavy dew, thick fog and associated with cold waves. The winter is followed by summer which lasts till mid – June and then monsoon sets in which generally lasts till the end of September. During winter the mercury drops to 4 °C and during summer it shoots up to 46 °C. The relative humidity varies between 50 – 60%.

The climate of Deoghar district varies from sub-tropical to sub-humid. May is the hottest month with an average temperature of 35.8°C and December is the coldest month with an average temperature of 12.5°C. August and September

are the wettest months. Average annual rainfall of the district is 1162 mm of which about 88% is received between June and October.

5.6 *AIR ENVIRONMENT*

There is no industrial area set up in 500 meter each side of the proposed Dumka-Deoghar Transmission line alignment. The source of generation of air pollutants is primarily from the transportation corridors i.e. NH 114 A and rural roads and from burning of fossil fuels for domestic purpose. Therefore the ambient air quality is representative of rural set-up. Total 11 villages in two district (Dumka, and Deoghar) are located within the 1 km (500 meter each side) buffer of three proposed transmission line. As per the 2011 Census records, the study area, covering 11 villages, has a total of 476 households and a population of 2626.

5.7 *NOISE ENVIRONMENT*

Since there are no industrial activities or major settlement along the alignment the source of noise is primarily from the transportation vehicles. Therefore the ambient noise quality along transmission line is representative of residential areas.

Total 11 villages in two district (Dumka, and Deoghar) are located within the 1 km (500 meter each side) buffer of three proposed transmission line. As per the 2011 Census records, the study area, covering 11 villages, has a total of 476 households and a population of 2626.

5.8 *DRAINAGE*

As per the site reconnaissance and review of the Survey of India Toposheet and satellite imagery it was observed that the LILO Dumka-Deoghar Transmission line is part of the Ganga River Basin. However, there are no major river or water body or water channels near the alignment. Only there are first order streams near the alignment.

5.9 *ECOLOGICAL ENVIRONMENT*

The transmission line stretch is located in Dumka and Deogarh districts of Jharkhand. The proposed line falls in 6B Deccan Peninsula – Chota-Nagpur Bio-geographic Province[1].

[1] http://iipsenvis.nic.in/Database/Envis_5275.aspx

Natural vegetation in the region can be broadly classified into **5B Northern Tropical Dry Deciduous Forests**. The dominant tree species in the region is Sal (*Shorea robusta*).

5B Northern Tropical Dry Deciduous Forests – In this region dry deciduous forest are found in the drier parts, mostly in the upper ridges. Here also the dominant species is sal (*Shorea robusta*). Other species that are associated with sal are *Termnalia belerica, Terminalia chebula, Adina cordifolia, Madhuca latifolia, Butea monosperma, Diospyros melanoxylon, Ailanthus excelsa, Cassia fistula* etc.

5.9.1 Vegetation within the Study area

Homestead plantation

During the primary survey trees like Aam (*Mangifera indica*), Jack fruit (*Artocarpus heterophyllus*), Imli (*Tamarindus indica*), chhatim (*Alstonia scholaris*), Sugar palm (*Borassus flabellifer*), Neem (*Azadirachta indica*), semal (*Bombax ceiba*), Palas (*Butea monosperma*), *Acacia auriculiformis*, Mohua (*Madhuca latifolia*), Peepal (*Ficus religiosa*), Wad (*Ficus benghalensis*), Kadam (*Haldina cordifolia*) etc. were found to occur frequently in human settlement.

Roadside plantation

Along the roadside following trees were recorded Gulmohor (*Delonix regia*), Babool (*Acacia nilotica*), Semal (*Bombax ceiba*), Peepal (*Ficus religiosa*), Wad (*Ficus benghalensis*) etc.

Trees within transmission line corridors

Tree species present with number of individuals within the transmission line corridor for LILO of 132 kV D/C 3 Ph. Dumka–Deoghar Transmission line are listed in Appendix.

Invasive Alien species

Major invasive species recorded during the study are: *Acacia auriculiformis, Lantana camara, Parthenium hysterophorus* etc.

5.9.2 Wildlife Habitat and Faunal Diversity

Wild Life Habitat

No Sensitive Ecological Habitat like National Park, Wild Life Sanctuary, Tiger Reserve or Elephant Reserve is located within the study area of the transmission lines.

5.9.3 Faunal Diversity

Herpetofauna

Three species of amphibians *viz*. Common Toad (*Duttaphrynus melanostictus*), Indian Bullfrog (*Hoplobatrachus tigerinus*) and Skittering Frog (*Euphlyctis cyanophlyctis*) etc. are observed from the study area. All the species are listed Least Concern as per IUCN Classification (IUCN Version 2017-3). 6 species of reptiles were observed/reported from the study area. The list includes Russel's Viper (*Daboia russellii*),, Indian Cobra (*Naja naja*), Common Krait (*Bungarus caeruleus*), Indian Rat Snake (*Ptyas mucosus*), Checkered Keelback (*Xenochrophis piscator*) and Oriental Garden Lizard (*Calotes versicolor*) . The list includes four Schedule II species viz. Russel's Viper, Indian Cobra Indian Rat Snake and Checkered Keelback.

Avifauna

A total of 36 species were recorded from the study area. The species list includes terrestrial and aquatic birds. Terrestrial and aquatic birds recorded are presented below

Terrestrial birds- Shikra, Bank Myna, Common Myna, Paddyfield Pipit, House Swift, Spotted Owlet, Common Pigeon, Indian Roller, House Crow, Asian Palm Swift, Black Drongo, Black Winged Kite, Asian Koel, Indian Silverbill, Coppersmith Barbet, Little Green Bee-eater, Black Kite, House Sparrow, Baya Weaver, Plain Prinia, Rose-ringed Parakeet, Red-vented Bulbul, Indian Robin, Eurasian Collared Dove, Jungle Babbler etc.

Aquatic birds- Common Kingfisher, White-breasted Waterhen, Indian Pond Heron, Cattle Egret, Pied Kingfisher, Little Egret, White-throated Kingfisher, Intermediate Egret, Little Cormorant, Red-wattled Lapwing etc.

Shikra (*Accipiter badius*), Black Kite (*Milvus migrans*) and Black Winged Kite *(Elanus caereleus*) are listed as Schedule I as per Wildlife Protection Act, 1972.

Mammals

Total 7 species of mammals are reported/recorded from the study area. The mammals observed/reported in the study area are Nilgai (*Boselaphus tragocamelus*),, Common Grey Mongoose (*Herpestes edwardsii*), Five-striped Palm Squirrel (*Funambulus pennantii*),, Golden Jackal (*Canis aureus*), Northern Plains Langur (*Semnopithecus entellus*), Rhesus macaque (*Macaca mulatta*), Lesser Bandicoot Rat (*Bandicota bengalensis*),etc. The list includes four Schedule II species Golden Jackal, Common Grey Mongoose, Indian Northern Plains Langur and Rhesus macaque.

5.10 SOCIO ECONOMIC ENVIRONMENT

Since the people constitute the essence and the focus of any socio-economic activity, it originates with reference to the underlying demographic features and trends.

This section deals with the baseline socio-economic environment of the associated proposed transmission line of proposed Jarmundi Substation (Scheme S). The following section discusses the methodology used for the socio-economic assessment. The subsequent sections discuss the baseline profile of the villages within the study area. The information provided has been primarily derived from the secondary sources (*Census of India*). In addition primary information was also collected during the discussions at the villages with the local community members. The village-wise secondary data (*obtained from Census, 2011*) has been taken into consideration for analyzing the socio-economic profile of the project area.

5.10.1 Area of Influence

The study area for this study is defined as area within 500 meter of each side of proposed transmission line. Total 11 villages in two district (Dumka, and Deoghar) are located within the 1 km (500 meter each side) buffer of three proposed transmission line. Line wise details of these villages are provided in below.

Table 5.1 List of the Villages Located Within Study Area

Transmission Line	Villages	Block	District
Dumka Deoghar Trnas. Line	Bunbuni, Pandedih, Tetaria, Biswamani, Jhiluwamarni, Pahardih, Pahardih (2) and Thanpur	Jarmundi	Dumka
	Parwaldih, Domanwadih, Bahinga	Sona Rai Tharhi	Deoghar

The demographic profile in terms of total population, household size, and sex ratio of the selected villages in the block has been summarized in the sections below.

5.11 GENERAL SOCIOECONOMIC PROFILE

The demographic profile in terms of total population, household size and sex-ratio of the above mentioned selected villages has been summarized in the sections below.

Population and Household Size

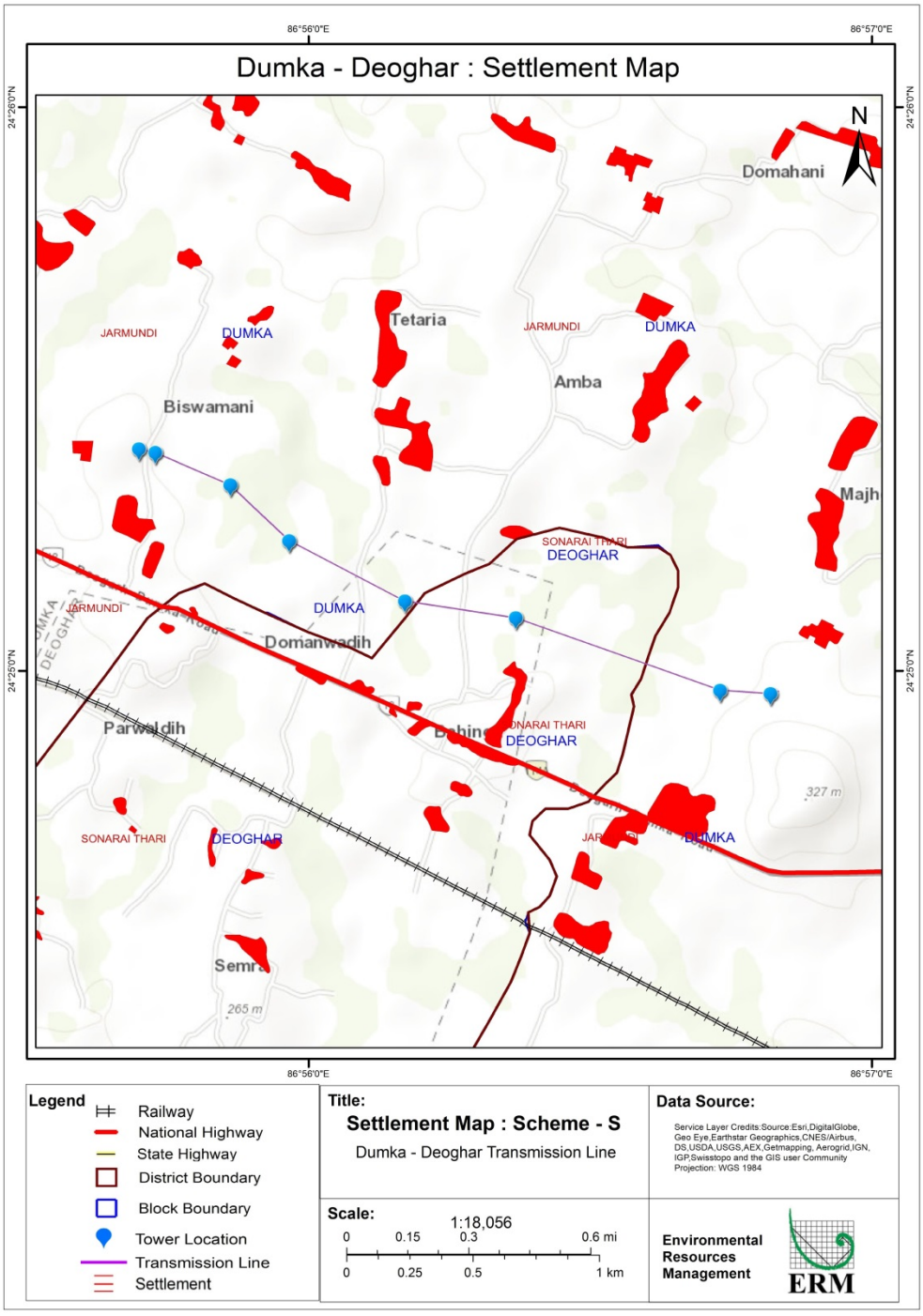
As per the 2011 Census records, the study area, covering 11 villages, has a total of 476 households and a population of 2626. The entire population in the

study area falls in the rural category. Among 11 villages located within the study area of Dumka Deoghar trans. line, Tetaria (841) has the highest population lived in 135 household and the lowest populations were recorded in Domanwadih (79) and total household no is 15. The household size of above mention 11 villages generally ranged within 4.52 to 6.23 with an average household size of 5.28. The demographic details are provided below.

Table 5.2 Demographic profile of villages located within the study area

Name of the village	No. of households	Total population	Average household size	Male %	Female %	Sex Ratio	SC population %	ST population %	Literacy rate %	Male literacy rate %	Female literacy rate %
Parwaldih	23	104	4.52	52.88	47.12	891	100.00	0	52.94	61.36	43.90
Domanwadih	15	79	5.27	46.84	53.16	1135	12.66	0.00	72.13	79.31	65.63
Bahinga	77	409	5.31	53.55	46.45	868	24.69	4.40	50.00	62.29	35.17
Bunbuni	45	254	5.64	53.54	46.46	868	0.39	35.04	70.19	77.68	61.46
Pandedih	18	91	5.06	49.45	50.55	1022	0.00	0.00	84.62	97.37	72.50
Paharidih	28	153	5.46	50.33	49.67	987	0.00	67.32	46.67	60.29	32.84
Jhiluwamarni	23	125	5.43	52.00	48.00	923	0.00	0.00	45.56	65.96	23.26
Biswamani	30	160	5.33	53.13	46.88	882	0.00	0.00	60.47	75.76	44.44
Tetaria	135	841	6.23	53.27	46.73	877	0.00	25.45	45.41	58.87	30.53
Thanpur	54	278	5.15	52.88	47.12	891	0.00	0.00	58.26	69.42	45.87
Paharidih	28	132	4.71	50.76	49.24	891	0.00	0.00	67.29	85.19	49.06

Figure 5.2 Special distribution of Settlements near TL Alignment



Sex Ratio

The average sex ratio of the villages located in the study areas as per the Census 2011 is 938. Within the study area, villages Domanwadih (1135) and Bahinga and Bunbuni (868) account for the highest and lowest sex ratios respectively.

Scheduled Caste (SC) & Scheduled Tribes (ST)

SC communities inhabiting only in the villages located within the study area i.e. Parwaldih, Domanwadih, Bahinga . As per Census 2011, STs account for 12.52 % of the total population in the study villages. Within the study villages, Pahardih (2) (67.32 %) accounts for the highest proportion of STs. Villages Thanpur, Biswamani, Jhiluwamarni, Pandedih, Domanwadih and Pahardih do not register the presence of any tribal population.

5.12 EDUCATION & LITERACY

Among above mentioned 11 study area villages, the average literacy rate was 59.41% and and male literacy rates are recorded to be 72.14 % and 45.88 % respectively. Highest and lowest literacy rate was recorded in Pandedih (88.62%) and Tetaria (45.41%). Average male and female literacy rate in the study area was recorded 72.14% and 45.88% respectively.

5.13 ECONOMIC ACTIVITY & LIVELIHOOD PATTERN

The relevance of economic activity and livelihood pattern is important in the context of the study since depending on the existing situation one can predict the impact of the project activity on the economy of the region.

Average total working population in the study area villages is 58.48 %. Of the total workforce, average main work force is 65.61 % and marginal workforce is 34.39 %. Summary of work force participation in different selected villages is mentioned in below.

Table 5.3 Livelihood profile of the villages located within the study area

Name of the village	WPR (%)	Main workers (%)	Marginal workers (%)	Cultivator (%)	Agricultural labourer (%)	HH worker (%)	Others(%)
Parwaldih	48.08	32	68	28.00	58.00	0.00	14.00
Domanwadih	27.85	40.91	59.09	22.73	9.09	0.00	68.18
Bahinga	54.03	32.13	67.87	31.67	55.66	0.00	12.67
Bunbuni	28.35	94.44	5.56	36.11	19.44	0.00	44.44
Pandedih	25.27	39.13	60.87	0.00	43.48	0.00	56.52
Paharidih	57.52	97.73	2.27	4.55	94.32	0.00	1.14
Jhiluwamarni	56.00	100.00	0.00	41.43	57.14	0.00	1.43
Biswamani	50.63	97.53	2.47	38.27	58.02	0.00	3.70
Tetaria	43.40	81.92	18.08	28.22	69.86	1.37	0.55
Thanpur	58.99	95.12	4.88	64.63	32.32	0.61	2.44

Name of the village	WPR (%)	Main workers (%)	Marginal workers (%)	Cultivator (%)	Agricultural labourer (%)	HH worker (%)	Others(%)
Paharidih	29.55	82.05	17.95	82.05	15.38	0.00	2.56

Work Participation ratio (WPR) (1), defined as percentage of total workers including main and marginal workers out of the total population of the study area, is 58.48 % which suggests the study area villages have relatively higher unemployment rate as most of people are involved in agriculture.

It can be seen from the following figures, the study area is characterised by dominance of main worker who are involved in same work more than 6 month in a year. It can be also observed that farm base and non-farm based livelihoods, both as the primary and secondary sources of livelihood. In farm based livelihood people mostly involved as both cultivator and agricultural labour while in case of nonfarm based livelihood community are involved as labour and other activities.

Other noticeable aspects as evident in the above table is that proportion of Agriculture Labourer (AL) is relatively high in majority of the study area villages which indicates number of farmers having sufficient land holding for their livelihood is on lower side in study area and community consultation also reveals that most of the people of local community has marginal to small landholding which is not sufficient for earning their livelihood.

5.14 BASIC AMENITIES AND INFRASTRUCTURE

Data on basic amenities and rural infrastructure for villages is drawn from the Village Directory 2011.

5.14.1 Drinking Water facilities

The social organization and settlement pattern in the study area is predominantly arranged around the available agricultural land and water resources in the area. Land based livelihood being the key feature of the community, proximity and availability of water is often linked to the economic status of the family/ household. Also typically in a village, water for drinking and other purposes defines the household hygiene/ sanitation and ultimately the standard of living of the community. For drinking purpose, availability of water is mostly in the form of:

- Ground water sourced through hand pump and well serve mostly to the needs of household drinking water consumption however no filtration facility is available for drinking water;
- Supply of water is not available in majority of the study area villages;

(1) Work Participation ratio (WPR) is defined as percentage of total workers including main and marginal workers out of the total population of the study area

Asper community consultation very few household in the village have access to individual sanitation facility and majority of the community reportedly resort to open defecation.

5.14.2 Medical Facilities

Medical facilities are one of the basic service indicators which need to be studied so as to know the quality of life in the area. In the most of the study area villages considered for the study, do not have health facility with in their village premises. They have to depend on health facility in the nearby urban centres like Dumka, Jarmundi etc.

5.14.3 Educational Facilities

The study area possesses necessary educational infrastructure to cater to the educational needs of the both rural and urban population. Among the study area villages, Government primary schools are present in majority of the villages and one middle school is present at village Jhiluwamarni. There are no secondary or senior secondary schools in the study area.

5.14.4 Transport & Communication

Majority of the study area villages is connected with major road and urban centre with all-weather road. Auto is the main transport facility for the villages though some of the villages also have bus facility from nearest urban centre.

5.14.5 Power Supply

Electricity is available in all except one study area villages - Thanpur through the frequent power cut are also reported by the community during consultation.

5.14.6 Post and Telecommunication

All the villages in the study area have access to mobile network. However, none of the villages have post offices or sub-post offices. Similarly, none of the villages have access to internet cafes or any form of public transport.

6 IMPACT ASSESSMENT AND MITIGATION MEASURES

This section identifies and assesses the potential impacts to the physical, biological and socioeconomic environment that can be expected from the proposed transmission line (132 KV DC Dumka – Deoghar transmission line). The impacts due to the project activities across different phases have been identified and assessed. The impacts due to the project activities across different phases have been identified and assessed. Impacts are identified and predicted based on the analysis of the information collected from the following:

- Project information (as outlined in ***Section 3***);
- Baseline information (as outlined in ***Section 5***).

6.1 POTENTIAL IMPACT

The identification of likely impacts during construction and operation phases has been carried out based on understanding of activities and their consequent impacts on various environmental and socio-economic resources or receptors. The impact identification matrix in ***Table 6.1*** captures the likely interactions between the activities on one axis and the resources / receptors on the other axis.

Table 6.1 Scoping Matrix for transmission line

Project Activity/ Hazards	Environmental Resources										Ecological Resource					Social-Economic Resources						
	Aesthetic & Visual Impact	Land Use	Soil Quality	Air Quality	Noise & Vibration	Surface water resource	Surface water quality	Ground water resource	Ground water quality	Traffic (Road)	Terrestrial Flora	Terrestrial Fauna	Aquatic Flora & Fauna	Protected /Migratory Species	Migratory Path/Corridor	Job & economic opportunity	Common Property Resources	Land Use (Economic Displacement)	Infrastructure & Services	Cultural Resources	Community Health & Safety	Occupational health & safety
Pre-Construction Phase/Planning Phase																						
Land Procurement for Tower Footing		■																■				
Construction Phase																						
Clearance (Vegetation)	■										■	■				■						
Construction of Site approach road			■	■	■					■						■						■
Excavation for tower foundation			■	■	■							■				■					■	■
Transportation of construction materials, equipment & machineries				■	■											■						■
Storage & handling of construction materials				■												■						■
Construction of the Tower Footing				■												■						■
Erection of Tower	■			■	■							■				■						■
Stringing of Transmission lines	■				■					■	■										■	■
Storage, handling and disposal of construction waste	■		■				■		■												■	
Generation of sewage and discharge			■				■		■				■								■	
Sourcing of construction water & domestic water								■								■	■					
Surface Runoff from construction site							■						■									
Operation Phase																						

Project Activity/ Hazards	Environmental Resources										Ecological Resource				Social-Economic Resources							
	Aesthetic & Visual Impact	Land Use	Soil Quality	Air Quality	Noise & Vibration	Surface water resource	Surface water quality	Ground water resource	Ground water quality	Traffic (Road)	Terrestrial Flora	Terrestrial Fauna	Aquatic Flora & Fauna	Protected /Migratory Species	Migratory Path/Corridor	Job & economic opportunity	Common Property Resources	Land Use (Economic Displacement)	Infrastructure & Services	Cultural Resources	Community Health & Safety	Occupational health & safety
Physical presence of transmission tower																						
Maintenance of transmission lines																						
Lopping of trees for maintaining safety distance																						

= Represents "no" interactions is reasonably expected

= Represents interactions reasonably possible but none of the outcomes will lead to significant impact

= Represents interactions reasonably possible where any of the outcomes may lead to potential significant impact

The details of the activities and their impacts have been discussed in detail in the following sections.

6.1.1 Impacts on Aesthetic and Visual Quality

Potential impacts to aesthetics and visual quality because of the setting up and operation of the transmission line (132 KV DC Dumka – Deoghar transmission line) may arise primarily due to disruption and degradation of views in the surrounding landscape. Visual impacts from transmission lines are highly variable and depends on several factors like location of the project, lines of sight, scenic vistas and most importantly the perception of the people. Degradation of views from transmission lines may result from cutting of trees and vegetation clearance from setting up of physical infrastructure (transmission towers). With the study area, not being recognized as a place of natural scenic beauty or a touristic destination, these factors are unlikely to lead to any significant adverse visual and aesthetic impacts in the area and it can be rated as **negligible**.

6.1.2 Air & Noise Quality

This project is not planned to house any point or area source of air emissions (particulate matter, pollutant gases, etc.) and neither does the study area have any industrial air pollution sources – the NH 114 A passing adjacent to the transmission line alignment (within 500 m), through which regular vehicular movement occurs is the only line source of air pollution, caused by vehicular emissions and because of re-entrained dust from the road surface. Based on visual observations, the quality of the air shed can be categorized as good and no indicators or existing sources of air pollutants were noted in the study area that could potentially result in air quality parameters to exceed National Ambient Air Quality Standards (NAAQS).

During site preparation and construction, the project is likely to generate dust (as particulates) in spite of best efforts to control it and there will be times during the construction phase when elevated dust concentrations may occur. Higher amounts of dust will be generated at places where earthwork, cutting and filling operations take place or in material handling and storage areas. A large percentage of such dust emissions from construction sites have been found to comprise of particles which are coarse in size (>10 microns) and has a tendency to settle down within a few hundred metres of the source of emissions. The smaller fractions (PM10) can however be carried over longer distances in a dust cloud, in the case wind velocity is higher and depending on prevailing wind direction maybe deposited in the adjoining settlements with a potential to cause soiling of residential premises, deposition on agricultural crops, etc. However, this will be a short-term impact lasting for a few months. Particulates, CO, SOx, NOx and unburnt hydrocarbons (VOCs) will be emitted by vehicles, batching plants (if used), heavy equipment and DG sets associated with site clearing and construction activities. Overall, the impact on air quality during the construction and operational phase of the project can be rated as **negligible to minor**.

Noise and vibration is expected to be primarily generated during the site preparation and construction phases of the project. Such noise may be generated from blasting (if required), operation of construction equipment and machineries, DG sets and the transportation of equipment and materials. During stringing of transmission line, principal source of noise would be from operation of winching machine. The winching machine produces noise level near 80 dB (A).

The study area has no major noise sources, except for vehicular noise on the adjacent NH. The noise generated from the construction phase activities is likely to be attenuated to acceptable levels as per the ambient noise standards within 200 m of the site. Such noise may however, cause discomfort the construction workers at site and nearby receptors of village settlements adjacent to the transmission line alignment. The construction activities, especially those with a potential to generate high noise levels would be temporary in nature and are not expected to last more than 15-20 days at specific tower location. The spatial scale of impact will be limited to a few hundred meters. The overall significance of the noise related impacts is rated as **minor**.

6.1.3 Impact on Land use

Approx. 20 nos of tower would be constructed in Scheme S (Dumka-Deoghar TL Alignment). Total length of the transmission line would be approx. 5 km. Land footprint of about 22 sq. m. would be required for each transmission tower, where right of way of the transmission line would be of 27 m (for 132 KV transmission line).

The present land use of the area through which all the transmission lines (in Scheme S) passes are primarily agricultural land. As discussed in Section 5.3, mainly single cropped is practiced in this area. Though there would be restrictions on development work (e.g., construction of building) on the land parcels falling within the right of way, knowing the fact that there would not be any restrictions on these land parcels for use of agricultural purpose, and further the TL alignment passing through mainly rural areas where chance of development work being coming up is near future very is meagre, significance of the land use related impacts is considered as minor. However, the TL alignment does not pass through forest land. Overall significance of the land use related impacts is rated as **minor**.

6.1.4 Impact on Soil

Cutting of vegetation (at tower foundation area), stripping of topsoil and digging of foundation pits for the tower are the three main activities, which are likely to affect the soil structure and quality. At the tower site (approx. 20 nos), all vegetation within 2 m beyond the tower base in all direction will be cleared to ground level. At four legs of the tower, topsoil will be stripped and foundations will be dug up to a depth of 3 m depending upon the tower type and soil characteristics. General practice shows that upon construction of the

transmission tower, land below the tower is used for cultivations. Therefore, if topsoil removed during tower base construction work is not properly reinstated, it may lead to loss of soil quality and thereby low agricultural productivity.

Considering good construction practices and planned embedded measures for mitigating these impacts, overall significance of the soil related impacts is considered as **minor**.

6.1.5 Impact on Road & Traffic

The traffic movement during construction phase (approx. 5-6 vehicle per day) will to some extent depend on which type and number of trips to and from the proposed site. The existing village roads would be used to the extent possible to approach the site. Since the vehicular traffic on the village roads are low there would be minimal increment in the existing traffic load. The overall significance of traffic related impacts is rated as **negligible to minor**.

6.1.6 Impact on Biological Environment

As discussed above some part of the transmission line would traverse through forest land. JUSNL would have to obtain Forest Clearance as per the provisions of the FCA, 1980, before any project related activity can commence through forest land. Site preparation will involve removal of trees, shrubs and herbs present along the transmission line corridor which will cause change in the modified habitat within the corridor leading to a loss of floral biodiversity at local level.

Trees within the transmission line corridor would be removed before construction. Moreover, there would also be removal of herbs and shrubs from the transmission line corridor. None of the floral or faunal species expected to be present within the site is threatened as per IUCN Classification (Version 2017-3).

Faunal species that have the most probability of occurrence within the transmission line corridors include amphibians (Common toad), reptiles (lizards and snakes), birds (Common crow, Common sparrow, Common myna, Drongo, larks, doves, parakeets, kites etc.) and mammals (mongoose, squirrels, rats, jackal, langur etc.). Vegetation clearance may affect the faunal species mentioned above, however, there are similar habitats in the vicinity and the species can easily relocate to those areas. Removal of vegetation at construction site (for tower footing) can adversely affect residential burrowing faunal species *viz*. reptiles (lizards and snakes), ground roosting birds (sparrows, pigeon, doves etc.) and mammals (rats, mongoose, mouse etc.). Removal of trees, herbs and shrubs from the transmission line corridors may cause loss of nesting habitats for bird species. In most cases however it has been observed that faunal and bird species to migrate to other local habitats which are adjacent, if the land affected is not very large. The scale of impact will be medium as it causes irreversible damage to a modified habitat. Duration of the impact will be long term as vegetation clearance would create

a permanent impact within the site area. Extent of the impact would be only within the project site and immediate vicinity.

Construction activities will include excavation, movement of machineries, increased anthropogenic movement (men and transport) and may lead to minor disturbances to floral and faunal habitats in the vicinity of the tower footing site because of deposition of dust, noise and light generated during construction activities may affect feeding, breeding and movement of animals. There is a chance of mammalian species falling in the excavated areas for transmission towers and get injured. However, these disturbances will be for a temporary period and expected to be of low magnitude and local in scale.

During the operation phase, several species of birds identified during the ecological study which can perch or make nests within transmission line area and can get electrocuted. Collision with the transmission line canal also result in bird mortality. The sensitivity of the site has been considered as medium due to the presence of Schedule I bird species.
Overall the significance of impact on biological environment can be rated to be **minor** to **moderate.**

6.1.7 Potential Impact on Socio-economic Conditions

Damage to Standing crops: Even though most of the construction activity has been planned during dry season there might be instances that during construction of the transmission tower foundation, erection of towers and subsequently stringing of transmission lines involve movement of men, machinery and equipment across agricultural fields leading to the tower locations. This may cause potential damage to the standing crops in agriculture field not only at the tower base and RoW of the transmission line but also may cause damage to the crops in adjacent agricultural plots due to movement of the vehicle and equipment and construction workers. This damage to crops will result in temporary loss of income for the cultivators.

Restriction on Land use and diminution of land value: As reported in Section 5.3, majority of all the three alignments passes through single crop agricultural land. No land would be acquired for the construction of tower footing. However, there would be restriction on use of land falling within right of way and tower base. As per the regulation of Government of Jharkhand[1], due to restriction of land use, compensation at the rate of 85% of land value would be paid to land owners for tower base area. For RoW, compensation at the rate of 15% of land value would be paid to land owners towards diminution of land value in the width of RoW Corridor. Further, even though there would be some loss of land and physical obstruction to use the land falling under the tower base, but the impacts would not be pronounced as non-mechanised agriculture is carried out in Jharkhand. The land owner would be able to use the land under the tower for agricultural purpose.

1) Department of Power, Government of Jharkhand notification dated 15th December 2017

Influx of Labour: Labour would be required for erection of transmission lines. Even though unskilled labour would be required for civil work and would be preferably sourced from local areas, skilled labour required for erection of transmission tower, stringing of transmission lines etc, would be primarily migrant labour. Some of the significant issues related with migrant labour would include:

- Conflict amongst workers, and between workers and local community, based on cultural, religious or behavioural practices.
- Discontent amongst local community on engagement of outsiders.
- Outbreaks of certain infectious diseases due to interactions between the local and migrant populations. The most common of these are respiratory (TB), vector borne (Malaria, Dengue), water borne (Stomach infections, typhoid) and sexually transmitted diseases (HIV, Syphilis and Hepatitis).
- Security issues to local women from migrant workforce.
- Use of community facilities such as health centres, temples, transport facility etc. by migrant labour may lead to discontent with local community.
- In case contractors bring in unskilled migrant labour, there stands the risk of exploitation of a labourer. This can happen in the form of hiring underage labourers, low and unequal wage payments, forced labour and discrimination on basis of the basis of caste, religion or ethnicity

The impacts described above are primarily within the RoW or would only extend to the settlements in the immediate vicinity of the transmission line, therefore localize in nature. Moreover, the damage to crop and conflicts of the migrant labour with the community would be temporary. Overall, socio-economic impact during the construction phase of the transmission lines are is evaluated to be of **minor** significance.

6.2 COMMUNITY HEALTH & SAFETY

Excavation of Tower Footings: During the construction of the foundation for the tower footing the excavation can pose potential safety concerns for the inhabitants in the locality. This would be more relevant when the construction is carried out near a settlement or along a foot track or existing village road.

Interference with utilities and traffic: The stringing of the transmission lines would cross existing roads (NH 33, SH) including village and districts road, state and national highways and railways. During the stringing operations when the transmission line crosses any road/ railways line, hindrance may be caused to the movement of traffic. In some instances temporary closure of the road/railway line may be required to facilitate stringing activities. This disruption in movement would cause inconvenience to the local population as access would be interrupted temporarily.

Changes in Environmental Conditions: Changes in baseline environmental conditions can be experienced by the local community in terms of increased nuisance levels from emissions of dust, contamination of surface water or

ground water and high noise levels during the construction phases. Even though there would be minimal increase in dust and noise during the construction period and this has the potential to lead to health impacts associated with eye irritation and general disturbance to daily activities.

Increased Prevalence of Disease: A maximum of 30 workers (at one point of time) will be employed for the construction phase during the peak construction and commissioning. This influx of workers to the community may cause impacts to public health, especially an increase in prevalence of diseases as well as pressures on existing health infrastructure. There is also the possibility of increase in sexually transmitted diseases such as HIV/AIDS as a result of the expected influx of workers to the area. In addition, vector-borne diseases will be sensitivity for settlements closer to campsites for the construction phase labour, particularly due to lack of hygienic conditions.

Electro Magnetic Field (EMF): During operation phase, Electro Magnetic Field (EMF) created by the transmission line can cause inconvenience on the surrounding community. It has been reported during the consultation that the people feel inconvenienced due to this charge especially when working on paddy fields underneath the conductors especially during the monsoon season. However, a review by the World Health Organization (WHO) held as part of the International EMF Project (1996), concluded that "From the current scientific literature there is no convincing evidence that exposure to radiation field shortens the life span of humans or induces or promotes cancer".

Considering good construction practices and planned embedded measures for mitigating these impacts, the overall significance of community health and safety impacts can be rated to be **minor**.

6.3 *OCCUPATIONAL, HEALTH & SAFETY*

The occupational risk related to the construction of transmission lines is primarily due to fall from heights which might cause serious injuries. Transmission towers would be of different heights and minimum height of the tower would be approx. 25 m in case of 132 kV transmission line. A review of the incident database (OSHA's Integrated Management Information System (IMIS) database) (1) indicate most of the incidents are due to fall from height while some incidents reported also include being struck by loads or falling objects during the erection of tower. Similarly there are risks of fall in the excavation created for tower footing.

Electrocution during the testing and charging: It has also been reported [OSHA's Integrated Management Information System (IMIS) database] that there has been fatalities due to electrocution. This occurs primarily during the testing and charging of the transmission lines is proper safety procedures are not followed.

(1) https://www.osha.gov/laws-regs/federalregister/2015-04-15-0

The construction work would involve several contractors who in turn would engage different labourers having varied skillsets. The duration and extent for most workmen is expected to extend for a few months and the occurrence of any accidents and consequent injuries/fatalities will lead to adverse impacts that could range from loss of productive time to loss of livelihoods (of workmen). If local workers are hired, they may not have appropriate training for adopting a safety culture expected at an industrial construction site – so receptor sensitivity may be anticipated to be high. There is also a possibility of legal non-compliance which may lead to temporary stoppage of work affecting construction schedules. Hence the receptor sensitivity is high. Overall, the impact significance for occupational health and safety can be considered to be **moderate**.

7 STAKEHOLDER ENGAGEMENT

A stakeholder is defined as "an individual, group, or organization, who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project". "Stakeholder Analysis" is the process of sorting identified stakeholder groups according to their impact on the project and the impact the project will have on them. This information is then used to assess the manner in which the interests of the stakeholders or projects impact on them should be addressed in the project development plan or its operation.

The importance of stakeholder analysis lies in the assessment and understanding of the socio-political environment surrounding the project. It allows for:

- Identification of the interests, concerns and societal risks surrounding the stakeholders, as well as conflicts of interests (if any);
- Identification of relations between stakeholders that may enable "coalitions" of project sponsorship, ownership and co-operation as well as the mechanisms which may influence other stakeholders;
- Key groups/ individuals to be identified who need to be informed about the project during the execution phase;
- Identifying stakeholders (those who might have an adverse impact on the project) and taking appropriate measures to mitigate their influence; and;
- Development of a framework for participatory planning and implementation of various project activities including interventions for community development.

The identification of stakeholders and their inclusion in the decision-making process is thus essential in the process of prioritizing, analyzing and addressing issues; and in creating management systems and strategies to address the concerns/ expectations of various stakeholders.

The following sub-sections provide a profile of the various stakeholders in the project as well as their concerns and relative influence with regards to the project.

7.1 IDENTIFICATION OF STAKEHOLDERS

The stakeholders who would directly impact or are directly impacted by the project are known as Primary Stakeholders, those who have an indirect impact or are indirectly impacted are known as Secondary Stakeholders. Keeping in mind the nature of the project and its setting, the stakeholders have been identified and listed in the table below;

Table 7.1 ***List of key stakeholders***

Stakeholder Category/ Group	Key Stakeholders
Primary Stakeholders	
Local Community	• Local Community
Other Primary Stakeholders	• Jharkhand Urja Sancharan Nigam Limited • World Bank
Secondary Stakeholder	
Institutional Stakeholders	• District Administration • Forest Department • Tribal Development Department
Other Secondary Stakeholder	• Contractors

Consultations with Local Communities

Community consultation is central to every impact assessment study because it helps to gather the opinion of the public on the proposed project and assess its potential effect on the public especially vulnerable groups. Consultations were carried out with community people residing in the adjacent to the proposed transmission lines to understand their concerns and also assess the extent of impact on the common. The location where the consultations were held in Scheme S along with the target group and the dates of consultation are presented in ***Table 7.2.***

Table 7.2 ***Details of Consultation***

Sl. No	Location	Date	Target group
1.	Bahinga	15/12/2017	General Population
2.	Pahridih	15/12/2017	General Population

The brief outcome of the consultations with the key stakeholder groups are listed below. The minutes of all consultations are recorded under ***Annexure 3*** of this document.

7.2 SUMMARY OF STAKEHOLDER CONSULTATIONS

ERM undertook consultations/ meetings with identified stakeholders during the course of the site visit. The intensive deliberations provided a platform for two-way communication between the team of consultants and the stakeholder groups. This in turn helped in developing an understanding of the perceptions of stakeholders with regards to the project and also allowed for a means of recording their feedback. The key points discussed with each of these stakeholders are provided in the below table.

Table 7.3 ***Summary of Stakeholder Consultation***

Sl. No.	Stakeholder Category	Key Points Discussed	Findings of the Consultation
Local Community			
1.1	Village - Bahinga,	• Current engagement scenario –livelihood options;	• Paddy and Wheat are the major crop. Paddy was grown as Kharif crop (sown in July-August and harvested in November-

Sl. No.	Stakeholder Category	Key Points Discussed	Findings of the Consultation
	No of Participants 5 persons; Date- 15/12/2017	• Basic amenities in the village – electricity, drinking water, etc.; • Health scenario in the village and distances of Hospitals/ Clinics; • Perception of local community towards the project; • Issues faced by the local community from transmission lines	December). Cultivation is dependent on monsoon. Wheat was grown as Rabi crop (sown in October-November and harvested in January-February). Villagers also grow corn and vegetables for personal use. • There are no immigrations into the village . No workers stay in the village for work. • Mixed community population was observed in the village. Santhal tribal community was also present in the village. Jahar than, is cultural area close to the village for Santhal community. Sohrai Vandana festival is celebrated at that place. Spiritual leaders of Santhal community are called Naiki. • No problems reported from villagers from the existing high voltage transmission line. • Villages expressed that the access road to the village needs to be repaired. • Mahila samiti need some training to do any business. They are willing to take vocational training. • Local people have raised concerns regarding damages to crop in case stringing of transmission line during harvesting period;
1.2	Village - Pahridih, No of Participants 5 persons; Date- 15/12/2017		• Paddy and Wheat are the major crop. Paddy was grown as Kharif crop (sown in July-August and harvested in November-December). Cultivation is dependent on monsoon. Wheat was grown as Rabi crop (sown in October-November and harvested in January-February). Villagers also grow potato and mustard for personal use. • There are no immigrations into the village . No workers stay in the village for work. • No tribal community lives in village. Only Yadav and Mahto caste found in village. • Water scarcity reported in summer seasons.so bore wells and ponds needed for irrigation purpose. • There is an existing transmission line in the village and the villagers do not have any issues related to the transmission line passing through the village. • Local people are concerned about compensation incase the project required private tree felling.

8.1 MITIGATION MEASURES & MANAGEMENT PLAN

This document provides the Environmental & Social Management Plan (ESMP) for the planning, construction and operation of the Project which is described in Sections below. This ESMP provides an action plan against each of the mitigations measures identified for an impact identified in the earlier section. It also defines the actions to be taken to check and monitor compliance and effectiveness of the mitigation measures to which JUSNL is committed. In addition, this EMP is used to ensure compliance with statutory requirements and World Bank safeguards policies

The environmental & social mitigation measures and plans are presented in form of a matrix according to the sequential flow of activities in the project life cycle. The matrix focuses on strategies to be adopted for safe guard of the environment from possible impacts resulting out of the project activities. These measures would be further updated by Contractor during the implementation of the ESMP. The ESMP is provided in ***Table 8.1***. To ensure that the conditions specified in the ESMP are adequately implemented by the Contractor General Conditions of Contract has been developed. The General Conditions of Contract are presented in ***Annexure 4.***

Table 8.1 Environment and Social Management Plan

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
	Planning/Preconstruction			
1.1	Location of transmission line/tower	Diminution of land value in the width of RoW , restriction on use of land	• Compensation at the rate of 85% of land value, as determined by District Magistrate or any other authority based on Circle rate/ Guideline value/ Stamp Act rates for tower base area (between four legs); • Compensation at the rate of 15% of land value, as determined based on prevailing Circle rate /Stamp Act rate towards diminution of land value in the width of RoW (27m) corridor.	JUSNL Subdivision/Division/Circle
1.2		Exposure to safety related risks	Transmission line will be designed as per IS 5613 (Par 2) to provide setback from dwelling area.	Design Consultant

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
1.3		Exposure to electromagnetic interference	Transmission line would be designed considering international guidelines such as Commission on Non-Ionizing Radiation Protection (ICNIRP), US National Council on Radiation, State Transmission Lines Standards and Guidelines in the USA etc.	Design Consultant
1.4		Damage to private property	Avoid settlement / hamlets within RoW	Design Consultant
1.5		Impact on Cultural Heritage	• Careful selection of route alignment to avoid socially, culturally and archaeological sensitive areas (i. g. sacred groves, graveyard, religious worship place, monuments etc.); and • Maintain minimum distance of 100 m from archaeological monuments	Design Consultant
1.6		Tree felling (Permission under the tree felling act)	Permission for felling of trees to be obtained before tree felling	JUSNL Circle/Divisional Office/External Consultant
2.1	Transmission line through forest/ protected area / precious ecological area	Loss of precious ecological values/ damage to precious species	Careful selection of route alignment to avoid natural habitats (i. g. National Parks, Wildlife Sanctuary, Biosphere Reserves/ Biodiversity Hotspots)	Design Consultant
2.2		Deforestation and loss of biodiversity edge effect	• Avoid transmission line/ tower in protected and reserve forest, Jungle Jhari by careful selection of alignment • If avoidance is not possible, minimise the land to be taken from forest, jungle jhari • Obtain Stage I and Stage II Clearance from the forest department.	Design Consultant
3.1.1	Line through identified migratory bird path and bird habitats and near waterbodies	Risk to the bird population primarily due to collision	Careful selection of route to avoid such areas with known avian populations e.g. nesting grounds, foraging grounds, migration corridors etc.	Design Consultant
3.1.2			Provide bird guards and markers [as per the specification provided in IS-	Design Consultant

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
			5613 (Part-II)] in transmission lines when passing through/near nesting grounds, foraging grounds, migration corridors etc.	
	Construction			
4.1	Site preparation and construction work	Loss of topsoil	• Top soil from the entire tower footing area (approx. 22 sq. m.) will be stripped (10 to 15 cm) before commencement of construction work; • Top soil will be stored in a dedicated top soil storage site, having adequate mitigation measures for preventing erosion due to runoff; • Activities will be scheduled (as far as possible) to avoid extreme weather events, such as heavy rainfall; • After construction work is over, top soil will be reinstated at the construction site.	Contractor
4.2.1		Noise and vibrations	All equipment/machineries to be regularly maintained to ensure efficient operation	Contractor
4.2.2			DG sets with acoustic enclosure should be used	Contractor
4.2.3			Construction work during night time (10 pm to 6 am) to be prohibited. In case of emergency work at night approval of JUSNL Division/ Circle is mandatory	Contractor
4.3.1		Air Pollution	Water sprinkling to be carried out twice a day during dry season on exposed surface area.	Contractor
4.3.2			Vehicles transporting loose construction/excavated materials shall be covered with tarpaulin sheets.	Contractor
4.3.2			Loose construction material/ excavated material shall be stored against any structure or would be kept covered with tarpaulin sheet at the construction site.	Contractor

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
4.3.3			All vehicles utilized in transportation of raw materials and personnel, will have valid Pollution under Control Certificate (PUCC)	Contractor
4.3.4			Regular maintenance of machines, equipment and vehicles that will be used for construction activities of substation/tower construction	Contractor
4.4		Water/Soil Pollution	Soak pits/modular bio-toilets would be provided at all construction camp, laydown area and labour camp	Contractor
5.1.1	Line through farm land	Disturbance to farming activity	• Use existing access roads wherever possible • Repair /reinstate damaged bunds on agricultural field etc after completion of construction work.	Contractor
5.1.2			Construction activities and stringing of lines to be avoided during cropping season.	Contractor
5.1.3			• Compensation for fruit bearing trees at prevalent market rates, to be calculated as annual net product value multiplied by the number of productive years remaining; • Compensation for timber trees to be calculated based on girth and type of trees; • Compensation for one-year net harvest for seasonal crops at prevalent market rates;	Contractor
6	Occupational health and safety	Injury and sickness of workers	• Provide safety equipment's (PPEs) for construction workers; • Prevent entry of unauthorised person at construction site; • Provide training on health and safety to all the workers.	Contractor
7.1	Blasting (if blasting is required)	Noise and Vibration	• Adopt appropriate engineering safeguards to meet the regulatory standard [DGMS Prescribed • Permissible Limit of Ground Vibration	Contractor

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
			(*Annexure 5*)] for blasting operation.	
7.2		Damage to Structure	In case there are any damages to the structures due to blasting, the same will be assessed and would be repaired	Contractor
7.3		Injury of workers	• Implement mitigation measures to control fly rock; • Secure and limit access to blasting areas to qualified personnel involved in, and necessary for, blasting operations; • Arrange for adequate safety measures (as per Explosives Rules, 2008) for transport and storage of explosives; • Provide protective equipment to all the personnel engaged in blasting activity.	Contractor
8.1	Community Health and Safety	Injury and sickness of local people	• Coordination with local communities for construction schedules etc; • Barricading construction area; • Placing reflective tapes on the boundary of construction area; • Undertaking regular health check-ups of the work-force and reporting any major illnesses at the earliest to Block health officer for disease control and surveillance; • Creating mass and labour awareness on HIV and STDs;	Contractor
8.2		Gender issue of local community	• Labour Camp should be located away from the village and it should be access control for the local people; • Awareness should be created among the migratory labour that they should not be entered in the village	Contractor

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
			without prior information to the villagers; • Local resource like handpump, bathing ghat should not be used by the labours.	
9.1	Health, Hygiene, Safety and Security of Workers in Labour Camp	Labour camp related EHS and Hygiene Issues	Facilities would be provided at the labour camp as per provisions of IFC Guidance Note on Worker's Accommodation 2009. Some of the relevant provisions to be complied are as follows: 1. Worker's accommodation; 2. Provision of safe drinking water; 3. Appropriate arrangement for cooking; 4. Management of waste water and solid waste from the camp site; 5. Availability of medical facility (first aid); 6. Security arrangement of the camp site; 7. Arrangement to register and redress grievance of workers. Refer ***Annexure 6*** for detail guideline.	Contractor
9.2		Conflict with local community due to sharing of local resources	Local resource like Handpump, pond, bathing ghat should not be used by the workforce.	Contractor
10	Line through areas having vegetation (trimming /cutting of trees/ vegetation clearance)	Loss of vegetation	• Avoid felling of trees during stringing unless it becomes absolutely necessary. • After completion of stringing, natural regeneration or dwarf tree/medicinal tree plantation would be allowed to heights as per the standards mentioned in IS: 5613 and Government of India Circular 7-25/2012-FC dated 5th May 2014.	Contractor

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
	Operation and Maintenance			
11	Operation of transmission lines	Collision of avifauna	• Regular checking of the vacuums or holes in the towers to avoid bird nesting; • Use of power line markers, which reduces of bird collision by increasing the visibility of transmission lines to birds.	JUSNL Subdivision Office
12	Uncontrolled growth of vegetation	Loss of vegetation	• Periodic pruning of vegetation to maintain minimum clearance of 4m between conductor and trees would (As per Government of India Circular 7-25/2012-FC dated 5th May 2014).	JUSNL Subdivision Office
13.1.1	Occupational health and safety of staff	Injury/ mortality to staff during O&M work	• During the testing and charging of electrical lines, electricity insulating protective equipment like footwear (ISO 20345: 2004 Part-2), rubber gloves (IS 4770: 1991) would be provided to workers. In addition, provisions of the "Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations 2010" would be adhered to.	JUSNL Subdivision Office
13.1.2			Induction training to all the new employee and six monthly refresher training for substation O&M staff would be organised.	JUSNL Subdivision Office
13.2		Injury/ mortality from emergency situation	Preparation of fire emergency action plan and training given to staff on implementing emergency action plan	JUSNL Subdivision Office
14	Community health and safety	Injury/ mortality to public	• Barriers to prevent climbing on transmission towers • Warning signs at transmission towers	JUSNL Subdivision Office

8.2 ENVIRONMENTAL MONITORING & REPORTING

The monitoring indicators, frequency for measurement and the responsibility for monitoring for each of the mitigations proposed in the management plan are described in ***Table 8.2.*** The monitoring of the ESMP provisions would be carried out by the respective agencies at a frequency mentioned in the ESMS monitoring plan.

For ensuring effective implementation and evaluation of the performance of the environmental & social mitigation measure a reporting mechanism has been drawn up and presented in ***Section 5.3*** of the Environmental and Social Management Framework. The reporting of the implementation of the ESMP for this project is presented ***Annexure 7.***

Table 8.2 ESMP Monitoring Plan

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
	Planning/Preconstruction				
1.1	Location of transmission line/tower	Diminution of land value in the width of RoW , restriction on use of land	Compensation received by land owner, grievance recorded from land owner	Once before construction work	JPSIP PIU
1.2		Exposure to safety related risks	Setback distances to nearest dwelling units	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
1.3		Exposure to electromagnetic interference	Electromagnetic field strength for proposed line design	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
1.4		Damage to private property	Distance from nearest dwellings units	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
1.5		Impact on Cultural Heritage	Distance from socially, culturally and archaeological sensitive areas	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
1.6		Tree felling (Permission under the tree felling act)	Number of trees felled against the permissible number of trees which can be felled	Once- Before commencement of construction activity	JUSNL Subdivision/Division/Circle/ JPSIP PIU
2.1	Transmission line through forest/ protected area / precious ecological area	Loss of precious ecological values/ damage to precious	Distance to natural habitats	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
		species			
2.2		Deforestation and loss of biodiversity edge effect	Distance to nearest protected and reserve forest and Jungle Jhari; Stage-I and Stage-II clearance	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
3.1.1	Line through identified migratory bird path and bird habitats and near waterbodies	Risk to the bird population primarily due to collision	Proximity of transmission lines to nesting grounds, foraging grounds, migration corridors etc.	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
3.1.2			Provision of bird guards and markers in transmission lines	Once during the detailed design	JUSNL Subdivision/Division/Circle/ JPSIP PIU
	Construction				
4.1	Site preparation and construction work	Loss of topsoil	Practice adopted to store and reuse topsoil which is removed from the construction site	Every week during tower construction work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.2.1		Noise and vibrations	Maintenance log book of vehicle/machinery , Number of equipment /vehicle undergoing regular maintenance	Every week during tower construction/ line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.2.2			Presence of acoustic enclosure in DG set	Every week during tower construction/ line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.2.3			How many night time approval was taken	Every week during tower construction/ line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.3.1		Air Pollution	Water sprinkling at dust generating area	Every week during tower construction work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.3.2			Tarpaulin cover on vehicle carrying loose construction/excavated materials	Every week during tower construction work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.3.3			Tarpaulin cover on loose construction/ excavated materials	Every week during tower construction work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
4.3.4			Number of vehicle not having valid PUCC certificate	Every month during tower construction work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.3.5			Maintenance log book of vehicle/machinery, Number of equipment /vehicle undergoing regular maintenance.	Every month during tower construction work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.4		Water/Soil Pollution	Availability of Septic tanks and soak pits/modular bio-toilets	Every month during tower construction/ line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5.1.1	Line through farm land	Disturbance to farming activity	No of new access roads constructed, number of grievance recorded from local community	Every month during line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5.1.2			Construction work schedule	Every month during line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5.1.3			Disbursement of Compensation	Every month during line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
6	Occupational health and safety	Injury and sickness of workers	Awareness of workers, use of PPE by workers	Every 15 days during tower construction/ line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
7.1	Blasting (if blasting is required)	Noise and Vibration	Measures adopted to control noise and vibration at blasting site	Weekly during blasting work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
7.2		Damage to Structure	Record of any damaged and repaired structure	Weekly during blasting work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
7.3		Injury of workers	Measures adopted to control fly rock, safety measures adopted for transport and storage of explosives, use of protective equipment, measures adopted	Weekly during blasting work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
			for access restriction at blasting site		
8.1	Community Health and Safety	Injury and sickness of local people	Number of accidents of local people (if any) at construction site; number of grievance recorded; Review of document related to regular health check-up of the work force; Review of document related to awareness camp organised periodically	Every month during tower construction/ line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
8.2		Gender issue of local community	Physical observation of the labour camp; grievance received from local community.	Every month during tower construction/ line stringing work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
9.1	Health, Hygiene, Safety and Security of Workers in Labour Camp	Labour camp related EHS and Hygiene Issues	Condition of labour camp, awareness of workers, complainant register	Every 15 days during operation of labour camp	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
9.2		Conflict with local community due to sharing of local resources	No of registered grievances and redressal status	during operation of labour camp	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
10	Line through areas having vegetation (trimming /cutting of trees/ vegetation clearance) **Operation and Maintenance**	Loss of vegetation	Tree felling in the RoW corridor, minimum clearance b between conductor and trees	Every month during line stringing work	JUSNL Subdivision/ Division/Circle/ Head Office
11	Operation of transmission lines	Collision of avifauna	Bird nests in towers, number of power line markers between towers	Monthly throughout the operation phase of the project	JUSNL Division/Circle/ Head Office
12	Uncontrolled growth of vegetation	Loss of vegetation	Minimum clearance b between conductor and trees	Monthly the operation phase of the project	JUSNL Division/Circle/ Head Office

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
13.1.1	Occupational health and safety of staff	Injury/ mortality to staff during O&M work	Accident-Incident register	Monthly the operation phase of the project	JUSNL Division/Circle/ Head Office
13.1.2			Document pertaining to training/awareness programs and mock drills/awareness level of staff engaged in O&M work of substation	Monthly the operation phase of the project	JUSNL Division/Circle/ JPSIP PIU
13.2		Injury/ mortality from emergency situation	Accident-Incident list	Monthly the operation phase of the project	JUSNL Division/Circle Office/ JUSNL PIU
14	Community health and safety	Injury/ mortality to public	Accident-Incident list	Monthly the operation phase of the project	JUSNL Division/Circle/ Head Office

8.3 INSTITUTIONAL SETTING AND IMPLEMENTATION ARRANGEMENTS

For the implementation of the Jharkhand Power System Improvement Project JUSNL has developed a Project Implementation Unit (JPSIP PIU). The JPSIP PIU is located at the JUSNL headquarters in Ranchi and is headed by the Chief Engineer (Transmission O&M) i.e. the Project Director (PD). Presently it includes four other members. The JPSIP PIU would also be responsible for driving the implementation of the E&S safeguards in JPSIP.

At the field level the Divisional/ Circle offices of JUSNL, who would be responsible for implementing the technical aspects of the JPSIP; he would also be responsible for the implementation of the E&S safeguards. The Junior Engineer of the respective division of JUSNL responsible for overseeing the project would also be responsible for overseeing that the provisions of the ESMP is being implemented by the Contractor. The Chief Engineer cum GM of the Dumka Zone however has the ultimate responsibility of ensuring that the project is implemented successfully and also ensuring the project's desired environmental and social outcomes are attained. In addition the Environmental Officer and the Social Officer at the Project Implementation Unit of JPSIP would also undertake periodic site visits to oversee the operations and suggest corrective actions in case it is warranted.

In addition, the Contractor implementing the subprojects would also have an Environment and Social personnel to actually carry out the E&S safeguards on the ground.

8.4 COMMUNICATION PLAN

Through the process of consultation and disclosures, JPSIP would ensure that the project information are communicated to the stakeholder and the feedback from the community is integrated into the execution of the project.

A Consultation Framework has been prepared to ensure involvement of stakeholders' at each stage of project planning and implementation. To ensure community participation at different stages of the project the Consultation framework for JPSIP has been proposed in below table.

Table 8.3 Summary of Consultation Framework

Project Phase	Activity	Details	Responsible Agency	Target Stakeholders
Planning	Check Surveys	Identification of sensitivities around the transmission line corridor and common property which might get affected	Contractor along with the JUSNL Circle/Divisional	Community People especially the land owners adjacent to the transmission line corridor, Revenue Officer , Village Panchayat
Construction	Commencement of Construction	Communicate about the activity and period of activity.	Contractor along with the JUSNL Circle/Divisional	
Operation	Commencement of operation	Communicate about the date of start of operation and charging of transmission line	JUSNL Circle/Divisional	

8.5 GRIEVANCE MECHANISM

A three tier Grievance Mechanism would be used for handling any grievances of community related to the project. The Three Tier grievances redressal process is presented in ***Box 8.1.***

Box 8.1 Three tier Grievance Redress Mechanism of JPSIP

Tier1: Circle Level: The aggrieved stakeholder can file a complaint with the respective Junior Engineer in charge of the site or at the Divisional/Sub-Divisional Offices of JUSNL. The complaints would be attended to by the Electrical Superintending Engineer of the Dumka Division and all the Executive Engineers and Assistant Engineers in the Dumka circle within 21 days of the filing of Compliant. In case the aggrieved is not satisfied with the solution provided Tier 1 he may escalate it to Tier 2: Zone Level.

Tier 2: Zone Level: The Chief Engineer cum GM of Dumka Zone and all the Superintending Engineers of the Dumka Zone would be the members of Tier 2 level. They would hear the aggrieved and also review the proceedings of the Dumka Division and provide relief to the aggrieved. The entire process would be completed within 45 days of the compliant being referred to Tier II. Unsatisfied with the solution the Complainant can approach the Tier III: GRC Level.

Tier 3: Grievance Redresses Cell (GRC): The GRC for JPSIP would be housed at the JPSIP-PIU. The cell would be headed by the Managing Director, JUSNL or his representative not below the rank of Director (Projects). It would have the Director Projects, JUSNL Chief Engineer (Transmission (O&M), Superintendent Engineer, JPSIP-PIU, Executive Engineer (JPSIP-PIU) as members. The Chief Engineer of Dumka Zone would be an invited member. Hearing the compliant the GRC would provide its decision. The process at the GRC would be completed with 60 days of the complaint being registered in Tier 3.

Court of Law: If the grievance/ complaint is not resolved at GRC Level or the complainant is not satisfied with the solution provided by GRC, the person may approach the Court of Law.

Mechanism for Registering and Communicating grievances: The Junior Engineer responsible for overseeing the activities of the project would be the first point of contact for registering the grievance. He shall be responsible for registering all grievances in the Grievance Form. The Grievance Form (***Annexure 8***) would be placed at the Office of the Junior Engineer of the respective sub-division and would also be available with the Supervisor of the Contractor. The contact number of the Junior Engineer shall also be displayed prominently at the site of the construction activity. The aggrieved person can either fill the Grievance Redress form and submit it at the nearest sub-division office of JUSNL or call up the Junior Engineer and register the grievance. The Junior Engineer in the latter case complete the grievances Redress Form and pass it to the Tier 1 for redressal. The outcome of the grievances redressal process shall be sent to the person registering the grievance by Registered Post.

It is understood from the ESIA study that the Project activities related to the construction of the transmission lines may create some impacts on:

- air quality (due to movement of vehicles during foundation construction and tower erection);
- ecology (primarily due to felling of trees and diversion of forest areas along the alignment);
- community health and safety (arising out of excavation of towers foundation near pathways);
- Occupational health safety (risks of falling from height and electrocution) during the construction phase.

However most these impacts are temporary and can be mitigated with proper mitigation measures.

In the operation stage there would be no impacts on the physical environment, the impacts on ecology would also be reduced to a major extent because the natural vegetation beneath the conductors would be allowed to regenerate to a safe height. The development of the 132/33 KV transmission lines and the associated 132/33 KV substation would improve the availability of quality power in the region.

The Environmental and Social Management Plan (ESMP) describes mitigation measures for impacts specific to the Project activities and also discusses implementation mechanisms. The implementation of the mitigation measures suggested can help in managing the negative impacts on air quality, ground water etc whereas the economic opportunities in terms of local employment are assessed as positive.

To conclude, implementation of ESMP will help the Project to comply with national/state regulatory framework as well as to meet World Bank's requirement of the environmental and social performance.

Annexure 1

List of Sub Projects in JPSIP

PHASE-I

Scheme – D			
1	132/33 Kv GSS Irba (2x50 MVA)	100	Zone-I Transferred
2	132 kV D/C Irba-Ramgarh Trans. line		50
3	132 kV D/C Irba-Kanke Trans. line		13
4	132 kV D/C Irba-Ratu Trans. line		25
Scheme – E			
1	132/33 kV GSS at Shikaripara (2x50 MVA)	100	Zone-II Transferred
2	132 kV D/C 3 Ph. Dumka - Shikaripara Trans. line		40
Scheme – H			
1	132/33 kV GSS at Silli (2x50 MVA)	100	Zone-I Transferred
2	132 kV D/C 3 Ph. Silli - Chouka Trans line		46
3	132 kV D/C 3 Ph. Silli - Sikidiri Trans line		32
Scheme – O			
1	132/33 kV GSS at Mahuadanr (2x50 MVA)	100	Zone-IV Transferred
2	132 kV D/C 3 Ph. Latehar– Mahuadanr Trans line		45
Scheme – P			
1	132/33 kV GSS at Angada (2x50 MVA)	100	Zone-I Transferred
2	132 kV D/C 3 Ph. Silli–Angada Transmission line		43
3	132 kV D/C 3 Ph. Angada–Sikidiri Trans. line		50
Scheme – S			
1	132/33 kV GSS at Jarmundi (2x50 MVA)	100	Zone-II Transferred
2	LILO of 132 kV D/C 3 Ph. Dumka–Deoghar Transmission line at GSS Jarmundi		6
Scheme – X			
1	132/33 kV GSS at Chakuliya (2x50 MVA)	100	Zone-III
			Transferred
2	132 kV D/C 3 Ph. Chandil–Chakuliya Trans. line		65
3	132 kV D/C 3 Ph. Bahragora–Chakuliya Trans. line		60
4	132 kV D/C 3 Ph. Dhalbhumgarh–Chakuliya Trans. Line		25
Scheme – Q			
1	132/33 kV GSS at Hansdiha (2x50 MVA)	100	Zone-II
			Transferred
2	LILO of 132 kV Lalmatia-Dumka Trans Line at GSS Hansdiha		35
3	132 kV D/C Hansdiha-Jasidih Trans Line		52
Scheme – T			
1	132/33 kV GSS at Amarapara (2x50 MVA)	100	Zone-II
			Transferred
2	132 kV D/C 3 Ph. Amarapara–Godda Transmission line		80

3	132 kV D/C 3 Ph. Amarapara - Pakur Trans. line		45
4	132 kV D/C 3 Ph. Amarapara–Dumka Transmission line		50

PHASE-II (7)

Scheme-A			
1	132/33 kV GSS at Chainpur (2x50 MVA)	100	Zone-I Identified
2	132 kV D/C 3 Ph. Chainpur-Mahuandanr Tran. line		42
3	132 kV D/C Chainpur-Gumla Trans. Line		50
Scheme - G			
1	132/33 KV GSS Sundarnagar (2x50 MVA)	100	Zone-III Transferred
2	132 kV D/C 3 Ph. Sundarnagar - Jadugoda		30
Scheme - K			
1	132/33 kV GSS at Ramkanda (2 x 50 MVA)	100	Zone- IV Not Identified
2	132 kV D/C 3 Ph. Ramkanda - Garhwa Trans line		60
Scheme - N			
1	132/33 kV GSS at Chhatarpur (2x50 MVA)	100	Zone-IV Identified
2	132 kV D/C 3 Ph. Chhatarpur–Daltonganj Transmission line		50
3	132 kV D/C 3 Ph. Chhatarpur-Japla Trans.line		40
Scheme - W			
1	132/33 kV GSS at Kolebira (2x50 MVA)	100	Zone-I Identified
2	132 kV D/C 3 Ph. Kolebira–Kamdara Transmission line		40
3	132 kV D/C 3 Ph. Kolebira–Simdega Trans. line		70
Scheme – AA			
1	132/33 kV GSS at Chouka(2x50 MVA)	100	Zone-III Identified
2	132 kV D/C 3 Ph. Chouka - Tamar Trans. line		40
Scheme – R			
1	132 kV D/C Chaibasa-Chakradharpur Trans. Line		22
2	132 kv D/C Nowamundi- Chaibasa Trans. Line		80
3	LILO of one ckt of 132 kV D/C 3 ph Nowamundi-Chaibasa Trans Line at 132/33 kV GSS Kendposi including 2 nos 132 kV bays		14
4	LILO of one ckt of 132 kV D/C 3 ph Chaibasa-Manoharpur Trans Line at 132/33 kV GSS Goelkera including 2 nos 132 kV bays		14
5	132 KV D/C Jadugoda old - Jadugoda New T/L		15

PHASE-III (10)

Scheme – F			
1	132/33 kV GSS at Meral (2 x 50 MVA)	100	Zone-IV Not Identified
2	132 kV D/C Meral - Garhwa Trans. line		20

Scheme – I			
1	132/33 kV GSS at Panki (2x50 MVA)	100	Zone-IV Not Identified
2	132 kV D/C Panki - Chhatarpur trans. line		50
Scheme – J			
1	132/33 kV GSS at Nagar Untari (2 x 50 MVA)	100	Zone-IV Identified
2	132 kV D/C 3 Ph. Nagar Untari-Garhwa Trans. line		40
Scheme – V			
1	132/33 kV GSS at Kandra (2x50 MVA)	100	Zone-III Not Identified
2	LILO of 132 kV Chaibasa-Rajkharsawan at Kandra		10
Scheme – Y			
1	132/33 kV GSS at Kurdeg (2x50 MVA)	100	Zone-I Identified
2	132 kV D/C 3 Ph. Kurdeg–220/132 kV Simdega GSS Transmission line		45
Scheme – Z			
1	132 kV GSS at Chandwa (2x50 MVA)	100	Zone-IV Identified
2	132 kV D/C Chandwa – Latehar Trans. Line		30
Additional Scheme-1			
1	132/33kV GSS at Sarath (2 x 50 MVA)	100	Zone-II Identified
2	132k DC Sarath-Palojori TL		24
3	132k DC Sarath-Madhupur TL		30
4	132k DC Sarath-Chitra TL		20
Additional Scheme-2			
1	132/33kV GSS at Surda (2 x 50 MVA)	100	Zone-III
2	132k DC Surda-Jadugoda TL		19
3	132k DC Surda-Musabani (DVC) TL		5
Additional Scheme-3			
1	132/33kV GSS at Naudiha (Palamu) (2 50 MVA)	100	Zone-IV
2	132k DC Naudiha-Panki TL		74
3	132k DC Naudiha-Chhatarpur TL		19
Additional Scheme-4			
1	132/33kV GSS at Narayanpur (Devipur) (2 x 50 MVA)	100	Zone-II
2	LILO of 132kV DC Jamtara-Madhupur TL at Narayanpur (Devipur)		12

Annexure 2

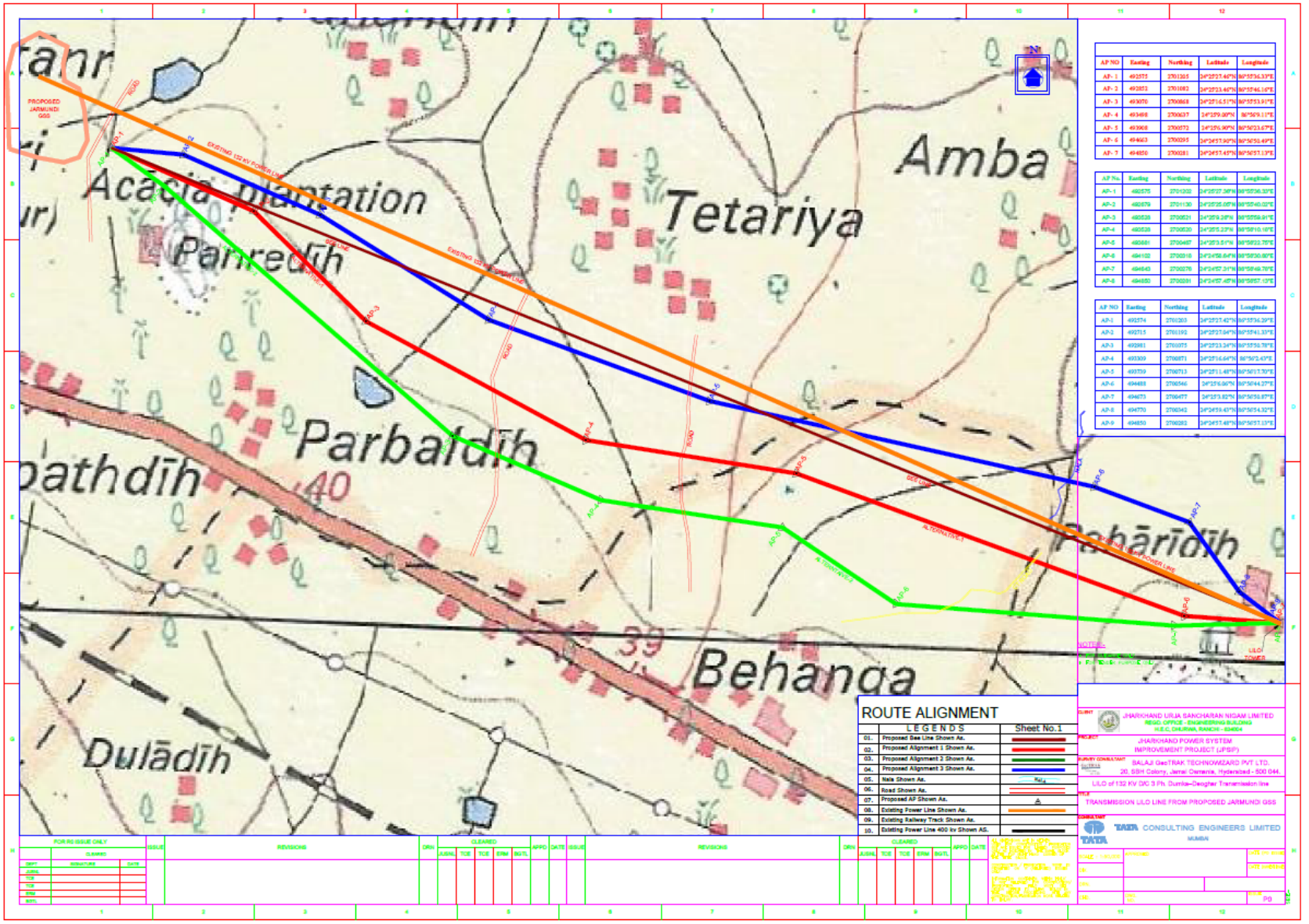
First Level and Second Level Screening

First Level Screening-Environmental and Social details for Transmission Lines

Sl. No	Description	Dumka-Deoghar		
		Alternative-1	**Alternative-2**	**Alternative-3**
1	Route particulars			
	Length (km)	2.502	2.557	2.507
	Terrain	Gently sloping	Gently sloping	Gently sloping
2	Environmental Details			
	Settlement in Alignment (within 2km)	0	0	0
	Houses within RoW	0	0	0
3	Forest Details			
	Forest Area in km	0	0	0
	Type of forest	NA	NA	NA
	Density of Forest	NA		
	Historical and cultural monuments	None	None	None
4	Compensation	NA	NA	NA
	Crop	Impact on crop if stringing is carried out during cropping season.		
5	No of crossings			
	Road	0	0	0
	Railway	0	0	0
	Transmission Lines	0	0	0
	River Crossing	0	0	0

Based on this exercise, Alternative 1 is found to be the least disturbance in terms of social and environmental issues and based on technical consideration (such as length, number of angle points (APs), river/canal crossings, railway crossing, road crossing, EHV line crossing etc.). Technically, the Alignment 1 has also been considered the best alignment and selected for detailed surveys.

Dumka-Deoghar Transmission line Alternative Alignments



Annexure 3

Minutes of Meeting of Consultation

A	*Project Title:*	ESIA Study, Jharkhand Power System Improvement Project	
B	*Stakeholder Title:*	Discussion with the resident villagers	
Note: This document provides a working summary of the main facts captured during the consultation/ key informant interview held and should not be treated as formal minutes. It is therefore deliberately not exhaustive or chronological. Its purpose is to record significant information/ feedback and not intended for official review or approval.			
C	*Basic details:*		
	Location:	**Village-Bahinga,** **Panchayat- Tharilapra,** **Block- Sonaraytharhi, Deoghar**	
	Date	**15/12/2017**	
D	*Attended By (Attendance Sheet Attached)*		
	Sr.	Name	Designation
	1.	**KULDIP SUMAN**	ERM
	2.	**WASIM QURAISHI**	ERM
	3.	**Rameshwar Yadav**	Village Resident
	4.	**Manik Bhandari**	Village Resident
	5.	**Dilip Bhandari**	Village Resident
E	*Purpose of Consultation*		
	• Collection of information regarding baseline socio-economic condition.		
F	***Key Points Inferred:*** • A primary school up to class-5 is present in village. • *Anganbadi Kendra* is present in the village. • Tube wells (8 no) and dug wells (19 no) are the primary source of drinking water. • Tube well depth reported to 300ft. Water quality was reported to be good. • No PHC (Primary Health Centre) is present in village. Nearest PHC at Sabejor. For better treatment villagers go to Deoghar. • Village is very near to the Dumka-Deoghar Road. For public transport buses are used. • Electricity is present in the village. No frequent power cuts were reported. Electricity is present 20-22 hours/ day. • There are 5 women's *samiti* or SHG (Self Help Group) is present in village. Each group having 12 members. They used to collect money from members and provide financial support to needy members. No other business reported from the groups. • Paddy and Wheat are the major crop. Paddy was grown as Kharif crop (sown in July-August and harvested in November-December). Cultivation is dependent on monsoon. Wheat was grown as Rabi crop (sown in October-November and harvested in January-February). Villagers also grow corn and vegetables for personal use. • No outsider staying in the village for work. • Mixed community population was observed in the village. *Santhal* tribal community was also present in the village. *Jahar than*, is cultural area close to the village for Santhal community. Sohrai Vandana festival is celebrated at that place. Spiritual leaders of Santhal community are called *Naiki.* • No problems reported from villagers from the high voltage transmission line. • Mahila samiti need some training to do any business. They are willing to take vocational training. • Access road repairing needed by villagers. • Local people have raised concerns regarding damages to crop in case stringing of transmission line during harvesting period;		

Photo documentation

Place: Bhinga

Place: Primary School, Bahinga

A	*Project Title:*	ESIA Study, Jharkhand Power System Improvement Project	
B	*Stakeholder Title:*	Discussion with the resident villagers	
Note: This document provides a working summary of the main facts captured during the consultation/ key informant interview held and should not be treated as formal minutes. It is therefore deliberately not exhaustive or chronological. Its purpose is to record significant information/ feedback and not intended for official review or approval.			
C	*Basic details:*		
	Location:	**Village-Pahridih,** **Panchayat- Tetariya,** **Block- Jarmundi, Dumka**	
	Date	**15/12/2017**	
D	*Attended By (Attendance Sheet Attached)*		
	Sr.	Name	Designation
	1.	**KULDIP SUMAN**	ERM
	2.	**WASIM QURAISHI**	ERM
	3.	**Tulsi Mahto**	Village Resident
	4.	**Sibu Mahto**	Village Resident
	5.	**Katki Mahto**	Village Resident
	6.	**Subhash Yadav**	Village Resident
E	*Purpose of Consultation*		
	• Collection of information regarding baseline socio-economic condition.		
F	***Key Points Inferred:*** • No school present in village. • No *Anganbadi Kendra* is present in the village. • Tube wells (Total-2, only 1 is working) and dug wells (4 no) are the primary source of drinking water. • No PHC (Primary Health Centre) is present in village nearest health centre and maternity centre at Taljhari. • Bus and Autos are used as public transportation. • Electricity is present in the village. No major power cuts were reported. • There are 3 women's *samiti* or SHG (Self Help Group) is present in village. Each group having 10- 12 members. These are newly formed groups. No collection done yet. • Paddy and Wheat are the major crop. Paddy was grown as Kharif crop (sown in July-August and harvested in November-December). Cultivation is dependent on monsoon. Wheat was grown as Rabi crop (sown in October-November and harvested in January-February). Villagers also grow potato and mustard for personal use. • No outsider staying in the village for work. • No tribal community lives in village. Only Yadav and Mahto caste found in village. • No problems reported from villagers due to the high voltage transmission line. • Bore wells and ponds needed for irrigation purpose. Water scarcity reported in summer seasons. • Local people are concerned about compensation incase the project required private tree felling.		

Place: Pahridih

Place: Primary School, Pahridih

Place: Tube well in Pahridih

Annexure 4

General Conditions of Contract

1.1 GENERAL EHS CONDITIONS

GCC 1.1 i. The contractor shall take all necessary measures and precautions, otherwise ensure that the execution of the works and all associated operations on-site or of-site are carried out in conformity with statutory and regulatory environmental health safety requirements including those prescribed elsewhere in the Environmental and Social Management Framework and the Environmental and Social Management Plans attached to the report

ii. The Contractor shall ensure that the construction site will be secured by means of fencing to prevent unauthorized entry into the site. The Contractor shall also ensure that the access to the construction site is restricted to public at all times.

iii. The Contractor shall take all the measures and precautions to avoid any nuisance or disturbance arising from execution of the work. This shall, wherever possible, be achieved by suppression of the nuisance at source rather than abatement of the nuisance once generated. The provisions of the Environmental, Social Health Safety Management Plan would be implemented for the suppression of nuisance, but it shall not be limited to these provisions of the ESMP. The provisions of this sub-clause shall however, be disregarded in respect of emergency work required for saving life or the safety of the works.

iv. In event of any spoil or debris or silt from the sites being deposited on adjacent land, the Contractor shall immediately remove such spoils, debris or silt and restore the affected area to its original state to the satisfaction of the JUSNL. No debris should be dumped on the community land like Gochars, thans etc. In case the extra excavated earth is placed for levelling the playground the same should be done with the written consent of the community. Such materials should be spread in such a manner as to limit subsequent erosion and shall be re-vegetated as existing ground cover dictates. JUSNL should be absolved of any liabilities arising such works which are undertaken

v. Surplus excavated material from the tower footing shall be carried out to the substation for the purpose of filing in case the tower is located within 15 kms of the substation area. The cost of hauling the material shall be considered within the cost for the earthwork for the substation. Additional borrow pits shall only be allowed by the Junior Engineer, only after the excavated material has been exhausted. In case this is not feasible the contractor shall remove the excess excavated material from the area of the construction of tower footing before the completion of the tower erection. All other provisions specified in the EMP shall be implemented.

vi. The Contractor should contain requisite quantity and type of spill kits to control the spills of fuel and other oils e.g. transformer oil to prevent the pollutant from spreading either outside the area of the spill or into the ground.

GCC 1.2 a) All fuel and chemical storage shall be sited on an impervious base within an embanked area and secured by fencing. The storage area shall be located away from any watercourse or wetland. The base and walls of the embankment shall be impermeable and of sufficient capacity to contain 110% of the volume of tanks/ containers taken together.

In case of filling/ refuelling of fuel or oil, filling and refuelling shall be

strictly controlled and subjected to formal procedures. The contents of any tank or drum shall be clearly marked. Measures shall be taken to ensure that no contamination happens or discharges enter any drain or watercourses. All discharge from the Oil storage areas shall be passed through a Oil Water Separator (OWS) before it being discharged outside.

b) All internal drainage channels from the site would be connected to a peripheral site drainage channel. The peripheral site drainage channel would be provided with a sedimentation tank and oil-water separator to prevent sediments and oil & grease to be carried away by the runoff.

GCC 1.3

(i) All water and liquid waste products arising on the sites shall be collected and disposed off at location onsite or offsite and in a manner that shall not cause nuisance or pollution.

(ii) The Contractor shall not discharge or deposit any matter arising from the execution of the works into any place except at the designated places without the permission of the Environmental and Social Officer and the regulatory authorities concerned.

GCC 1.4

(i) The Contractor shall carry out dust suppression by sprinkling of water or methods of working to minimise dust, gaseous or other air born emissions and carry out the works in such a manner as to minimise adverse impacts on air quality. Sprinkling of water shall be carried out twice a day on exposed surface area during dry season.

(ii) Stockpiles of materials should be sited in sheltered areas or within hoarding, away from sensitive areas. Stockpiles of friable materials shall be covered with clean tarpaulins with application of sprayed water during dry and windy weather. Stockpiles of debris shall be dampened prior to their movement, except where this is contrary to the specifications.

(iii) Any vehicle with an open load carrying area used for transport of potentially dust producing materials shall have properly fitting side and tailboards. Materials having potential to produce dust shall not be loaded to a level higher than the side and tail boards and shall be covered with clean tarpaulin in good condition. The tarpaulin should be properly secured and extended to at least 300 mm over the edges of the sideboard and tailboard.

(iv) During high wind, no dust generating operations shall be permitted within 200m of residential areas having regard to the prevailing direction of the wind.

(v) Construction vehicles and machinery shall be kept in good working order and engines turned off when not in use. Appropriate measures shall be taken to limit exhaust emissions from construction vehicles, machinery and plant and the contractor shall include details of such proposed measures in the mitigation and monitoring plan to be submitted to the Employer or his representative.

(vi) All vehicle employed in the project shall have valid Pollution under Control (PUC) Certificate. The Contractor should maintain PUC Certificate log book on a regular basis and shall provide it to the Employer or his representation for inspection when asked for.

GCC 1.5 (i) The Contractor shall consider noise as an environmental concern in his planning and during execution of the works.

(ii) The Contractor shall use plant and equipment conforming to National and International standards and directives on noise, vibrations and emissions.

(iii) The Contractor shall take all necessary measures to ensure that operation of all mechanical equipment and construction processes on and off the site shall not cause any unnecessary or excessive noise, taking into account all applicable environmental requirements. The Contractor shall use all necessary measures and shall maintain all plant and silencing equipment in good condition so as to minimise the noise emissions during construction works.

(iv) The operations of the Contractor which is likely to generate noise shall be restricted during the night time (22.00 hrs to 6.00 hrs) especially if it is near residential areas.

GCC 1.6 (i) The Contractor shall take all necessary measures to protect any archaeological finds or antiquities as required.

(ii) Where antiquities are shown on the drawing or otherwise identified during the course of the works, these shall be protected by means of suitable fencing and barriers to the satisfaction of the EHS Engineer of JUSNL. The Contractor shall abide by the provisions of the Indian Treasure Trove Act, 1878, Jharkhand Ancient Monuments and Archaeological Sites, Remains and Art Treasures Act, 2016.

GCC 1.7 On completion of the works, the Contractor shall reinstate all areas with natural vegetation to the satisfaction of the Environmental Officer of JPSIP PIU. Where directed by the Environment Officer the Contractor shall improve and reinstate the land on which informal roadside service area have been established by removing all debris and contaminated soils, re-grading to natural ground levels and re-establishing the natural vegetation where appropriate. All debris and contaminated materials shall be disposed off site as approved by the Environment Officer at the PIU.

GCC 1.8 The Contractor shall ensure that the labour accommodation within the site /fly camp/ laydown area is provided with toilets/modular bio-toilets, septic tank and soak pits. The municipal solid waste generated shall be composted in pits located within the site.

GCC 1.9 The Contractor shall adopt all possible means to ensure that groundwater usage is minimised during the construction activities. The bore well/s used for extraction of water for construction purpose shall be provided with water metres to monitor the ground water abstraction. The Contractor should maintain a daily water abstraction log book of water extracted from the bore well. Daily water abstraction log book should be produced to the employer or his representative on demand.

1.2 COMPLIANCE WITH LABOUR REGULATIONS

GCC 2.1 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 byelaws 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.

GCC 2.2 The Contractor shall keep JUSNL 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.

GCC 2.3 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.

GCC 2.4 The contractor shall abide by the provision of the following acts:

a) Workmen Compensation Act 1923
b) Payment of Gratuity Act 1972
c) Employee P.F. and Miscellaneous Prevision Act 1952
d) Maternity Benefit Act 1951:
e) Contract Labour (Regulation & Abolition) Act 1070
f) Minimum Wages Act 1948
g) Payment of Wages Act 1936
h) Equal Remuneration Art 1970
i) Payment of Bonus Act 1965
j) Industrial Dispute Act 1947
k) Industrial Employment (Standing Orders) Act 1946
l) Trade Unions Act 1926
m) Child Labour (Prohibition & Regulation) Act 1986
n) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service Act 1979
o) The Building and Other Construction workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996
p) Factories Act 1948

GCC 2.5. During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all applicable existing World Bank Group labour requirements (refer Annex11 Management of Labour Influx of the Environmental and Social Management Framework)

COMPLIANCE TO ENVIRONMENTAL & SOCIAL REGULATIONS

GCC 3.1 If the employer is caused to pay under any law as proponent such amounts as may be necessary to cause or observe, or for non-compliance of the provisions or negligence of the Contractor for any provision stipulated in the notifications / byelaws/Acts / Rules/regulations including amendments and Orders of the Hon'ble National Green Tribunal/ Hon'rble Court of Law, 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 Contractor shall ensure to adhered provisions of the following acts;

a) The Water (Prevention and Control of Pollution) Act, 1974
b) The Air (Prevention and Control of Pollution) Act, 1981
c) The Environment (Protection) Act 1986
d) The Public Liability Insurance Act, 1991
e) Wild Life Protection Act, 1972, as amended
f) Forest Conservation Act, 1980 & Forest Conservation Rules, 2003 (as amended) & corresponding orders and judgements
g) Jharkhand Biological Diversity Rules 2007
h) Ancient Monuments & Archaeological Sites and Remains Act, 1958
i) Indian Treasure Trove Act, 1878
j) Jharkhand Ancient Monuments and Archaeological Sites, Remains and Art Treasures Act, 2016
k) Jharkhand Timber and Other Forest Produce (Transit and Regulation) Rules, 2004
l) Ozone Depleting Substances (Regulation and Control) Rules, 2000
m) The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (LARR 2013)
n) Chota- Nagpur Tenancy Act, 1908
o) Santal Pargana Tenancy Act, 1949
p) Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016
q) E-Waste (Management) Rules, 2016
r) Battery (Management & Handling) Rules 2001
s) Ozone Depleting Substances (Regulation and Control) Rules, 2000
t) Central Ground Water Authority (CGWA) Public Notice dated 4th January 2017
u) Regulation of Polychlorinated Biphenyls Order, 2016

GCC 3.2 (i) 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.

(ii)The Contractor shall (a) abide by the Environmental Management Plan (b) carry out all the monitoring and mitigation measures set forth in the environmental management plan and (c) allocate the budget required to

ensure that such measures are carried out. The Contractor shall submit to the Employer Monthly Reports on the carrying out of such measures.

(iii) The Contractor shall adequately record the conditions of roads, agricultural land and other infrastructure prior to transport of material and construction commencement before start of the construction activity. In case of deterioration during the construction activity the Contractor shall fully reinstate pathways, other local infrastructure and agricultural land to at-least their pre-project condition upon construction completion. In case of any grievance of the community regarding damage to any common property e.g. roads/ walkways/ pathways, bridges, wells or any place of worship due to any construction activity; it shall be the responsibility of the Contractor to reinstate the same to its original condition (before the start of construction) unless other he can prove that the same was not constructed due to his activities.

(iv) The Contractor shall undertake detailed survey of the affected persons during transmission line alignment finalization under the Project, where applicable. The Contractor shall provide the information to the employer for records and use wherever required. Any compensation due to the damage of property shall be commensurate to the provisions in the entitlement matrix.

(v) The Contractor shall include a Social Officer in his team. The Social Officer shall explain to the land owners the process of the procurement of land through a negotiated settlement process.
(vi) 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.

GCC 3.3 The procurement or deployment of any machinery by the Contractor for the project should be in accordance to the environmental rules and regulations in place at the time of implementation. All DG sets should conform to the CPCB standards for noise and emission mentioned under the under the Environment (Protection) Act, 1986.

GCC 3.4 The Contractor shall procure transformer oil in conformance to the Regulation of Polychlorinated Biphenyls Order, 2016.

GCC 3.5 The Contractor shall procure CFC free equipment in conformance to the Government of India Guidelines

GCC4.1 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 handing over, provide:
a) fencing, lighting, guarding, putting up reflective strips 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.

GCC 4.2 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 or as may be directed by the Engineer of JUSNL or as he may deem necessary.

GCC 4.3 The Contractor will notify well in advance to the JUSNL Division / JPSIP PIU 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 JUSNL Division /JPSIP PIU 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 JUSNL Division / JPSIP PIU 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 JUSNL. JUSNL shall not entertain any claim of the Contractor towards additional safety provisions/conditions to be provided for/constructed as per the JUSNL Division /JUSNL PIU Instructions. Further, any such decision of the JUSNL Division /JUSNL PIU 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 JUSNL Division /JUSNL PIU, the Contractor shall use alternative methods with the approval of the JUSNL Division /JUSNL PIU without any cost implication to the Employer or extension of work schedule.

GCC 4.4 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.

GCC 4.5 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 JUSNL Division /JUSNL PIU or by the person authorised by him.

GCC 4.6 The Contractor shall provide suitable personal safety equipment of prescribed standard to all employees and workmen according to the Job Safety Analysis carried out by the Contractor, or as may be directed by the Employer. The Employer or his representative will also have right to examine these safety equipment to determine their suitability, reliability, acceptability and adaptability. The Contractor shall arrange biannual safety training for all workers.

GCC 4.7 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.

GCC 4.8 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.

GCC 4.9 Before the Contractor connects any electrical appliances to any plug or socket belonging to the other Contractor or the Employer , he shall:

a) Satisfy the JUSNL Division /JUSNL PIU that the appliance is in good working condition;
b) Inform the JUSNL Division /JUSNL PIU of the maximum current rating, voltage and phases of the appliances;
c) Obtain permission of the JUSNL Division /JUSNL PIU detailing the sockets to which the appliances may be connected.

GCC 4.10 The JUSNL Division /JUSNL PIU 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.

GCC 4.11 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.

GCC 4.12 No repair work shall be carried out on any live equipment. The equipment must be declared safe by the JUSNL Division /JUSNL PIU and a permit to work shall be issued by the JUSNL Division /JUSNL PIU 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.

GCC 4.13 The Contractors shall employ necessary number of qualified, full time electricians/electrical supervisors to maintain his temporary electrical installation.

GCC 4.14 The Contractor employing more than 100 workmen whether temporary, casual, probationer, regular or permanent or on contract, either directly or through the Contractor shall employ at least one full time officer exclusively as EHS Officer (who shall have a Bachelors degree in Environmental Management/ Environmental Engineering /Environmental Science with additional qualification in safety) to supervise safety aspects of the equipment and workmen, who will coordinate with the Environmental Officer and Social 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.

Contractor shall employ a social team as it may deem fit. The Social Team would be led by the Social Officer (who shall have degree Sociology/Anthropology/Economics or any other Social Science with experience in handling resettlement of multilateral funded projects) and would assist the Contractor to carry out negotiation with the land owners.

The name and address of such EHS Officer and Social Officer of the Contractor will be promptly informed in writing to JUSNL with a copy to JUSNL Division /JUSNL PIU before he starts work or immediately after any change of the incumbent is made during currency of the Contract.

GCC 4.15 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 JUSNL Division /JUSNL PIU in prescribed form and also to all the authorities envisaged under the applicable laws.

GCC 4.16 The JUSNL Division /JUSNL PIU 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 JUSNL Division /JUSNL PIU within 3 days of such stoppage of work and decision of the JUSNL Division /JUSNL PIU in this respect shall be conclusive and binding on the Contractor.

1.4 EHS RULES

GCC 5.1 Each employee of the Contractor shall be provided with initial indoctrination regarding Environment Health and Safety by the Contractor, so as to enable him to conduct his work in a safe and sustainable manner.

GCC. 5.2 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.

GCC 5.3 Under no circumstances shall an employee hurry or take unnecessary chance when working under hazardous conditions.

GCC 5.4 Employees must not leave naked fires unattended. Smoking shall not be permitted around fire prone areas and adequate firefighting equipment shall be provided at crucial location.

Employee should also not leave any equipment/machinery /activity unattended if it has the potential to cause harm to the environment

GCC 5.5 Employees under the influence of any intoxicating beverage, even to the slightest degree shall not be permitted to remain at work.

GCC 5.6 The contractor shall make suitable arrangement at every work site for rendering prompt and sufficient first aid to the injured.

GCC 5.7 The staircases and passageways shall be adequately lighted.

GCC 5.8 The employees when working around moving machinery must not be permitted to wear loose garments. Safety shoes, safety helmets (IS 2925: 1984) are recommended when working in the construction site or any activity related to the project where materials or tolls are likely to fall. When working at height the Contractor shall ensure that all employees use full body harness (as per IS 3521: 1999). Only experienced workers shall be permitted to go behind guard rails or to clean around energized or moving equipment. The employer shall at periodic intervals or as he may deem fit inspect these equipment and ask the Contractor for replacement of the personal safety equipment.

GCC 5.9 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. During the testing and charging of electrical lines and substation, the Contractor shall provide electricity insulating protective equipment like footwear (ISO 20345: 2004 Part-2), rubber gloves (IS 4770: 1991) to workers. In addition, provisions of the "Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations 2010" would be adhered to.

GCC 5.10 Requirements of ventilation in underwater working to licensed and experienced divers, use of gum boots for working in slushy or in inundated conditions are essential requirements to be fulfilled.

GCC 5.11 In case of rock excavation, blasting shall invariably be done through licensed blasters and other precautions during blasting and storage/transport of charge material shall be observed strictly.

Annexure 5

DGMS Prescribed Permissible Limit of Ground Vibration

DGMS Prescribed Permissible Limit of Ground Vibration

Type of structures	Dominant excitation frequency, Hz		
	< 8Hz	8-25Hz	>25Hz
(A) Buildings/structures not belong to the owner			
1. Domestic houses/structures (Kuchcha, bricks & Cement)	5	10	15
2. Industrial building	10	20	25
3. Objects of historical importance & sensitive Structures	2	5	10
(B) Buildings belonging to the owner with limited span of life			
1. Domestic houses/structures	10	15	20
2. Industrial buildings	15	25	50

Annexure 6

Management Plan for Labour Influx

It is envisaged that during construction phase of the project, labourers for various jobs such as civil, mechanical and electrical works will be hired through authorised manpower agencies. The labour requirement will range from 10 to 15 construction of tower footings. Since these will be employed from outside the region and will therefore, be migrant labourers and hence, accommodation will be provided. These migrant labourers will be accommodated in a temporary campsite within the project area. This could result in stress on local resources, disruption in community relations, and movement of labours.

Objective:

The influx of migrant labour will have both negative and positive impacts on the nearby community and local environment. The labour will be accommodated in temporary campsite within the project boundary which can have significant interface with the nearby community. However, the influx of migrant workers would lead to a transient increase of population in the immediate vicinity of the project area for a limited time. This would put pressure on the local resources such as roads, fuel wood, water etc.
Hence, a plan has been designed to demonstrate the:

- Potential impacts associated with influx on the host population and receiving environment are minimized;
- Provision of safe and healthy working conditions, and a comfortable environment for migrant labour; and
- To ensure compliance with the IFC PS 2and 4 and national labour laws;

IFC Performance Standards:

International Finance Cooperation (IFC) Performance Standard 2- Labour and Working Conditions is specific to labour and working conditions. This Standard focuses on the protection of the basic rights of workers, fostering constructive worker-management relationships, as well as promoting fair treatment and the provision of a safe and healthy workplace. The basic provisions for migrant workers under PS 2 are enumerated below:

- As per the provisions of PS 2, the client shall identify migrant workers engaged through third party and ensure that they are engaged on substantially equivalent terms and conditions to non-migrant workers carrying out similar work (if any);
- The contractor shall ensure provision of adequate accommodation, transportation, and basic services including water, sanitation, and medical care for the workers working on that project;
- The compensation paid to the migrant workers should be non-discriminatory and the principle of equal opportunity and fair treatment to be followed; and

- Wastewater, sewage, food and any other waste materials are to be properly handled, in compliance with local standards– whichever is more stringent – and without causing any significant impacts to the biophysical environment or surrounding communities.

IFC PS 4 – Community Health, Safety and Security carries health and safety through to the community environment. The objectives of the Performance Standard are:

- To minimise and manage health and safety risks to local communities; and
- To ensure that the project does not harm community health and safety.

General Requirements:

All migrant workers are envisaged to be accommodated in temporary campsite within the project area. If migrant workers are accompanied by their families, provisions should be made accordingly. Guidance on Workers Accommodation developed by IFC and EBRD is also referred for inclusion of requirements for labour camp to be established by contractor during construction phase of the project . Contractor shall ensure implementation of the following measures to minimise the potential negative impacts of worker accommodation and workers on local communities:

Cleanliness: Pest extermination, vector control and disinfection are to be carried out throughout the living facilities in compliance with local requirements and/or good practice.

Complaints and incident reporting: A formal Complaints Procedure will be implemented to ensure timely and transparent response to complaints as received from labour.

Labour education: The workforce will be sensitized to local social and cultural practices through provision of an induction course for all employees that stipulates expected behaviour;

Labour behaviour in campsite provided: A Code of Behaviour governing appropriate behaviour in the accommodation facilities to be kept in place and to be strictly enforced. The contractor shall ensure implementation of the "rules of engagement" between labours living in campsite and community and shall be implemented by construction contractors for all engaged labours. Labour Compensation and Accommodation: Client shall ensure that labours are provided with benefits such as annual leave, weekly rest day, etc. Accommodation to be provided for the construction labour which cover facilities (including catering facilities, dining areas, washing and laundry facilities etc.) and supporting utilities.

Hiring and Recruitment Procedures:

The manpower contractor shall, wherever possible, locally recruit the available workforce and shall provide appropriate and requisite on job and

EHS training as necessary. The following general measures shall be considered for the workforce during their employment tenure:

- Project should include a code of conduct relating to the accommodation to be signed with the contract document of contractor.
- The contractor shall not employ any person below the age of 18 years nor will have any forced labour;
- The construction labourers will be provided with documented information regarding their rights under national labour and employment law such as but not limited to Factories Act, Minimum Wages Act, Trade Unions Act and Workmen's Compensation Act;
- First priority for employment of labour should be given those impacted by the project such as landowners who have lost land or those who have their land parcels under ROW;
- No discrimination shall be done by the contractor with respect to recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, termination of employment or retirement, and disciplinary practices;
- The contractor to ensure that work hours are set at eight hours a day, 48 hours a week, with a weekly rest day for all engaged labours;
- Every labour is entitled for maximum of only two hours a day as Overtime (OT) work. OT pay is twice the hourly remuneration;
- Project shall ensure equal wages for male and female workers for work of equal nature or value is maintained;
- A grievance redress mechanism for workers shall be put in place by the contractor to raise workplace concerns. The workers will be informed about the grievance mechanism at the time of recruitment; and
- The Project shall ensure that the contractor develops and implement a procedure to review the performance of their sub-contractors, if any.
- The procedure developed should include regular inspection of the camp sites, maintaining information pertaining to labours sourced by sub-contractors;

Workers' Accommodation:

The Project will supervise and monitor the activities performed by their contractor and accommodation facilities provided in the campsite. The following measures shall be provided:

- The labour will be provided with accommodation on twin sharing basis made of insulated material and locally available building material, etc.;
- The migrant workers with families shall be provided with individual accommodation comprising bedroom, sanitary and cooking facilities;
- The units will be supported by common latrines and bathing facilities duly segregated for male and female labour;
- Adequate number of toilets shall be provided in the accommodation facilities. A minimum of 1 unit to 15 males and 1 unit for 10 females shall be provided;

- The contractor shall provide a kitchen facility for the construction workers and the food will be of appropriate nutritional value and will consider religious/cultural backgrounds;
- All doors and windows shall be lockable and mobile partitions/curtains shall be provided for privacy;
- Facilities for the storage of personal belongings for workers shall be provided within the campsite only;
- Dustbins shall be provided for collection of garbage and will be removed on a daily basis;
- It is also required to provide first aid box in adequate numbers; and
- Ventilation should be appropriate for the climatic conditions and provide workers with a comfortable and healthy environment to rest and spend their spare time.

Security:

The contractor shall put in place the following security measures to ensure the safety of the workers. The following measures shall be incorporated:

- Access to the campsite shall be limited to the residing workforce;
- The contractor shall be responsible for deploying adequate number of guards;
- Adequate, day-time night-time lighting shall be provided;
- The security personnel shall be provided with training to respect the community traditions and in dealing with, use of force etc.; and
- The rental accommodation shall be provided with firefighting equipment and portable fire extinguishers.

Provision of Drinking Water:

Access to an adequate and convenient supply of free potable water is necessity for workers. The domestic water supply shall be made available by the contractor.

- Safe drinking water conforming to the IS 10500:2012 for drinking water shall be provided;
- Private tanks can be utilized for provision of drinking water for the migrant labours;
- The direct usage of water from bore well should not be allowed and water shall be adequately treated;
- The Project should regularly monitor the quality of drinking water available. In case of non-compliance with the Drinking Water Specifications, additional treatment shall be provided or alternative sources of water supply shall be arranged; and
- All tanks used for the storage of drinking water are constructed and covered as to prevent water stored therein from becoming polluted or contaminated.

Cooking Arrangement:

The construction phase will involve engagement of large number of migrant people in the project area for a limited time. Hence, there shall be requirement of provision of cooking facilities (kitchen) as listed below:

- Places for food preparation are designed to permit good hygiene practices, including protection against contamination between and during food preparation;
- Adequate personal hygiene including designated areas for cleaning hands and cleaning of utensils; and
- All kitchen floors, ceiling and wall surfaces adjacent to or above food preparation and cooking areas are built using durable, non-absorbent, easily cleanable, non-toxic materials;
- Food preparation area to be durable, easily cleanable, non-corrosive surface made of non-toxic materials.

To ensure that the fuel need of labourers in the project area does not interfere with the local requirements, necessary arrangements for supply of cooking fuel to the labourers shall be done by the contractor. In case, fuel requirement for cooking purposes are only to be met by fuel wood then that must be purchased from authorized vendors.

Waste Water Generation:

There will of generation of wastewater from the campsite. About 80% of water used shall be generated as sewage/wastewater. Contractor shall ensure that the campsite are equipped with septic tank and soak pit for disposal of sewage or with mobile bio-toilets. It is also recommended that the storm water and sewage system should be separate. The surface water drainage shall include all necessary gutters, down pipes, gullies, traps, catch pits, manholes etc. Sanitary and toilet facilities are constructed of materials that are easily cleanable. Sanitary and toilet facilities are required to be cleaned frequently and kept in working condition.

Solid Waste Management:

The solid waste generated from campsite will mostly comprise of compostable wastes like vegetable residues (kitchen waste) and combustible waste like paper, cans, plastic and some non-degradable waste like glass/glass bottles. Improper disposal of solid waste will lead to environmental degradation and health hazards to labour as well as nearby community.
The following measures shall be adopted by contractors for ensuring effective management of solid waste:

- The solid wastes of domestic nature generated shall be collected and stored separately in appropriate containers with proper sealing on them;
- Separate bins with proper markings in terms of recyclable or non-recyclable waste shall be provided in the houses and kitchen premises in sufficient numbers for collection of garbage;

- Food waste and other refuse are to be adequately deposited in sealable containers and removed from the kitchen frequently to avoid accumulation; and
- It is the responsibility of contractor to ensure safe disposal of all wastes generated out of labour camps.

Medical Facility:

Effective health management is necessary for preventing spread of communicable diseases among labour and within the adjoining community. The following medical facilities shall be provided by contractors for the construction workers:

- A first aid centre shall be provided for the labour within the construction site equipped with medicines and other basic facilities;
- Adequate first aid kits shall be provided in the campsite in accessible place. The kit shall contain all type of medicines and dressing material;
- Contractor shall identify and train an adequate number of workers to provide first aid during medical emergencies;
- Regular health check-ups shall be carried out for the construction labourers every six month and health records shall be maintained;
- Labours should have easy access to medical facilities and first aid; where possible, nurses should be available for female workers;
- First aid kits are adequately stocked.
- Information and awareness of communicable diseases, AIDS etc. shall be provided to workers.
- Basic collective social/rest spaces are provided to workers.;

Inspection of camp sites:

- Campsite shall be inspected at frequent intervals to ensure that the facilities are well organized and maintained to acceptable and appropriate standards by the contractor. The key areas are:
- Daily sweeping of rooms and houses shall be undertaken;
- Regular cleaning of sanitary facilities shall be undertaken;
- The kitchen and canteen premises shall be established under good hygiene conditions;
- Daily meal times shall be fixed for the labour;
- Smoking and alcohol consumption shall be prohibited in the workplace;
- Water logging shall be prevented at areas near the accommodation facilities and adequate drainage is to be provided; and
- Checklists pertaining to the daily housekeeping schedule shall be maintained and displayed at houses, toilets and kitchen.

To limit the impact due to cumulative labour onsite during construction phase, contractor shall provide adequate number of labour camps which should be appropriate for its location and be clean, safe and, at a minimum, meet the basic needs of workers.

- Contractor should assess the location of labour camp, that it should not be constructed in immediate vicinity of any drainage channel;

- All tanks used for the storage of drinking and cooking water to be covered as to prevent water stored therein from becoming polluted or contaminated and all the migrant workers will be instructed accordingly;
- Contractor should ensure that accommodation which is provided is not overcrowded and does not pose a risk to the health and safety of workers;
- The labour camp will be equipped with sceptic tanks and soak pits and avoid presence of stagnant water is a factor of proliferation of potential disease vectors such as mosquitoes;
- Contractor should ensure that the disruption of local communities is minimum and if required limit the worker's movements in the nearby areas;
- Security staff should have a clear mandate and instructions about their duties and responsibilities such as not to harass, intimidate, discipline or discriminate against workers;
- Contractor should ensure that workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff;

Grievance Redress Mechanism:

A Grievance Redress Mechanism (GRM) shall be formulated for the construction labourers (local and migrant) comprising of a review committee including representatives elected by labour and management representatives. Project can extend the grievance mechanism developed for the project to the contractor also. A documented GRM shall have the following elements:

- Proper system for lodging grievances;
- Provision for raising anonymous complaints;
- Appropriate level of management for addressing concerns;
- Workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff;
- Provision for timely action and feedback;

Monitoring and review of grievances raised and action taken; and scope for continual improvement of the system.

Annexure 7

Format for Reporting of ESMP Implementation

JHARKHAND POWER SYSTEMS IMPROVEMENT PROJECT

ENVIRONMENTAL MANAGEMENT PLAN
MONTHLY IMPLEMENTATION STATUS REPORT

Name of the Transmission Line_____ Period/Month _____

EMP Reference	Activities	Observation/ Status till end of last Observation/ Period	Status till end of this Period
1c	Has the final route selection avoided the displacements/ damage to property		
2bi	Has the final route been able to avoid transmission line/ tower in Forest, Jungle Jharis by careful selection of alignment		
2bii	Has the final route minimizes the need of deforestation by reducing the RoW requirement wherever possible as per the MoEF Circular No F. No.7-/25.-2012 -FC		
3ai	Has the route included bird guards and markers in transmission lines as per the specification provided in IS-5613, near the migratory bird path and bird habitats e.g. nesting grounds, foraging grounds, migration corridors etc		
6aii	Has the pre-construction equipment checks been carried out (use additional sheets to provide the monitored Leq values)		
6aii	Is regular equipment maintenance being carried out? (Use additional sheets to provide maintenance log)		
6aiv	Has monthly noise monitoring been carried out for DG sets		
6av	Has any permission been provided by Chief Engineer for night time work?		
6bi	Has quarterly air quality monitoring been carried out during the earthwork?		
6biii	Is PUCC certificate log book being maintained on regular basis?		
6biv	Instrument, machine, vehicle maintenance log book should be maintained on regular basis		
7ci	Has the Cut and fill slopes been protected with using standard engineering practices?		
7 dii	Has peripheral site drainage channel and provision of oil-water separator been made for the site?		
7di	Has septic tanks and soak pits/modular bio-toilets would be provided at construction camp?		

EMP Reference	Activities	Observation/ Status till end of last Observation/ Period	Status till end of this Period
9 aiv	Has the safety practices been undertaken during the construction? Please explain in details whether barricading, reflective tapes has been undertaken?		
7g	What steps has been taken for coordination with local communities?		
7h	What initiatives have been taken to prevent obstruction to traffic?		
10	Please indicate the actions which have been taken to prevent conflicts with local workers?		
12ai	Have the workers been provided with relevant PPE?		
12aii	How many observation on non – compliance in using personal protective equipment?		
12bi	Has the Contractor carried out Health Safety training for workers? (Please provide details of training carried out). This should include the details of carrying out the induction training, refresher training etc.		

Annexure 8

Format for Registering Grievance from Community/Project Affected Persons

JHARKHAND POWER SYSTEMS IMPROVEMENT PROJECT

GRIEVANCE REDRESSAL MECHANISM
Format for Grievance Recording

Name of the Village: _____ Name of Block:_____

Name of the Transmission Line_____ Period/Month _____

*The project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback. Mentioning the name and Contact details are essential as this would help us in getting in touch with you. Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name.*
Thank you.
Managing Director
Jharkhand Urja Sancharan Nigam Limited

Date	Sub Division of Registration (to be filled by JE)
Contact Information/Personal Details	
Name	
Home Address	
Village/Block	
Phone Number	
Complaint/Suggestion/Comment/Question : *Please provide the details (who, what, where and how) of your grievance below*:	
If included as attachment/note/letter, please tick here:	

For Official Use Only

Registered by *(Name of the Junior Engineer Registering Grievance)*
Mode of Communication: Letter Verbal/Telephonic
Reviewed by (Name /Position of Official reviewing Grievance
Action Taken
Whether Action Taken has been communicated to the Complainant: Yes/No

Annexure 9

Assessment of Impact Significance

Impacts on Aesthetics & Visual Quality

Impact	Aesthetic and visual impact			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Negligible**			

Impacts on Air Quality

Impact	Air quality impact			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Negligible to Minor**			

Impacts on Noise Quality

Impact	Noise quality impact			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Minor**			

Impact on Land use

Impact	Impact on land use		
Impact Nature	Negative	Positive	Neutral
Impact Type	Direct	Indirect	Induced
Impact Duration	Short Term	Medium Term	Long Term

Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Minor**			

Impact on Soil

Impact	Impact on water resource			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Minor**			

Impacts on Road & Traffic

Impact	Impacts on Road & Traffic			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Negligible to Minor**			

Impact on Biological Environment

Impact	Impact to Biological Environment			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major

	Significance of impact is considered **Moderate**

Impact on Socio-economic Conditions

Impact	Impact on Socio-economic Conditions			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Minor**			

Impact on Community Health and Safety

Impact	Community Health and Safety			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Minor**			

Impact on Occupational Health and Safety

Impact	Occupational Health and Safety			
Impact Nature	Negative	Positive	Neutral	
Impact Type	Direct	Indirect	Induced	
Impact Duration	Short Term	Medium Term	Long Term	
Impact Extent	Local	Regional	National	
Impact Scale	Low	Medium	High	
Impact Magnitude	Positive	Small	Medium	Large
Resource/ Receptor Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major
	Significance of impact is considered **Minor to Moderate**			



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