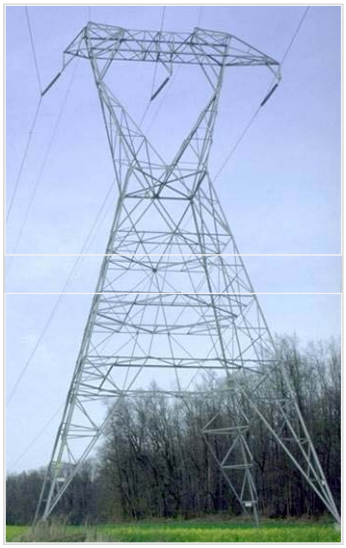

Environment and Social Impact Assessment Report (Scheme F, Volume 1)

Jharkhand Urja Sancharan Nigam Limited

Final Report

February 2018

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FINAL REPORT

Jharkhand Urja Sancharan Nigam Limited

Environment and Social Impact Assessment Report (Scheme F, Volume 1)

26 February 2018

Reference # 0402882

Prepared by : Suvankar Das

Reviewed & Approved by:	**Debanjan Bandyapodhyay** *Partner*	

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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 Grid 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. The proposed new 132 KV Grid substation at Meral is covered under the **Scheme F Phase II**.

The proposed Grid Substation (GSS) would be located on Plot no. 1889 and 1908 of the Bhagodih Village, Ramna Block in Garhwa District. A total area of 20.47 acres (8.28 ha) have been transferred (1) by the District Commissioner of Garhwa to JUSNL for setting up of two Grid Substations- 220/132 KVA and 132/33 KVA. The site can be accessed from Ranchi through NH-75 via Daltongunj.

The project activities would involve the design, construction and operation of a 132/33 KV GSS. The key components of the project would include: 2 No.s 50 MVA oil cooled transformers, incoming and outgoing bays connecting to the grid, control room and residential quarters for JSUNL employees. Setting up of the sub-station would involve a permanent change in land use from presently forest land to infrastructure. Construction activities are expected to cause temporary disturbances because of plying of vehicles in approach roads, site preparation involving cutting and filling of earth and soil, operation of construction machinery and equipment, and the involvement of a labour force.

During operational phase, about 16-20 employees would be located at site. Resource use would comprise of about 9 KLD of water, to be sourced through a bore well at site. On a regular basis, small amounts of domestic waste and waste water would be generated from the site. From time to time, minor amounts of hazardous waste would also be generated and would be disposed off in conformance to regulatory requirements.

The baseline studies have profiled the environmental and social conditions of the Meral site and the study area of 2 kms around it. 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 area and the Garhwa District. Site specific environmental and social baseline is described in the Table below:

(1) http://jharbhoomi.nic.in/jhrlrmsmis/MISRegister2/frmRegister2Report.aspx?distcode=14&circlecode=12

Environmental Setting	
Terrain & Slope	The site is slightly undulating with a gradual slope towards South-West. The highest and lowest contours of the site are 239 m and 244 m respectively.
Soil	The soil at site is lateritic in nature.
Existing drainage pattern	A minor drainage channel, locally known as Sukhra nala, traverses at northern boundary of the project site
Environmental pollution in the vicinity	The proposed substation is located in a rural setting. There are no sources of air pollution in the vicinity. During the site reconnaissance no industries were observed in the vicinity of the site.
Other environmental sensitivity	There is an embanked waterbody within 1.2km in the South East
Social Setting	
Status of Land	The land belongs to the Land Revenue Department Government of Jharkhand, and categorized as Gair Mazrua land, Approximately 20.47 acres of land has been transferred to JUSNL for setting up 220 KVA and 132 KVA Grid Sub-Station.
Habitations	The nearest major habitation is Chundi Village approximately 300m away from the site.
Religious & Culture related sensitivity (including sacred groves)	No cultural sensitivities were identified near the project site.

In addition to the baseline surveys, a community consultation exercise was undertaken in the adjoining Chundi village. Residents of the village were consulted to validate secondary information on the socio economic status of the village, the perceptions of the local people with respect to the planned GSS project and to identify any existing dependency of the local community on the proposed site. The consultations revealed that there was no dependency on the plot of land, since the land was frequented by *Nilgais* rendering it unsuitable for cultivation.

The potential impacts of the proposed GSS project were identified and evaluated using standard impact assessment procedures. Source references including past project experience, professional judgment and knowledge of both the project activities as well as the environmental and social setting of the site and surroundings were used as a basis for the assessment.
The change in land use from fallow culturable wasteland to industrial may be considered to be a positive impact because the land that was lying fallow and was not cultivated would be put to a purpose for the society. Excavations, cutting and filling of soil may lead to erosion and runoffs which may adversely impact adjoining land parcels and Sukhra nala. In addition, local drainage in and around the site may get impacted due to the change of the site topography, if proper site design is not undertaken considering these factors.

With the construction phase lasting about 1 year, construction related activities are expected to cause local level impacts (adjoining settlements of Chundi village) 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, issues related to health and safety due to involvement of labour in project construction activities is anticipated. 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. Adverse impacts caused by the project during the operational phase are expected to be minimal, with no plans for any point source emissions or discharges from the GSS to any environmental media. The operation of the facility is expected to result in generation of small amount of wastes, some of which (like oily rags, waste oil, etc.) may be hazardous in nature and are not expected to cause any significant adverse impacts if adequate safeguards and mitigation measures are adopted, as delineated in the ESMP.

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. 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:

- Plan for the sub-station site layout and for cutting and filling of earth in a manner that local drainages are not disturbed and ensure that the adjoining pond can be kept out of the boundary of site;
- Adopt appropriate engineering and associated mitigation measures and plans to minimize 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; and
- Ensure local suppliers and contractors implement local employment and procurement policies to the benefit neighboring communities of Chundi, Bhagodih, Korga, Majhgaon, etc,.

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. An ESMP

Monitoring Plan would be put in place to 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 Daltongunj Zone of JUSNL would be responsible for implementing the technical aspects of the JPSIP with respect to the Meral GSS 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 1800 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 scheme. For the purpose of implementation these are divided into 3 schemes. The subprojects in each of the schemes are presented as ***Annexure 1***.

In Phase II there are 8 schemes. Three (3) nos of these scheme are located in Garhwa District, two (2) nos of scheme are located in East Singhbhum District, one (1) no of scheme is located in Palamau District and one (1) no of scheme is located in Seraikela-Kharsawan District. Meral GSS is part of **Scheme F Phase II** that lies in Garhwa District.

This Environment and Social Impact Assessment Report deal only with the construction of the new 132/33KV Meral Substation at Ramna Block which is part of Scheme F of Phase II.

1.3 PURPOSE AND SCOPE OF THIS ESIA

The ESIA process involves the identification of the potential environmental and social issues in the project and tries to address them through design interventions. Impact prediction and evaluation of residual environmental and social issues of a Project is conducted as part of ESIA. 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 Grid Substations (GSS);
- 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 and Social Management Plan (ESMP) to implement suggested mitigation measures to minimise 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 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

ERM would like to highlight the following limitations with regard to this ESIA document

- 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 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.

ERM is not engaged in social and environmental, health & safety consulting and reporting for the purposes of advertising, sales promotion, or endorsement of any client's interests, including raising investment capital or recommending investment decisions, or other publicity purposes. The client acknowledges that the report prepared by ERM are for exclusive use of the client and agrees that ERM's reports or correspondence will not be used or reproduced in full or in part for such promotional purposes, and may not be used or relied upon in any prospectus or offering circular. The client also agrees that none of its advertising, sales promotion, or other publicity matter containing any information obtained from these assessments or reports, either in parts or entirety, will make reference to ERM's trade name. Nothing contained in this report shall be construed as a warranty or affirmation by ERM that the site and property described in the report are suitable collateral for any loan or that acquisition of such property by any lender through 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 the JPSIP projects. It has also identified all the World Bank Policies and guidelines which are applicable to 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 acts, regulations, and relevant policies in the context of the project are presented in below table.

Table 2.1 National/State level Acts/Rule/Policy Triggered for the Project

Sl. No.	Acts/Rule/Policy	Applicability & Action Required	Responsibility
A.	**Electricity Related Regulation**		
1.	Electricity Act 2003 and Indian Telegraph Act 1885	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.	JUSNL
2.	Technical Standards for Construction of Electrical Plants and Electric Lines Regulations, 2010; Measures relating to Safety	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	JPSIP, Contractor

Sl. No.	Acts/Rule/Policy	Applicability & Action Required	Responsibility
	and Electric Supply Regulations, 2010	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	
B.	**Environment/Social Legislation**		
1.	Environment Protection Act, 1986	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 with 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. There are a number of trees in Meral substation. Thus permissions would be required from the DFO before felling of trees.	JPSIP, Contractor
3.	Ancient Monuments & Archaeological Sites and Remains Act, 1958; Indian Treasure Trove Act, 1878; Jharkhand Ancient Monuments and Archaeological Sites, Remains and Art Treasures Act, 2016.	Proposed substation site is not located near or inside archaeological site. Thus National 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.	JPSIP, Contractor
4.	Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016	Generation of waste oil and used transformer oil at site attracts 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 Contractor
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	JPSIP Contractor

Sl. No.	Acts/Rule/Policy	Applicability & Action Required	Responsibility
		recycler.	
6.	Battery (Management & Handling) Rules 2001	It is the responsibility of the bulk consumer (1) (JPSIP) to ensure that the used batteries are deposited with the dealer, manufacturer, or registered recycler for handling and disposal. A half-yearly return (Form-1) is to be filed as per the rule to JSPCB.	JPSIP Contractor
7.	Ozone Depleting Substances (Regulation and Control) Rules, 2000	JPSIP shall follow the provisions of the notification and shall phase out all equipment, which uses these substances. In case of substation no equipment would be procured which contain CFC's.	JPSIP, Technical Consultant
8.	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
9.	Regulation of Polychlorinated Biphenyls Order, 2016	The use of polychlorinated biphenyls or any equipment containing PCB would be prohibited entirely from 31st December, 2025. The technical specification would clearly state that the transformer oil should be free of PCBs or else the DPR should provide a road map for ensuring the phasing out of all PCB's by 2025.	JPSIP and Technical Consultant
C.	**Labour related Legislation**		
1.	The Child Labour (Prohibition and Regulation) Act, 1986	JPSIP and its contractors would comply with the requirements of these regulations. For this purpose, JPSIP would incorporate requirements of these regulations in contract document of procurement.	JPSIP, Contractor
2.	Contract Labour (Regulation & Abolition) Act 1970		
3.	Minimum Wage Act, 1948 Bonded Labour System (Abolition) Act, 1976		
4.	Grievance Redressal Policy under Industrial Disputes Amendment Act, 2010		
5.	Employees' Provident Fund and Miscellaneous Provisions Act, 1952		
6.	The Payment of Wages Act, 1936, amended in 2005; Workmen's Compensation Act, 1923		
7.	Maternity Benefit Act, 1961; Employees State Insurance Act, 1948		
8.	Inter-state Migrant		

(1) 'Bulk Consumer' means a consumer such as the Departments of Central Government like Railways, Defense, Telecom, Posts and Telegraph, the Department of State Government, the Undertakings, Boards and other agencies or companies who purchase hundred or more than hundred batteries per annum.

Sl. No.	Acts/Rule/Policy	Applicability & Action Required	Responsibility
9.	Workmen Act 1979 Intimation of Accidents (Forms and Time of Service of Notice) 2004		

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.	Technical 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	Environmental and Social Consultant of JPSIP

Sl. No.	World Bank Policies/Guidelines	Applicability	Responsibility
		down in "Indian Treasure Trove Act, 1878". The ESIA Study for the Meral substation ash to be carried out for this purpose.	
3.	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 of JPSIP
4.	IFC/WB Guidelines for Power Transmission and Distribution		

3 PROJECT DESCRIPTION

3.1 REGIONAL SETTING

The proposed substation at Meral is located at Bhagodih village of Ramna block in Garhwa district.

3.2 PROJECT LOCATION

3.2.1 Location

The land for proposed 132/33kV Meral GSS has been identified adjacent to the under construction 220/132kV Garhwa GSS and lying within the same plot boundary. As per Letter no. 605 dated 15th February, 2017, a total area of 20.47 acres (8.28 ha) have been transferred (1) by the District Commissioner of Garhwa to JUSNL for setting up both 220/132 KVA and 132/33 KVA GSS. The salient features of the project location and land is presented in ***Table 3.1***.

Table 3.1 Salient Features of the Project Location

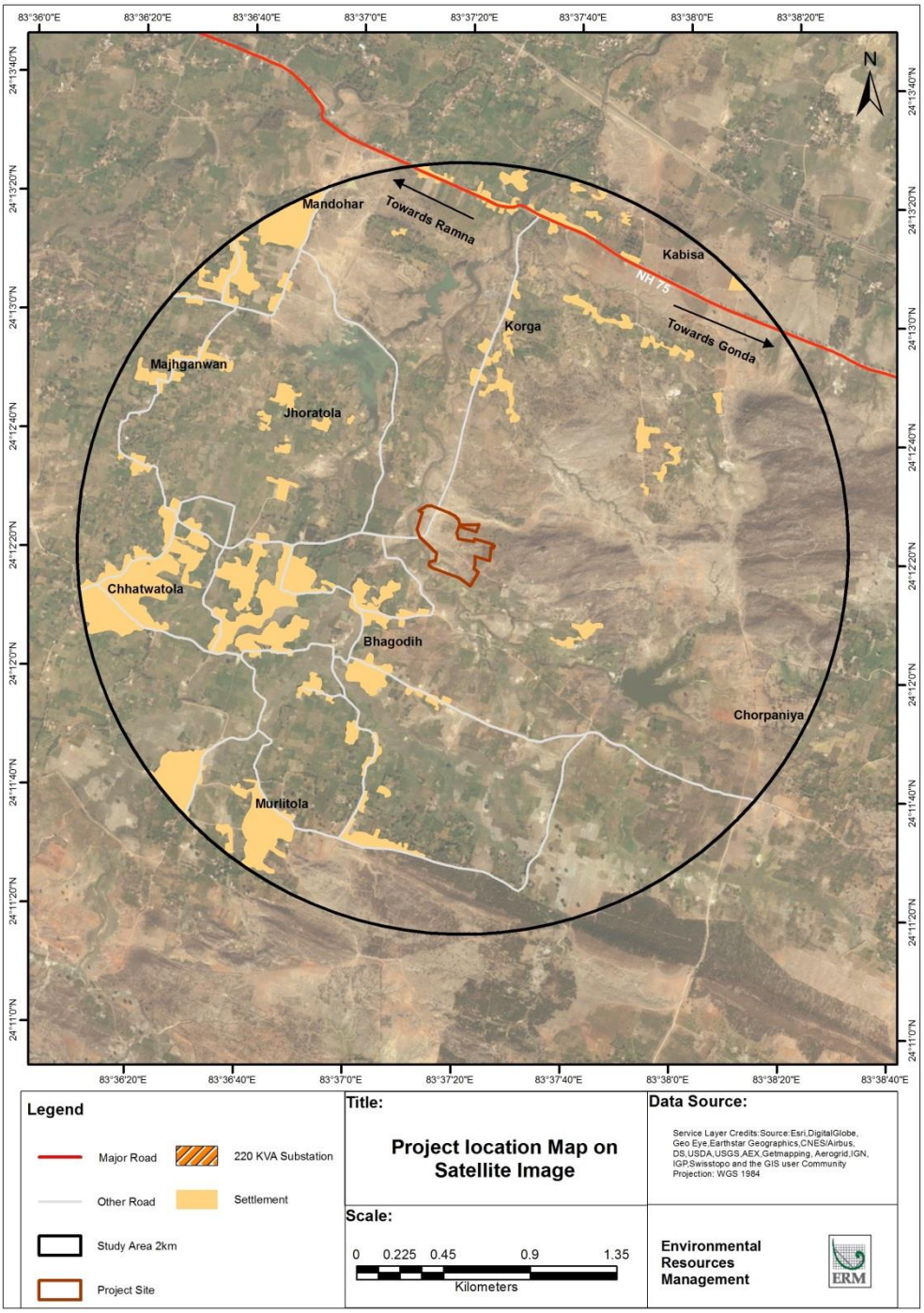
Sl. No	Item	Description
1.	Plot No/s	1889 and 1908
2.	Khata No.	435
3.	Thana No.	189
3.	Area	20.47 acres/8.28 ha (land allotted for 220/132 KVA and 132/33 KVA grid substation)
5.	Type of Land	Gairmazrua Malik
6.	Ownership	Government of Jharkhand
7.	Coordinates	24°124'21.06"N, 83°37'19.62"E

3.2.2 Accessibility

Major components of the proposed substation e.g. transformer, switchgear would be transported to the site through road / railways. The site can be accessed from Ranchi through NH-75 through Daltongunj. There is a 5m wide metalled road that diverges on the left from Korga towards South. The proposed site lies adjacent to Chundi Village, Meral. The proposed project location and accessibility to the site is shown in ***Figure 3.1.***

(1) http://jharbhoomi.nic.in/jhrlrmsmis/MISRegister2/frmRegister2Report.aspx?distcode=14&circlecode=12

Figure 3.1 Project Location and Accessibility Map



3.3 ENVIRONMENTAL SETTING

3.3.1 Project Site

As discussed above, total area of the allotted land is 20.47 acres comprising of two land parcels of 15.25 acres and 5.22 acres. One motorable road separates these two land parcels. Land parcels measuring 15.25 acres would house both 220/132 KVA substation (which is presently under construction) and 132/33

KVA substation (proposed under JPSIP project). Land parcels measuring 5.22 acres would presently not be used for the project purpose.

During site visit it was observed that the proposed site comprises of fallow land. Few mature trees were present on the eastern part of the project site. Slight undulation was observed at the site with general slope from north to south.

3.3.2 Site Vicinity

The physical feature, built structures (habitations, roads) and other environmental sensitivities around the site is presented below.

Direction	Features
North	Micro drainage channel (locally known as Sukhra nala) traverses at northern boundary of the project site. Beyond this stream, there are fallow land, agricultural land and scattered settlements (of Korga village). One water body is located approx. 690m north of the project site.
East	Fallow land, scrub land and hillock are present at eastern side of the proposed site. Also, at approx. 1.7 km east of the project site, tola of Bhagodih village in located.
South	Fallow land and Sukhra nala is present in the southern direction.
West	Immediate adjacent to west of the project site, there is fallow land followed by Sukhra nala. Beyond this, there is settlement of Chundi village, at approx. 300 m west of the project site. Other than that the whole area to the west of the project site is interspersed with predominantly agricultural land and settlement.

Photograph of the features surrounding the substation site is presented in ***Figure 3.2***.

Figure 3.2 Photographs of Site Surroundings

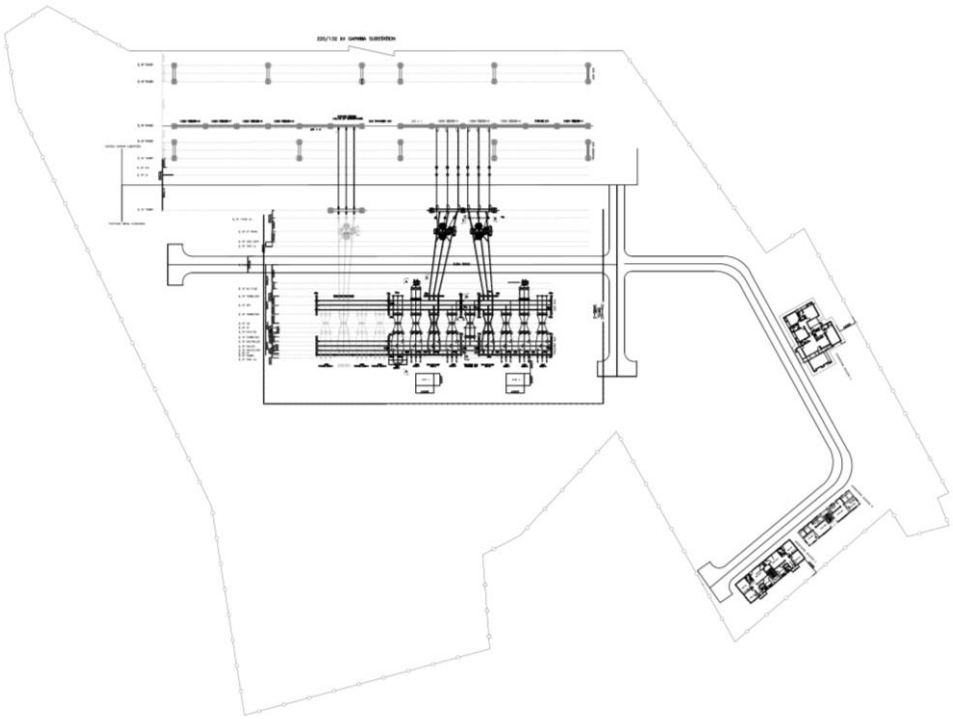
3.4 PROJECT COMPONENT

The project components which have been planned in the project are presented in the ***Table 3.2*** and the typical substation layout is presented in ***Figure 3.3.***

Table 3.2 Project Components in the 132/33 KV Substation at Meral

Sl. No	Component	Description	Remarks
	A. Core Infrastructure		
1.	Transformer	2 nos 50 MVA Oil Cooled Transformer	A bund would be placed around the transformer and the all the runoff and oil from the surrounding areas would be collected in an Underground RCC Bund Oil Tank. The oil water mixture would be collected and sent to authorized recyclers at regular interval
2a.	Bays (incoming)	3 nos of 132 KV bays (1 no for future expansion)	-
2b.	Bays (outgoing)	15 Nos of 33 KV bays	-
3	Transformer Oil	Would be as per the Regulation of Polychlorinated Biphenyls Order, 2016	
	B. Associated Infrastructure		
4	Control Room	One number with control panel	
5	Residential Quarters	8 nos of 2 bedroom flats 8 nos of 1 bedroom flat 1 four rom bungalow	The residential units would be provided with septic tank and soak pits for treatment of domestic wastewater.
6	Pump House	1 nos of submersible pump	The ground water would be pumped and stored in overhead tank to provide water to the resident of the quarters. This water would also be used for supply to the control room for domestic purpose

Figure 3.3 Layout of a 132/33 KV substation at Meral



Source: DPR

3.5 PROJECT TIMELINE AND PROJECT COST

The estimated cost for construction of the 132/33 KV Meral substation would be around INR 36.16 crores. This cost includes the cost of civil works, cost of procurement of electrical equipment and associated materials, installation and commissioning. It is estimated the construction would be completed within a period of 18 months. Site preparation, construction and civil works of the substation are expected to be completed in about 12 months.

3.6 RESOURCE

The resources required during the construction are presented in ***Table 3.3.***

Table 3.3 Resource Requirement in Construction & Operation of GSS at Meral

Sl. No	Description	Resource Requirement
1.	Land (Total)	1.5 acres of land would be required for the 132 KVA GSS (Total area of the plot is 20.47 acre)
2a.	Manpower (Construction Phase)	The peak manpower requirement is expected to be 50 persons
2b.	Manpower (Operation Phase)	The peak manpower is expected to be 16-20 persons
31.	Water (Construction Phase)	10-13 KLD (peak water requirement)
3b.	Water (Operation Phase)	8.4 KLD (for domestic purpose)

Sl. No	Description	Resource Requirement
4.	Construction Material	Steel, cement, aggregate and sand

3.7 DISCHARGES AND WASTE

Emission and discharges from the proposed substation during construction and operation phases are presented in ***Table 3.4***.

Table 3.4 Emission and Discharges form 132/33 KV Grid Substation

Sl. No	Description	Quantity
1a.	Waste Water (Construction)	Peak generation of 2.5 KLD
1b.	Waste Water (Operation)	6.7 KLD
2a.	Solid Waste (Construction)	The municipal solid waste would be around 7.5 -12 kg per day. In addition, construction waste would be generated.
2b.	Solid Waste (Operation)	The municipal solid waste generated during the operational stage would be around 21 kg/day
3.	Used transformer oil	The used transformer oil would be produced at an interval of 15 years.
4.	e–waste	The e-waste generated form the panels at the end of the life

4 ESIA METHODOLOGY

A project level Environmental and Social Impact Assessment (ESIA) is a method of systematic identification and evaluation of the potential impacts (effects) of the proposed substation 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 and social effects/impacts 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 visit was conducted to the site to understand the extent of the site and prevailing environment and social setting in its immediate vicinity and use it as a basis of screening and scoping exercise for the ESIA.

An effort was also made to understand the decision process that led to the selection of the site and how environmental and social issues were factored into the selection process. Discussions with the respective Zone and Division of JUSNL revealed that a number of available plots of land belonging to the government were proposed by the Land Revenue Department and the decision towards confirmation of the site was made based on the following technical, environmental and social considerations:

- The plot had good road access;
- It did not comprise of prime agricultural land and did not have any residential premises within it;
- There were no major settlements in the immediate vicinity.

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 Meral GSS at the allocated site. 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. Resettlement Plan, Biodiversity Action Plan and Tribal People Plan.

4.2 *BASELINE STUDIES*

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

Considering the project activities described in **Chapter 3** it is anticipated that scale and magnitude of project induced impacts are likely to be perceived within 2 km radius of the GSS site location and has been considered as study area for the ESIA. Site surveys were conducted in the study area to understand the environmental setting of the site 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 site, condition of the approach road to the site 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.

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.

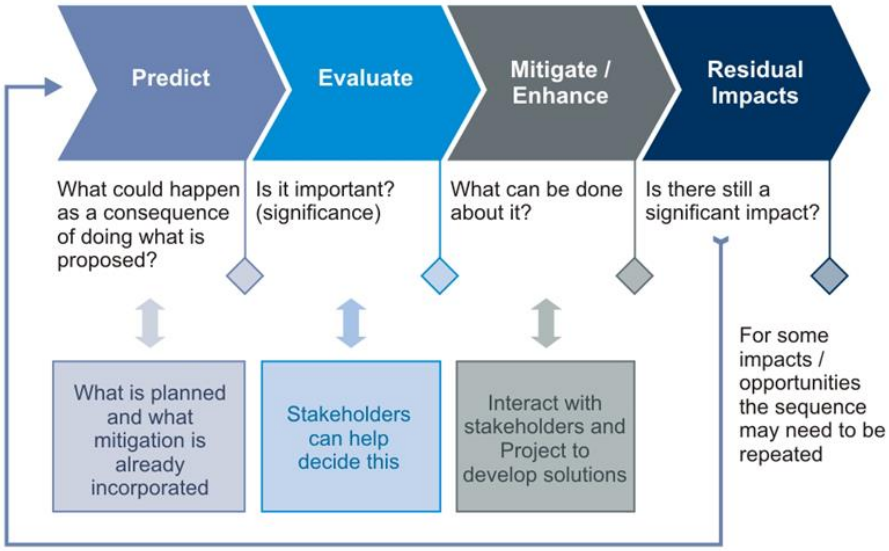
Prediction of impacts was undertaken as an objective exercise to determine what could potentially happen to the environmental and social receptors as a consequence of the project and its associated activities and took into account baseline conditions at site, stakeholder's opinion and expert judgement. 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 and 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 figure below.

Figure 4.1 Impact Assessment Process



4.4 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN PREPARATION

The Environmental & Social Management Plan along with a Monitoring Plan has been prepared as a site specific document for the construction and operation of the GSS. 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 project site and surrounding area to provide a context within which the impacts of the Project are to be assessed. Methodology for baseline data collection for the ESIA study is discussed in above ***Section 4.5***.

5.2 LAND COVER

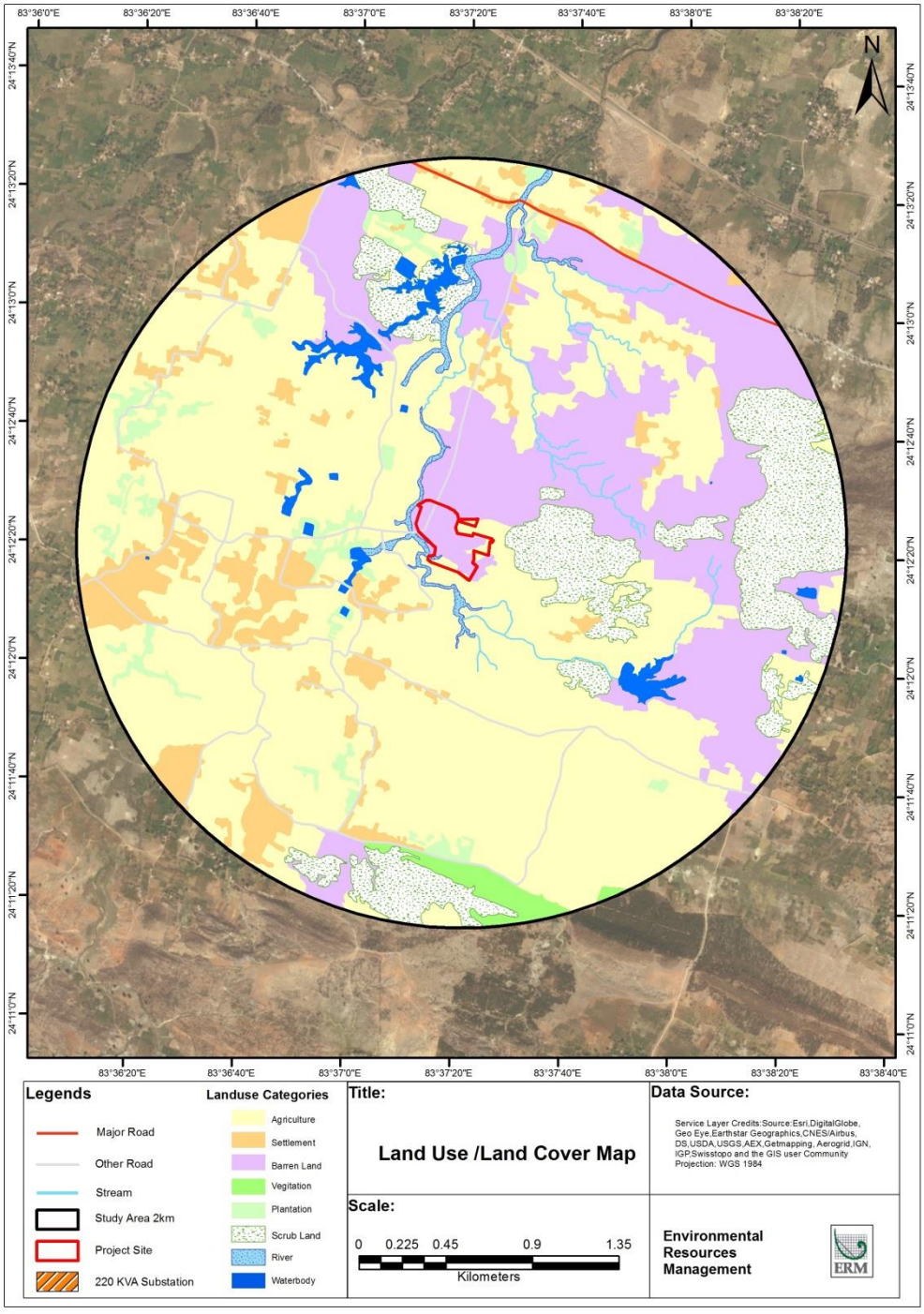
Total land under the proposed GSS site is 20.47 acre. The land is fallow and agriculture is not practiced within the proposed site. No Forest land is present within the site.

Agriculture land (~ 76.28%) is the most predominant land use with in the study area followed by settlements (13.59%), barren land (~ 2.01%), river (1.77%), vegetation (~1.51%), streams (1.05%), minor roads (0.49%), major roads (0.26%) and waterbodies (0.07%). Existing land cover pattern in and around the study area is provided in ***Table 5.1*** and the land use map of the study area is shown in ***Table 5.1.***

Table 5.1 ***Existing Land Cover Pattern of the Study Area***

Name	Area in Sq. Km.	Percentage (%)
Agriculture	6.83	54.40
Barren	2.48	19.73
Scrub Land	1.40	11.13
Settlement	0.94	7.50
Plantation	0.30	2.35
Waterbody	0.19	1.50
Other Road	0.13	1.05
Vegetation	0.12	0.96
River	0.11	0.84
Streams	0.05	0.40
Total	**12.56**	**100**

Figure 5.1 Land Use/Land Cover Map of the Study Area



5.3 SOIL

The soils occurring in different landforms have been characterized during soil resource mapping of the state on 1:250,000 scale (Haldar et al. 1996) and three soil orders namely Entisols, Inceptisols and Alfisols were observed in Garhwa district. Alfisols were the dominant soils covering 54.5 percent of TGA followed by Entisols (29.7 %) and Inceptisols (14.7 %). Crops such as paddy, maize, wheat, pigeonpea, mustard, lentils are cultivated in these soils.

5.4 CLIMATE AND METEOROLOGY

Garhwa District is characterized by humid and subtropical climate comprising of three distinct seasons – hot and dry summer, cold winter and rainy season. November to March forms the winter season. It is followed by summer season from March to May and monsoon June to September.

The rainfall in the district is mainly received from the South-West monsoon. The average annual rainfall is 1193 mm. Approximately, 90% of the total annual rainfall is received during the monsoon period especially in July. During winter season the region receives a rainfall of approximately 10 cm.

5.5 NATURAL HAZARD

According to District Disaster Management Plan 2016, Garhwa is vulnerable to drought, forest fires and earthquake.

Garhwa District is situated in Zone –III of Seismic Risk Zone and the vulnerability to earthquakes is considered to be low.

5.6 AIR ENVIRONMENT

There is no industrial set up within 2 km of the proposed GSS site.

The source of generation of particulate matter is due to transportation of vehicles on the state highways and through adjoining village road. The other source is burning of fossil fuels for domestic purposes. Based on visual observations, the ambient air quality of the study area is representative of a rural set-up.

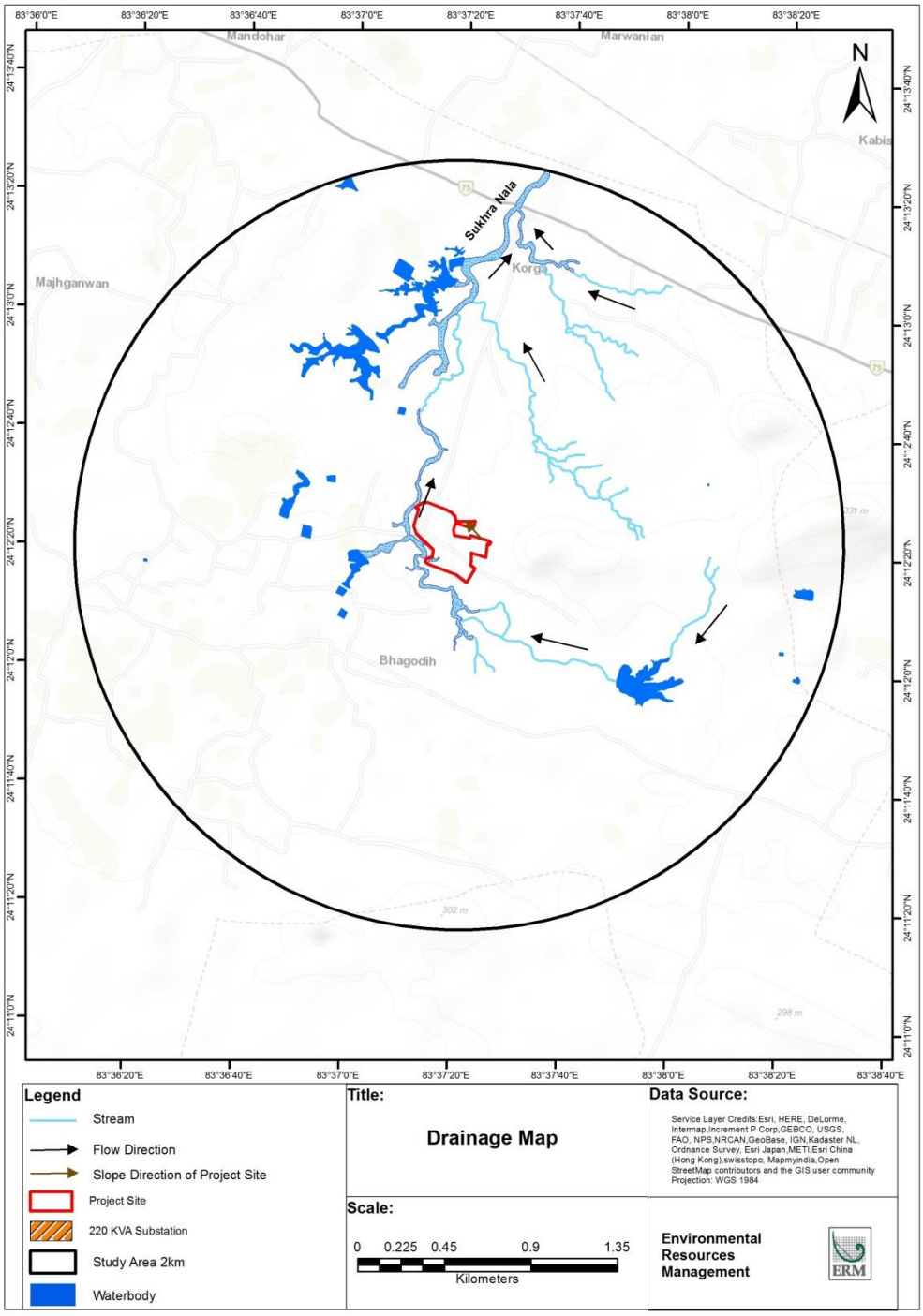
5.7 NOISE ENVIRONMENT

No industrial set up is observed in 2 km of the proposed GSS site. The only source of noise is due to vehicular movement through the adjoining village roads. Heavy vehicle movement were not observed during site visits or reported by public during consultations. Overall, it can be concluded that the ambient noise quality is representative of residential areas in rural setup.

5.8 DRAINAGE

Sukhra nala drains through the study area and flows from East to West and then turn towards North. There are several seasonal streams that drain into Sukhra Nala. The drainage pattern in the study area is dendritic in nature. Drainage map of the study area is presented in ***Figure 5.2.***

Figure 5.2 ***Drainage Map of the Study Area***



5.9 SURFACE WATER

Sukhra nala forms the major surface waterbody in the study area. There are several other micro-drainage channels that drain the runoff from the study area. Also, few ponds are present within the study area and many of them are associated with the drainage system of Sukhra nala. The water from the surface water bodies are used for domestic purposes.

5.10 GROUND WATER

Garhwa district is underlined by hard rock foundations, belonging to the precambrain period and recent alluvium along river banks. The geology and structure of underlying basement controls the occurrence and movement of ground water. The ground water occurs within secondary porosity like joints, fractures and the extent of inter-connection with them. Ground water occurs in the district within weathered mantle. The thickness of weathered mantle varies from 5 to 16 mbgl in general. The source of Ground Water recharge is entirely by rainfall. The rivers of the district are seasonal and do not contain appreciable amount of water during lean period to recharge Ground water in lower reaches. Major part of the rain water also flows as run off.

As per the hydrogeological map of the District drawn up by the CGWB, the hydrogeology of the project site comprises of Chotanagpur Granite of the Archean age and characterized by Archaean complex in which the ground water occurs within fractures and weathered residuum. As per ground water information booklet (2013) of CGWB, depth to water table in this area varies from 2-5 m bgl during post-monsoon period to 5-10 m bgl during pre-monsoon period. As of 2013, the gross ground water draft for all uses in the Ramna block was 248.51 ham. Discharge of the bore wells is 15.6 m^3/hr with a drawdown of 30 m.

Consultations with villagers in the study area revealed that ground water is predominantly used for drinking and domestic purposes and is sourced through dug wells or tube wells. From the ground water quality perspective, the water quality has been found to be potable in general.

5.11 ECOLOGICAL ENVIRONMENT

The proposed GSS site in Garhwa district of Jharkhand State falls in 6B Deccan Peninsula – Chota-Nagpur plateau bio-geographic province.

Terrestrial Ecosystem

In Garhwa district, about 2028 sq. km of forest area is present, which is about 42.5% of the total geographic area of the district.

Natural vegetation in the region can be broadly classified into **C3 Moist Mix Deciduous Forests and 5B Northern Tropical Dry Deciduous Forests**.

C3 Moist Mixed Deciduous Forests – These forests are mainly found in some patches of narrow valleys. Sal (*Shorea robusta*) is the dominant species. Other species that are associated with Sal, in this type of forest are *Terminalia tomentosa*, *Diospyros melanoxylon, Buchanania latifolia, Anogeissus latifolia, Haldina cordifolia, Lannea grandis, Boswellia serrata* etc.

5B Northern Tropical Dry Deciduous Forests – Dominant species is Sal (*Shorea robusta*). Other species that are associated with Sal are *Terminalia belerica, Terminalia chebula, Haldina cordifolia, Madhuca latifolia, Butea monosperma, Buchanania latifolia, Diospyros melanoxylon, Ailanthus excelsa, Cassia fistula* etc.

5.11.1 *Vegetation within the Study area*

The proposed land for substation is located within the GM land and Private Land areas. Mature trees of Khair, Arjun, Palas, Neem, Siris, are present within the GSS site. Vegetation within the study area is presented below.

Forest Vegetation

Sal (*Shorea robusta*) is the most dominant tree of the forested areas. Other common tree species recorded are Palas (*Butea monosperma*), Date palm (*Phoenix dactylifera*), Sagwan (*Tectona grandis*), Neem (*Azadirachta indica*), Semal (*Bombax ceiba*), Mohua (*Madhuca longifolia*), Sugar palm (*Borassus flabellifer*), Bans (*Bambusa arundinacea*), Ghoraneem (*Ailanthus excelsa*), Wad (*Ficus benghalensis*), Date palm (*Phoenix dactylifera*), Sugar palm (*Borassus flabellifer*) etc.

Homestead plantation

During the primary survey trees like Peepal (*Ficus religiosa*), Bans (*Bambusa arundinacea*), Wad (*Ficus benghalensis*, Aam (*Mangifera indica*), Neem (*Azadirachta indica*), Ghoraneem (*Ailanthus excelsa*), Date palm (*Phoenix dactylifera*), Sugar palm (*Borassus flabellifer*), Chhatim (*Alstonia scholaris*), Siris (*Albizzia lebbek*), Amla (*Emblica officinalis*), Imli (*Tamarindus indica*) etc. were found to occur in proximity to the human settlements within the study area.

Roadside plantation

Trees like Gular (*Ficus racemosa*), Shisham (*Dalbergia sisso*), Peepal (*Ficus religiosa*), Semal (*Bombax ceiba*), Neem (*Azadirachta indica*), *Eucalyptus* sp. were recorded along the side of the roads within the study area.

Riparian Vegetation

Riparian vegetation is observed on the sides of streams and waterbodies. Major tree species observed is Jamun (*Syzygium cumini*), Peepal (*Ficus religiosa*),Shisham (*Dalbergia sisso*), Semal (*Bombax ceiba*), Wad (*Ficus benghalensis*), *Eucalyptus* sp. etc.

Invasive Alien species

Invasive alien species are non-native species in a specific ecosystem whose introduction and subsequent establishment adversely impacted the economy, agriculture, biodiversity and human health. Major invasive species recorded during the study are: *Eucalyptus* sp., *Lantana camara, Parthenium hysterophorus* etc.

5.11.2 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 GSS.

Faunal Diversity

Herpetofauna

Three species of amphibians *viz*. Common Indian Toad (*Duttaphrynus melanostictus*), Indian Bullfrog (*Hoplobatrachus tigerinus*) and Skittering Frog (*Euphlyctis cyanophlyctis*) etc. are observed/reported from the study area. All the species are listed Least Concern as per IUCN Classification (IUCN Version 2017-3).

8 species of reptiles were observed/reported from the study area. The list includes Indian Cobra (*Naja naja*), Indian Rat Snake (*Ptyas mucosus*), Checkered Keelback (*Xenochrophis piscator*), Russel's Viper (*Daboia russellii*), Banded Krait (*Bungarus fasciatus*), Fan-Throated Lizard (*Sitana ponticeriana*), Oriental Garden Lizard (*Calotes versicolor*) and Common Indian Skink (*Eutropis carinata*). The list includes four Schedule II species as per Indian Wildlife Protection Act (IWPA) *viz*. Indian Cobra, Indian Rat Snake, Checkered Keelback and Russel's Viper.

Avifauna

A total of 48 species of avifauna were recorded from the study area. The species list includes terrestrial and aquatic birds. Terrestrial and aquatic birds recorded are presented below.

Terrestrial birds- House Sparrow, House Crow, Common Myna, Spotted Dove, Asian Pied Starling, Common Pigeon, Shikra, Rufous Treepie, Paddyfield Pipit, House Swift, Spotted Owlet, Indian Roller, Jungle Myna, Asian Palm Swift, Zitting Cisticola, Greater Coucal, Black Drongo, Black Winged Kite, Baya Weaver, Asian Koel, Indian Robin, Coppersmith Barbet, Little Green Bee-eater, Ashy Prinia, Black Kite, Plain Prinia, White Browed Fantail, Rose-ringed Parakeet, Red-vented Bulbul, Black Hooded Oriole, Large Grey Babbler etc.

Aquatic birds- Common Kingfisher, White-breasted Waterhen, Asian Openbill, Grey Heron, Little Grebe, Indian Pond Heron, Cattle Egret, Little

Egret, Indian Spotbilled Duck, Intermediate Egret White-throated Kingfisher, Bronze Winged Jacana, Little Cormorant, Purple Swamphen, Red-wattled Lapwing, Common Moorhen, Black Headed Ibis 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. Black Headed Ibis (*Threskiornis melanocephalus*) is listed as Near Threatened as per IUCN Classification (IUCN version 2017-3).

Mammals

Total 7 species of mammals are reported/recorded from the study area. The mammals observed/reported in the study area are Five Striped Palm Squirrel (*Funambulus pennantii*), Golden Jackal (*Canis aureus*), Common Grey Mongoose (*Herpestes edwardsii*), Rhesus macaque (*Macaca mulatta*), Northern Plains Langur (*Semnopithecus entellus*), House Rat (*Rattus rattus*), Wild Pig (*Sus scrofa*), Nilgai (*Boselaphus tragocamelus*), etc. The list includes four Schedule II species Golden Jackal, Common Grey Mongoose, Northern Plains Langur and Rhesus macaque. All the mammalian species are listed as 'least concern' as per IUCN Classification (IUCN version 2017-3).

5.12 SOCIO ECONOMIC ENVIRONMENT

The population of Garhwa district according to the 2011 census data is 1,322,78 which were 1,035,46 as per the census of 2001, registering a decadal growth of 27.75. The analysis reveals that Garhwa district accounts for 48.9% of total population of Jharkhand State. Whereas the literacy rate in Garhwa Ranchi district is 49.477.13% as against the state figure of 67%.

According to the 2011 census data, the sex ratio is 935, which is comparatively lower than the state average of 949. The ST population constitute 15.42% against the state figure of 26.2%. But a opposite trend is found in case of the SC categories, i.e 23.35% SC population in Garhwa district against 12.08% of the state figure.

Total households in Ramna block, where the proposed project site is located, is reported to be 13345 with average household size of 5.29. The total population of the Ramna block is 70584 as per Census Report 2011. The literacy rate is 57.09 % and the sex ratio is reported to be 931.

Demographic Profile of the Study Area Villages

Proposed substation land is situated in Ramna block, while five villages are located within the 2 km study area i.e. Bhagodih, Korga, Mandohar, Majhganwan and Chundi. As per the 2011 Census records, the study area has a total of 1041 households and a population of 5421. The entire population in the study area falls in a rural setting. Demographic profile of the study area villages are presented in ***Table 5.2***

Table 5.2 Demographic profiles of the village located within study area

Village	No. of Household	Total Population	Household Size	% of Male Population	% of Female Population	Sex Ratio	% SC Population	% of ST Population	% Literate	% Male Literate	% Female Literate
Bhagodih	844	4372	5.18	51.88	48.12	928	20.65	5.54	50.55	62.37	37.83
Korga	284	1591	5.60	50.79	49.21	969	53.87	3.90	50.73	63.26	38.02
Mandohar	168	723	4.30	52.28	47.72	913	36.65	0.00	66.89	80.00	53.06
Majhganwan	217	1125	5.18	51.82	48.18	930	15.82	0.53	65.87	79.35	51.70
Chundi	372	1982	5.33	49.90	50.10	1004	29.06	6.41	51.45	64.35	38.10

Source: Census 2011 Data

The total population within the study area is 5421 that resides in 1041 households. The highest population was observed to be in Bhagodih (4372) and the lowest in Mandohar (723). The average household size ranges between 4.3 to 5.60.

Demographic Profile of Surveyed Population of Bhagodih Village

A general socio economic survey of 20 households was conducted during the month of December, 2017 as a part of the ESIA study to validate the present socio-economic scenario of Bhagodih village. The questionnaire template used for administering the survey is presented in *Annexure 8*. Community consultations were also conducted to supplement the survey findings.

Total number of surveyed population is 104, representing 20 households. The average household size is 5.2 which is similar to the household size recorded in the Census data. Among the 104 surveyed populations, total male and female population is 54.81 % and 45.19 % respectively and the sex ratio is 825.

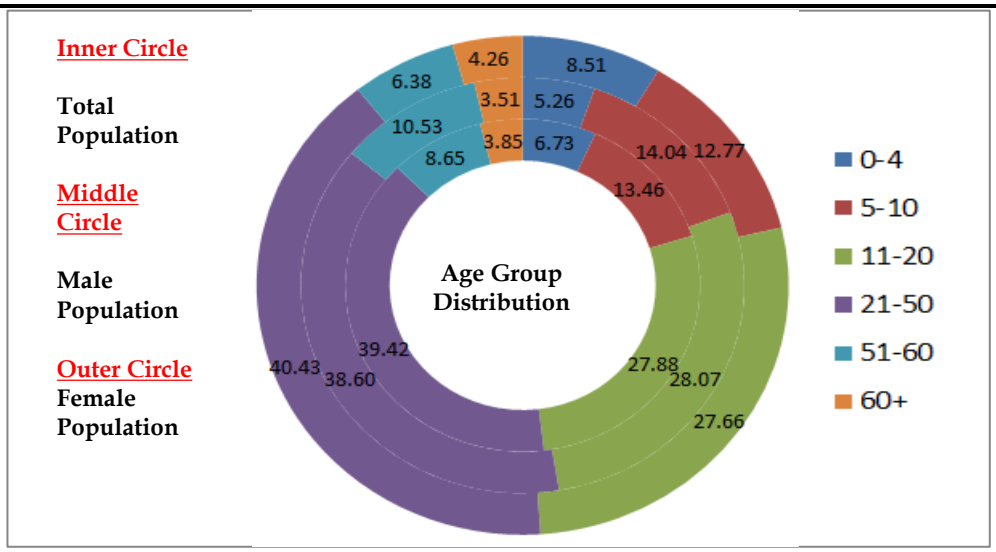
Table 5.3 Demographic profiles of the Surveyed Population

Village	Total Household	Total Population	Average Household Size	Male (%)	Female (%)	SC Population (%)	ST Population (%)	Literary Rate (%)	Male Literary rate (%)	Female Literary rate (%)
Bhagodih	20	104	5.2	54.81	45.19	15.00	0	52	64.81	39.53

Source: ERM Socio Economic Survey

Age group distribution of the surveyed population show that maximum number of population belong to the working age group of 21 to 50 followed by the young age group (11 to 20) which potentially will become the working age group in the future. ***Figure 5.3*** represents the age group distribution of the surveyed population.

Figure 5.3 Age Group Distribution of the Surveyed Population



Source: ERM Socio Economic Survey

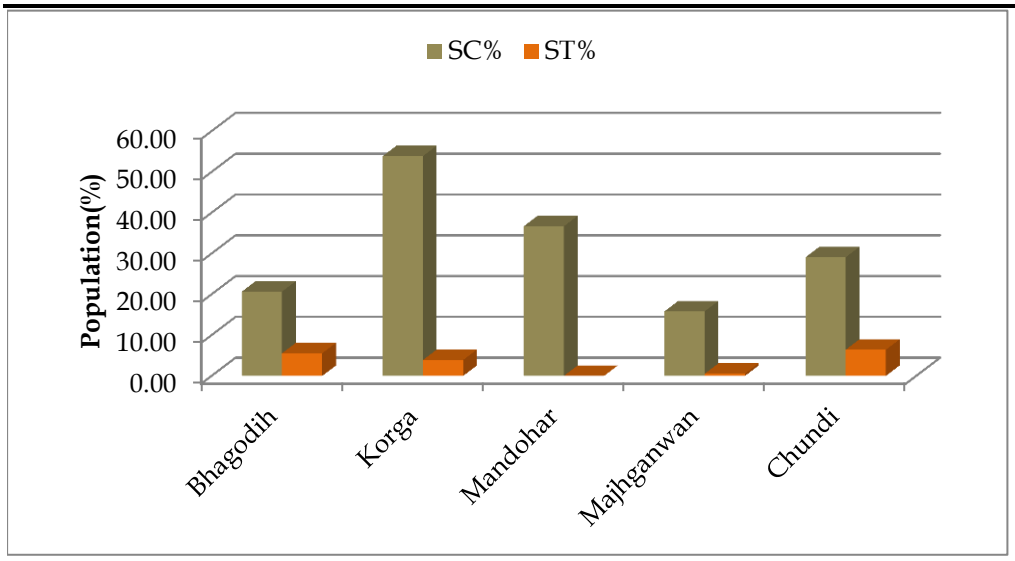
SC/ST Population in study area villages

The scheduled tribe population in the study area is 3.60%, which is lower than the district figure of 15.56% as per Census 2011 data. Proportion of SC and ST Population in the study area is captured in ***Figure 5.4***. Caste and community profile of the study area further reflects that percentage of Scheduled Tribes (ST) population is almost quite negligible in the study area. Chundi village is having 6.% ST population. Other than that Korga (3.90%) also has ST Population.

Percentage of Scheduled Tribes (SC) population is quite significant in the study area. Village Korga is having maximum percentage of SC population (53.87%) among the entire study area and in other four villages SC population ranges between 15.82% and 36.65%.

Remaining population are further classified into General Caste and OBC (Other Backward Caste) that is not accounted for in the Census survey of India.

Figure 5.4 Proportion of SC/ST Population in the Study Area

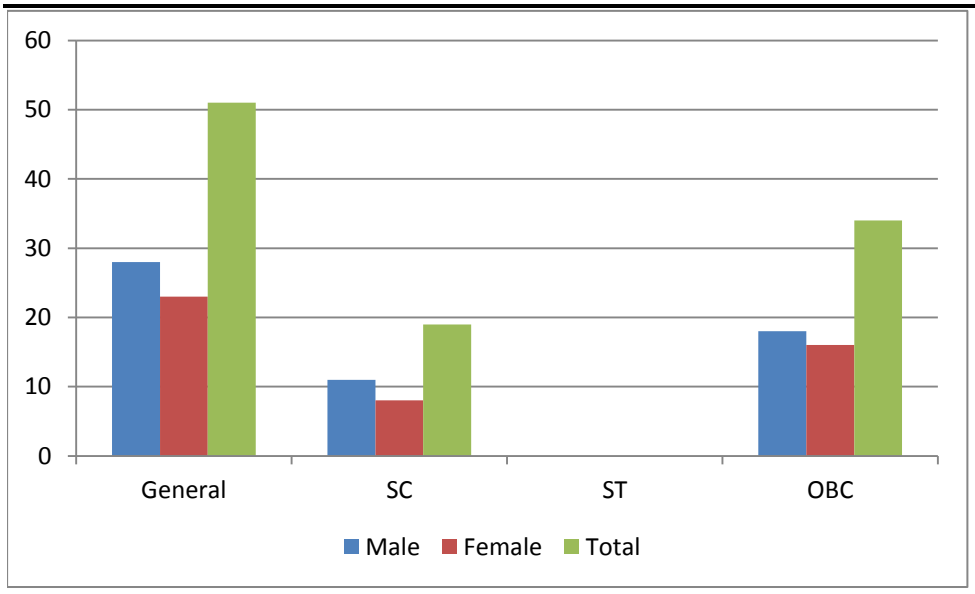


Source: Census 2011 Data

SC & ST Population of Surveyed Village (Bhagodih village)

Among the surveyed population, no ST population is recorded in Bhagodih village. Other Castes like General, SC and OBC population is 49.04 %, 18.27 %, 32.69 % respectively. It can be observed that people belonging to the General Caste is predominant in Bhagodih Village. ***Figure 5.5*** depicts the Caste wise distribution of the surveyed population.

Figure 5.5 Caste Distribution of the Surveyed Population of Bhagodih



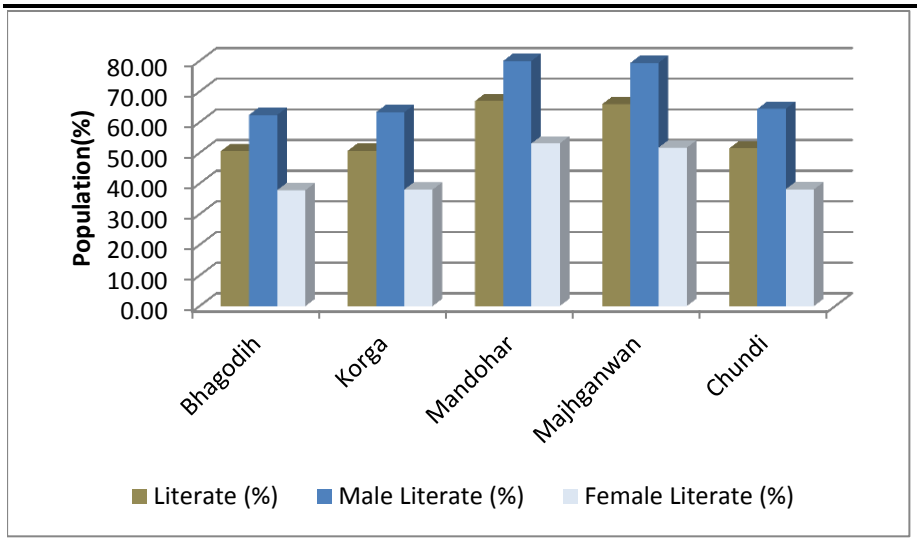
Source: ERM Socio Economic Survey

5.12.2 *Education profile*

Literacy Profile in study area villages

Literacy status of the study area villages is presented in ***Figure 5.6*** and it suggests that the average literacy rate in study area villages (50.55 % - 66.89%) is lower than that observed at the State level (67%). A general trend of education level attainment in study area as observed during consultation is that mostly teenagers drop out after Secondary School and key reasons for higher drop-out rates are economic conditions of the families as well as lack of education infrastructure in the vicinity.

Figure 5.6 Literacy profile of the study area villages



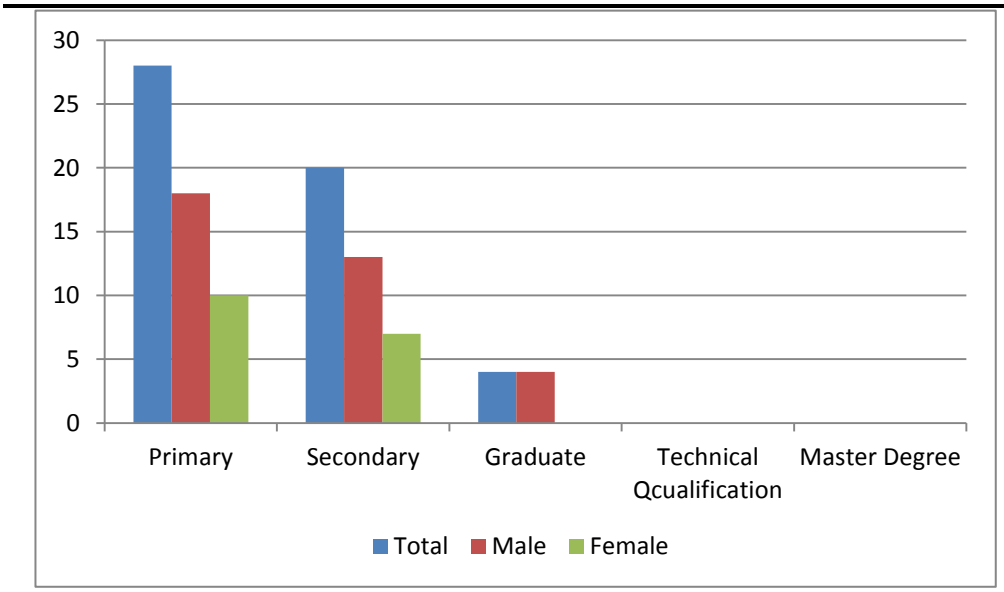
Source: Census 2011 Data

Educational profile of Surveyed Population of Bhagodih Village

Out of total 104 surveyed population 53.61 % are literate and 46.39 % are illiterate. Male and female literacy rate is 64.81 % and 39.53 % percent respectively, indicating high illiteracy rate among female population in comparison to male population.

Educational status of surveyed population shows that maximum category of population are either educated up the secondary level or continuing their education in secondary level. Educational status of the surveyed population presented in ***Figure 5.7***.

Figure 5.7 Educational Status of the Surveyed Population



Source: ERM Socio Economic Survey

Educational Infrastructure in Study Area villages

Number of schools and colleges existing in study area villages is shown in below ***Table 5.4***. The information is compiled from village directory, 2011. The table reflects that each village is having a primary and some also have access to middle school in its peripheral boundary. But numbers of secondary, higher secondary and college are absent in this study area. The assessment of education facilities and education promotion programs provided by the government in study area indicates that available education infrastructures in terms of number of schools are not adequate.

Table 5.4 Schools facilities in study area

Study Area Villages	Primary school	Nearest Facility	Middle school	Nearest Facility	Secondary school	Nearest Facility	Senior secondary school	Nearest Facility	Degree college	Nearest Facility
Bhagodih	Y		Y		N	Ramna	N	Ramna	N	Garhwa
Korga				Silidaag-1	N	Ramna	N	Ramna	N	Garhwa
	Y		N							
Mandohar	Y		Y		N	Ramna	N	Ramna	N	Garhwa
Majhganwan	Y		N	Sildag	N	Ramna	N	Ramna	N	Garhwa
Chundi	Y		Y		N	Ramna	N	Ramna	N	Garhwa

Source: Village Directory, Census 2011 (Y – Yes; N – No)

Educational Infrastructure of Surveyed Village

All respondents informed that a Primary school is present within 1 to 1.5 km of the village. In case of higher educational infrastructures, 100 % of surveyed population informed that secondary school and college is not present within 1 to 1.5 km of the village.

5.12.3 *Economic Activity & Livelihood Pattern*

Occupational Pattern

The most important factor, which governs the occupational pattern of a local economy, is the availability of the total work force. The analysis of workers' profile reflects that 13.20% of total population of Garhwa District is total main workers, 29.96% are marginal workers and 56.80%are non -workers, who depend for their livelihood on the toils of the main workforce. The non-workers comprise of old, diseased, disabled and most of them are children of non-working age group besides housewives.

In case of Ramna block, 42.78% of the total population comprises the total worker population. Of the total working population, 25.89% are main workers whereas 31.71% comprises the marginal worker population. The employment pattern in this area suggests that 76.14% of local people are employed in agricultural sector whereas 23.86% workers are engaged in other sectors.

Occupational Pattern of the Study area Villages

Agriculture is the mainstay of the local economy of the study area. Agriculture laborers constitute significant portion among the different occupation followed by the people in study area. Classification of working population of the study area as well as of the study area as per Census 2011 data is presented in the ***Table 5.5***.

Table 5.5 Occupational pattern of villages in the study area

Village	WPR	Main Worker	Marginal Worker	Cultivator	Agricultural Labour	HH worker	Other
Bhagodih	49.29	29.93	70.07	26.77	68.17	0.46	4.59
Korga	51.85	6.18	93.82	2.42	92.61	0.61	4.36
Mandohar	28.77	31.73	68.27	3.37	59.13	0.00	37.50
Majhganwan	47.82	17.66	82.34	11.52	70.45	0.19	17.84
Chundi	47.02	7.83	92.17	14.27	83.58	0.54	1.61

Source: Census 2011 Data; Note: WPR – Work Participation Ratio

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 46.17% - which suggests the study area villages have relatively higher unemployment rate as most of people are involved in agriculture.

Other noticeable aspects as evident in the above table is that proportion of Agriculture Labour (AL) is relatively high in all 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 reveal that most of the people of local community has marginal to small landholding which is not sufficient for earning their livelihood.

(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

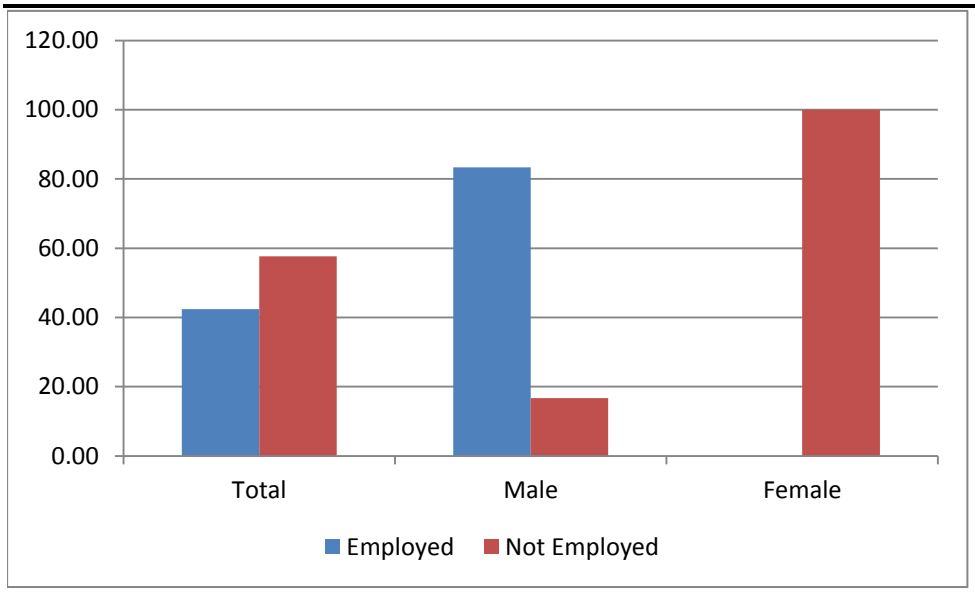
Economic Status of the Surveyed Population (Bhagodih village)

The survey conducted by the ERM team revealed that maximum (55 %) household is under below poverty level [(1)] and only 45 % household is above poverty level.

Employment Status of the Surveyed Population (Bhagodih village)

It can be seen from the primary survey data that 42.37 % of the surveyed population above the age of 20 are employed while 57.63 % population are not employed. The male employment rates among surveyed households were found to be 83.33 %. None of the female respondents were employed. Employment status of surveyed population is presented in ***Figure 5.8***.

Figure 5.8 Employment Status of the Surveyed Population



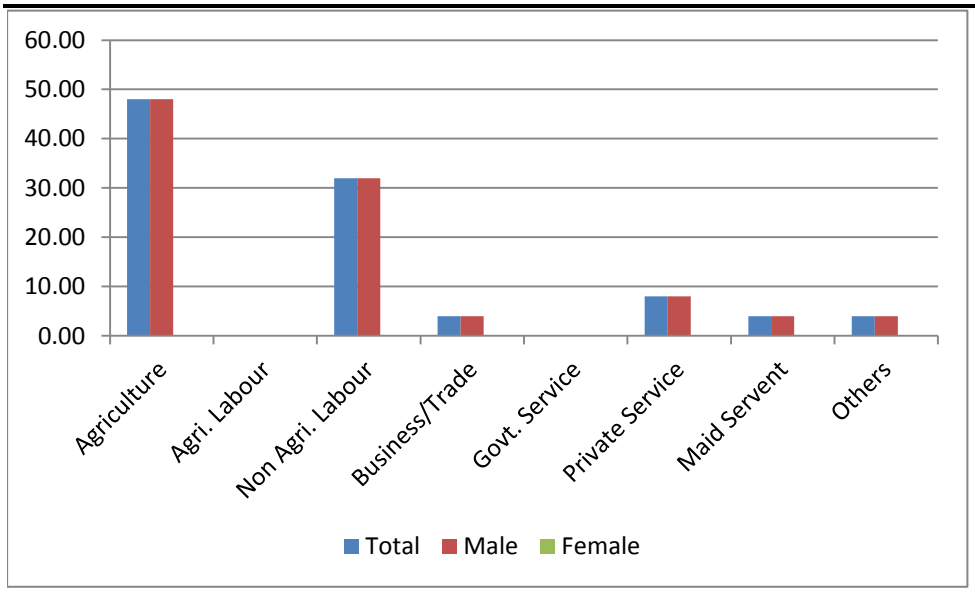
Source: ERM Socio Economic Survey

Occupational Pattern of the Surveyed Population (Bhagodih village)

Among the surveyed population majority (48 %) number of people is involved in agricultural activity in their own land. ***Figure 5.9*** represents the occupational pattern of the surveyed population.

(1) In 2011-12, the average Monthly Per Capita Expenditure (MPCE) of Jharkhand in urban and rural areas was INR 1894 and INR 920, respectively. – Report of Task Force on Poverty Elimination in Jharkhand, Rural Development Department, Govt. of Jharkhand (The monthly per capita consumption expenditure is treated as the poverty line at all India level as per the Tendolkar Commission Report.

Figure 5.9 Occupational Pattern of the Surveyed Population



Source: ERM Socio Economic Survey

Skill of the Surveyed Population

Survey data show that the residents of this village are not having significant indigenous skills.

5.12.4 *Drinking Water & Sanitation 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 study area villages;

As per community consultation very few household in the villages in the study area have access to individual sanitation facility and majority of the community reportedly resort to open defecation.

5.12.5 *Irrigation*

Community consultation reveals that irrigation facilities in study area do not exist and farmers were reported to be entirely dependent upon rain water for cultivation. Though use of water drawn from wells was reported, the same was confirmed to be rare.

5.13 HEALTH INFRASTRUCTURE

Health care infrastructure of the study region is captured in the table below in ***Table 5.6;*** which shows that health care infrastructure is very poor in the study areas. There are no hospitals, primary health centre (PHC) and health sub centre (SC) in the study area.

Table 5.6 Health care facilities in study area

Study villages	Hospitals	PHC	Sub-Centre
Bhagodih	N	N	N
Korga	N	N	N
Mandohar	N	N	N
Majhganwan	N	N	N
Chundi	N	N	N

Source: Village Directory, Census 2011, (Y – Yes; N – No)

Nearest hospital is located at Ramna, which caters to the health care requirement for most people of the study area.

Status of Govt. of Scheme Implementation in Bhagodih village

Implementation of Govt. Schemes is not in full force in the surveyed village. Free Rice Scheme, Old Age Pension and Widow Pension are few of the schemes that were found to be implemented. 14 households (70 %) responded that they receive benefit from Free Rice Scheme.

5.14 OTHERS PHYSICAL INFRASTRUCTURE

Road & Transportation

All the study area villages are connected with metalled road. For the local transportation, use of auto rickshaw is very common in the study area.

Electricity

Electricity is present in the villages of the study area.

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 substation project at Meral. 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 4***).

The identification of likely impacts during construction and operation phases has been carried out based on likely activities having their impact on environmental and socio-economic parameters. The details of the activities and their impacts have been worked out in the following sections.

6.1 POTENTIAL IMPACTS

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 Meral Substation

Project Activity/ Hazards	Environmental Resources											Ecological Resource					Social-Economic Resources							
	Aesthetic & Visual Impact	Land Use	Soil Quality	Air Quality	Noise & Vibration	Topography & Drainage	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	Economy & Livelihoods	Common Property Resources	Land Use (Economic Displacement)	Infrastructure & Services	Cultural Resources	Community Health & Safety	Occupational health & safety
Construction Phase																								
Land Procurement																								
Clearance (Vegetation & other structure)																								
Site Development (cutting & filling)																								
Construction of site access road																								
Transportation of construction materials, equipment & machineries																								
Storage & handling of construction materials																								
Construction of switch yard and Other building																								
Storage, handling and disposal of construction waste																								
Generation of sewage and discharge																								
Sourcing of construction water & domestic water																								
Generation of surface runoff from construction site																								
Operation Phase																								
Physical presence of substation																								
Maintenance of Substation & generation of transformer oil and e-waste																								
Sourcing of water for earthling pit & residential units																								

Project Activity/ Hazards	Environmental Resources											Ecological Resource					Social-Economic Resources							
	Aesthetic & Visual Impact	Land Use	Soil Quality	Air Quality	Noise & Vibration	Topography & Drainage	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	Economy & Livelihoods	Common Property Resources	Land Use (Economic Displacement)	Infrastructure & Services	Cultural Resources	Community Health & Safety	Occupational health & safety
Storm water runoff																								
Generation of MSW & Disposal																								
Generation of sewage & discharge																								

= 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

6.1.1 Potential Impact on Aesthetic and Visual

Potential impacts to aesthetics and visual quality because of the setting up and operation of the Meral GSS may arise because of two key factors – disruption and degradation of views in the surrounding landscape; and, use of nighttime lighting for construction and security purposes. Visual impacts of GSS projects along with associated transmission lines (in and outgoing) 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 setting up of the GSS in the identified plot of land may result from cutting of mature trees (14-15) and vegetation clearance, handling of construction and domestic wastes, and setting up of physical infrastructure (including some transmission towers which are to be constructed on the boundary of the site) associated with the GSS. After the GSS is commissioned, night-time security lighting would be operational and would lead to addition of strong artificial lights in what is at present is a predominantly rural area with no street or external lighting. 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 minor.

6.1.2 Impact on Ambient Air Quality

The GSS 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 village road passing adjacent to the site along its southern edge, through which regular vehicular movement occurs is the only line source of air pollution, caused by vehicular emissions and due to 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 *tola's* of Chundi 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.

The operational GSS site at Meral will not have any specific source contributing to air emissions. However, the site will house transformers, switches and associated cables which may contain insulating gases such as Fluorocarbons and Sulfur hexafluoride (SF_6). If accidentally released during maintenance work or equipment overhauling, they may release these gases which are categorized as greenhouse gases and having significantly higher global warming potential (GWP) than CO_2. The frequency of such non-routine incidents is predicted to be very few in the entire lifecycle of the operation of the GSS. 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 at the Meral GSS site 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 heavy construction equipment and machineries, DG sets and the transportation of equipment and materials. During operational phase, the transformers and switches to be installed within the GSS would also emit typical humming noise caused because of magnetostriction (involving the expansion and contraction of the iron core due to the magnetic effect of alternation current flowing through the transformer coils). Though the emitted noise may vary in characteristics depending on the rating of the transformer, typically the intensity and amplitude transformer emitted noise is about 120 Hz and 55 dB (A). As the transformers and other sound emitting equipment would be located well within the boundary of the site, any incremental contribution to the ambient noise quality at the boundary of the site would be negligible.

The study area has no major noise sources, except for vehicular noise on the adjacent village road. 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 at the small settlement (*tola*) of Chundi village adjacent to the site boundary. 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 12 months. 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 Potential Impact on Land Use, Soil and Drainage

The proposed substation will be constructed on 20.47 acres of land. The land use study reveals that the proposed land is on GM Malik land. During field visit few trees were observed at site. JUSNL will divert the GM Malik land for setting up of GSS. This land is fallow culturable wasteland and not used for cultivation. The duration of proposed land use change will be long term. There is no dependency of local people on the proposed site as revealed from discussions with local communities. The potential impact on land use is assessed to be positive as the fallow and cultivable land will be put to industrial purpose.

The preparation of land for the construction activities at site would involve vegetation clearance, soil stripping and considerable cutting, filling and levelling activities in order to make the site topography suitable for setting up of the GSS. As the site has lateritic soil which is loose in nature, changing of topography of the site can create potential for local slope failures. The removal of vegetation cover and top soil can increase the potential for soil erosion during a short period of time till the site is levelled and then stabilized with fill materials like gravel, sand and fly ash. If proper soil erosion and slope stability control measures are implemented, these impacts will be in the short term and unlikely to be severe in terms of scale and magnitude.

Disposal of solid waste and spills of lubricants, fuels and chemicals during land clearing, terrain sloping, levelling and construction activities creates the potential for soil and water contamination. The specific type of solid wastes likely to generated during the construction of the Meral GSS sites would include remains of cut trees and vegetation, defective or compromised building materials, waste concrete, wastes from on-site machineries and repair of machineries and equipment, packaging pallets and crates and wastes associated with onsite activities of workers (in relation to the number of workers present) like domestic solid wastes.

During the operational phase, hazardous wastes generated from the GSS would include small quantities of used oil, contaminated absorbent material, burned out bulbs or tube lights, used parts, scrap and debris. The transformer oil is expected to be changed every 15 years and the waste oil is planned to be reused through authorized recyclers. E-waste (electrical parts, panels, etc. which will need replacement) and used lead acid batteries would also be collected and disposed off or recycled through authorized agencies. In addition, as all hazardous waste will be stored in covered areas which have a lined floor and with appropriate physical barriers for containment of spills, it is very unlikely to contaminate soil or underlying groundwater at site. Overall, the impact on drainage and soils is expected to be **minor**.

6.1.4 Potential Impact on Water Resources

However, the water demand is expected to peak during civil works when the manpower requirement would also be at its peak (50 nos). It has also been reported by CGWB, 2013 that the groundwater is suitable for drinking purpose.

The ground water in this region is available at an average depth of 6-11mbgl (pre-monsoon). Even though the population in the vicinity is dependent on groundwater for domestic requirement the level of development of ground water is around 35.29%

Water resourcing requirements for a GSS project are minimal, as there is no process or activities that require a steady supply of water. In the operational phase, water would need to be sourced on the long term to meet the domestic needs of about 16 – 20 people and the daily requirement would be about 8.4 KLD. The water

requirement during the construction phase is expected to be more intense – an estimated amount of 10-12 KLD (including provision for domestic water supply to labourers of approx. 2 KLD) and about 3-4 KLD during the rest of the construction period. It is estimated that the civil works would be completed within 1 year and the construction phase would last 2 years.

With no nearby source or provision to provide piped or treated water from a surface water being present, the project would depend on extraction of ground water resources, using a bore well, to be dug at site. The bore well would be planned to extract water from the deeper aquifers which are at the level of 50 to 120 m. It has also been reported by CGWB, 2013 that the groundwater is suitable for drinking purpose. The ground water in this region is available at an average depth of 6-11mbgl (pre-monsoon). Even though the population in the vicinity is dependent on groundwater for domestic requirement the level of development of ground water is around 35.29% (expected yield of 15.6 m3/hr and with a drawdown of 30 m) should be sufficient to meet the water requirement of the Meral GSS during the short to medium term. The neighboring settlements source water using dug wells and tube wells and both of them utilize the shallow, near shallow aquifers; so, there is expected to be no conflicting demands on ground water resources. Considering the amount of water planned to be sourced, the limited spatial extent which would be impacted and the sensitivity of the resource, the significance of the project's impact on water resources can be considered to be **minor**.

6.1.5 Impact on Surface Water Bodies

The site is expected to generate surface water runoff, both during the construction and operational phases, when it rains and the water will be channelized through a storm /surface water drainage system through a point of discharge, to an existing natural drainage channel maintaining gravity flow, for further drainage into an adjacent stream or surface water body. Runoff from the GSS site, if allowed to flow off areas where wastes are stored (as has been identified in the previous sub-section) or from areas where contaminants like lubricants, fuels and chemicals have been spilled, have the potential to impact the receiving surface water body or stream. During operation, about 7 KLD of domestic waste water /sewage will be generated from the residential quarters and the toilets. The sewage would be treated through a septic tank system and any overflows along with the domestic waste water would be discharged through an outlet into the nearby surface water drainage, meeting prescribed standards for surface water effluents.

There is stream –Sukhra nala that flows beside the western and northern boundary of the site. If both during construction and operation, waste water and surface runoff from the GSS site flows into this stream, it has potential to pollute the waterbody. The likely impact is expected to be **moderate.**

6.1.6 Potential Impact on Biological Environment

Site preparation will involve removal of trees, shrubs and herbs present at site from the site which will cause change in the modified habitat within the site leading to a loss of vegetation at local level.

Faunal species that have high probability of occurrence within the site include amphibians (Common toad), reptiles (lizards and snakes), birds (Common crow, Common sparrow, Common myna, Drongo, Indian Roller, larks, Common Pigeon, doves, parakeets, kites etc.) and mammals (Indian Grey mongoose, squirrels, mouse, rats etc.). Removal of vegetation from the site can adverse on 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 from the site 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 site because of deposition of dust, noise and light generated during construction activities may affect feeding, breeding and movement of animals. 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 (viz. Doves, Pigeon, Roller, Mynas, Kites etc.) or make nests within the GSS area (viz. sparrows, pigeons, doves etc.) with a possibility for electrocution. The same could occur to small mammalian species like mongoose, macaques, langurs, nilgais may get electrocuted within the GSS area. However, the chances of birds and mammalian species getting electrocuted within the GSS site are rare; moreover the species having the potential to get electrocuted are common in the area and of low sensitivity. Overall the significance of impact on biological environment can be rated to be between **minor to moderate**.

6.1.7 Impact on Socio-economic environment

Proposed Meral GSS will be constructed on approximately 20.47 acres of land which belongs to the government and therefore would not require any land acquisition (through any involuntary mechanism / application of powers of eminent domain) or negotiations for purchase of land for setting up the project. In addition, no encroachments or encumbrances within the land parcel either in form of agricultural or residential uses was noted within the demarcated site and as a result no displacement or adverse impact on livelihoods (of people) are expected because of the uptake of land to build the GSS. There could be an issue of community conflict. A cart track used for accessing Bhagudih village from Chundi Village passes through proposed GSS land. The incorporation of the road within the site will be a source of inconvenience to the local villagers. A metalled track road encircling the Chundi village exists, that will serve as an alternative for the villagers.

However, several nominally positive socio-economic impacts can result from the project. There is scope for generation of indirect employment opportunities generated during the site preparation and construction phases of the project. It is anticipated that about 50 workers would be employed during the construction phase and it is expected that part of these workers, especially need for unskilled workers,that also includes unskilled workers. The demand for the unskilled workers may be met from local villages. There would also be a scope for some small contracts to be provided to local contractors for supply of construction materials, vehicles, tractors, etc. In addition, the presence of workers, contractors, engineers during the construction period is expected to stimulate a demand for other economic activities (shops, restaurants, etc.) and thus giving a boost to increased purchase from local businesses. It should be noted that these opportunities would be in the short-term, as the operational phase of the project would involve the deployment of a small number (about 8 – 10) of technical skilled workmen (mostly engineers). Both the beneficial and adverse socio-economic impacts can be rated to be minor in terms of significance.

6.1.8 Influx of Labour

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. Even though unskilled labour force can be sourced locally, for skilled labour required for the project would be primarily migrant labour.

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 some 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 may put some pressure on the local resources such as roads, fuel wood, water etc. 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;
- 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; and
- 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 may primarily extend to the settlements in the immediate vicinity, therefore localize in nature. From the context of project site setting, it would be noted that, no vulnerable community like women headed family, scheduled tribes etc. was recorded from community consultation and from socioeconomic survey.

The socioeconomic survey in Bhagodih village, indicates that there is approximately 57.63 % population unemployed and 32% work as daily wage labour (agriculture and nonagricultural). The finding indicates that there is a pool of labour-resource who can be engaged in the project as unskilled labour. The project would source unskilled workers from surrounding villages (e.g., Bhagodih, Korga, Chundi etc.). Also a planned labour camp for skilled workers within the GSS site may further reduce the assessed potential impacts related to labour influx. Therefore, impact from labour influx is evaluated to be of minor significance.

6.1.9 Community Health and Safety

Experience shows that because of its nature and scale, project like GSS's can be expected to have a limited interface with the local community and as a result will have minimal impact on the safety and health of local communities. During the construction stage of the project, there will be an influx of workmen and labours, with some of them being from different socio-cultural settings as compared to the villages around site. In the case that hygienic conditions are not maintained at the construction site, there may be a vector borne and other ailments in the immediate vicinity. Unless proper sensitisation of neighbouring communities is undertaken and appropriate safeguards are adopted, there is a possibility for increase in sexually transmitted diseases, though the possibility appears quite remote.

The site clearing activities and construction activities (involving fill materials, brick and concreting work) would result in emissions of dust and noise, discharge of sanitary waste water and potential littering from labour quarters for around 12 months and has a potential to contribute to additional nuisance levels for the community and households located immediately adjacent to site. However, with very few people living close to the site and the main habitation (*tola's*) of Chundi village being located at a distance of 300 m, no significant health related impacts are expected to the communities in the area. The increase in vehicular movements as a

result of plying of construction vehicles on the adjoining road and the site access road would add to the risk of accidents in which local villagers may be involved. In addition, the GSS project would have incoming and outgoing transmission lines (132KV), house transformers and associated equipment which has the potential to create electro-magnetic fields (EMF). Although there is a public concern over the potential health effects associated with the exposure to EMF, empirical data is insufficient to demonstrate adverse health impacts from typical EMF levels originating from high voltage power lines and substation equipment. 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**.

6.1.10 Occupational, Health and Safety

During the construction phase of the project, about 50 workers would be involved in construction related activities, some of which are inherently unsafe, unless adequate precautions and safeguards are adopted by the workers and construction site contractors. Safety issues related to construction of the GSS at Meral may involve physical hazards like working at height, exposure to heat, particulate matter, noise and vibration, collision with vehicles/moving equipment; exposure to electrical hazards; exposure to chemicals hazards (both inhalation and physical contact) like organic solvent vapours, reactive and toxic chemicals (acids's, bases, insecticides, etc.). Such occupation hazards would vary with the nature of work undertaken by the workmen, as they may employed by different contractors responsible for doing a particular component of the work.

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

7.1 INTRODUCTION

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.

7.2 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

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 Substation site to assess the extent of impact on the common people.

Figure 7.1 Consultations with Local Communities

Consultation at GSS site (Bhagodih)

The brief outcome of the consultations with the key stakeholder groups are listed below.

7.3 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 table below:

Table 7.2 Summary of Stakeholder Consultation

S. No.	Stakeholder Category	Key Points Discussed	Outcomes in brief
1.1	Local Community (Location – Chundi Village, Date – 30/11/2017; Number of Participants – 5)	• Current engagement scenario – livelihood options; • 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;	• The land proposed for the GSS was reported to be fallow land and not used by the local villagers; • During site visit it was observed that preparation of land for constructing 220 kVA GSS was ongoing. On enquiring with the villagers it was learnt that since the GSS was located at Government land they had no opinion be it objection or agreement on whether the GSS should be allowed to be built in the proposed location; • There is no water supply to the village; • Ground water is the main source of drinking water fetched through hand pump and dug well; • Bore well going up to a depth of 300 feet is used for drinking water. The water quality was reported to be good and available around the year; • Auto is used for public transportation from Meral; • During consultation it was learnt that the villagers were concerned about the cart road connecting Chundi village with Bhagodih village that would be acquired for the construction of the GSS; • Electricity is present but there are frequent power cuts., so the people were hoping that the establishment of the GSS might reduce the power cut in their village; • People are very interested to get job opportunity during construction;
1.2	Local Community (Location- Bhagodih Village; Date- 30/11/2017; Number of participants - 4 people)	• Current engagement scenario – livelihood options; • Basic amenities in the village – electricity, drinking water, etc.; • Health scenario in the village and distances of Hospitals/ Clinics;	• Most of the people consulted are dependent on agriculture to earn their livelihood. • Majority of the agriculture land is mono cropped and entirely dependent on monsoon. • Major crop of this area is paddy. • People are mainly involved in agricultural activity. But agricultural can be done only during monsoon season. Irrigation from dug well is practiced by few individuals. • People are also involved in other activity like non agri labour, • People are very interested to get some

S. No.	Stakeholder Category	Key Points Discussed	Outcomes in brief
		• Perception of local community towards the project;	earing opportunity during construction and operation phase of substation. • Majority of the people are go to the other district and neighbouring Chhatisgarh state to earn their livelihood both for permanent and temporary basis. • Electricity supply is present in the village but power cut is also very frequent.

8 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 MITIGATION MEASURES & MANAGEMENT PLAN

This document provides the Environmental and 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 ESMP is used to ensure compliance with statutory requirements and World Bank safeguards policies.

The environmental and 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 and Special Conditions of Contract has been developed. The General and Special Conditions of Contract are presented in ***Annexure 2*** and ***Annexure 3*** respectively.

Table 8.1 Environment and Social Management Plan

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
	Planning/Preconstruction			
1	Felling of trees on the land	Permission under the tree felling act	Permission for felling of trees to be obtained before tree felling	JUSNL Circle/Divisional Office/External Consultant
2	Substation location and design	Access restriction on use of common property	Substation layout to ensure that a linear stretch of land is left at the periphery to replace the existing cart track that will become part of the project land.	Design Consultant/ Contractor
3	Design of residential quarter and office at substation	Water/soil pollution	Septic Tank with soak pit to be designed as per IS: 2470 (Part-1) - 1985 (Code of Practice for Installation of Septic Tank).	Design Consultant/ Contractor
	Construction			
4.1	Site preparation and construction work	Loss of topsoil	• Top soil from the construction site will be stripped 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; • Top soil will be used for landscaping within the GSS 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

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
4.3.2			Vehicles transporting loose construction/excavated materials shall be covered with tarpaulin sheets.	Contractor
4.3.3			Loose construction material/ excavated material shall be stored against any structure or would be kept covered with tarpaulin sheet at the construction site.	Contractor
4.3.4			All vehicles utilized in transportation of raw materials and personnel, will have valid Pollution under Control Certificate (PUCC)	Contractor
4.3.5			Regular maintenance of machines, equipment and vehicles that will be used for construction activities of substation/tower construction	Contractor
4.4		Water/Soil Pollution	Septic tanks and soak pits/modular bio-toilets would be provided at all construction site and labour camp	Contractor
4.5.1		Erosion and sediment	Cut and fill slopes would be protected using standard engineering practices including bio-engineering techniques (**Annexure 5** of the ESMF) wherever feasible.	Contractor
4.5.2			• A peripheral site drainage channel would be constructed at the beginning of the construction work. The peripheral site drainage channel would be provided with a sedimentation tank to prevent sediments to be carried away by the runoff. • Storm water drainage should not be discharged to into any agricultural field.	Contractor
4.6		Depletion of water resource	Consumption of water would be reduced to the extent possible through the application of water conservation measures and through reuse/recycling of water, wherever possible.	Contractor
4.7		Alteration /diversion of natural drainage channel	Existing micro drainage channel passing through the GSS site would be redirected along the boundary of the GSS site to prevent any waterlogging within premises.	Contractor

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
5.1	Community Health and Safety	Injury and sickness of local people	• Coordination with local communities for construction schedules; • access restriction for local people at the construction site. • 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
5.2		Local Woman 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 without prior information to the villagers. • Local resource like handpump, bathing ghat should not be used by the labours.	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 (in case of hard rock formation)	Noise and Vibration	Adopt appropriate engineering safeguards to meet the regulatory standard [DGMS Prescribed Permissible Limit of Ground Vibration (refer Annex 6)] for blasting operation.	Contractor
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

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
7.3		Occupational health and safety	• 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	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** 7for detail guideline. Hiring of local unskilled labours during the construction period will further reduce the burden of any potential impact related to labour influx.	Contractor
	Operation and Maintenance			

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
9	Drainage of storm water	Water/Soil Pollution	• All internal drainage channels from the substation 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. • Storm water drainage should not be discharged to into any agricultural field.	Contractor
10.1.1	Handling and disposal of waste	Water/Soil Pollution	The municipal solid waste would be composted in composting pits	JUSNL Subdivision Office
10.1.2			• Authorization for hazardous waste generation (used transformer oil) should be obtained from the Jharkhand State Pollution Control Board (1); • Hazardous waste need to be disposed through CPCB/PCB authorised recyclers; • Annual return [Form 4 Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016] to be submitted to JSPCB.	JUSNL Subdivision Office
11	Storage and handling of SF6	Emission of most potent GHG causing climate change	Procedure would be put in place for storage, handling and refilling of SF6 gas cylinders. Every refill would be documented and any unusual variation in gas volume would be reported to JPSIP for review and rectification. Each and every leakage will be promptly detected, addressed and documented and reported to the JUSNL Management.	JUSNL Subdivision Office

(1) As per recommendation made by the Jharkhand Pollution Control Board

Sl. No.	Project Phase /Activity	Potential Impacts	Proposed Mitigation Measures	Responsibility
12.1.1	Occupational health and safety of staff	Injury/ mortality to staff during O&M work	During the testing and charging of electrical lines and substation, 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
12.1.2			Induction training to all the new employee and six monthly refresher training for substation O&M staff would be organised.	JUSNL Subdivision Office
12.2		Injury/ mortality from emergency situation	Preparation of fire emergency action plan and training given to staff on implementing emergency action plan	JUSNL Subdivision Office
13	Community health and safety	Injury/ mortality to public	Integrity of compound wall would be maintained all time	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 alongside the mitigation measures proposed in ***Table 8.2*** . The monitoring of the EMP provisions would be carried out by the respective agencies at a frequency mentioned in the Environmental Management Plan.

For ensuring effective implementation and evaluation of the performance of the environmental mitigation measure a reporting mechanism has been drawn up and presented in ***Section 5.3*** of the Environmental and Social Management Framework. The reporting format for noting down the implementation of the ESMP for this project is presented ***Annexure 4.***

Table 8.2 Environment Monitoring Plan

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
	Planning/Preconstruction				
1	Felling of trees on the land	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
3	Substation location and design	Access restriction on use of common property	Design consideration to avoid restriction on use of common property	Once- during the detailed design	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
	Design of residential quarter and office at substation	Water/soil pollution	Provisioning of septic tank with soak pit in substation design	Once- during the detailed design	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
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	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	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.2.2			Presence of acoustic enclosure in DG set	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.2.3			How many night time approval was taken	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.3.1		Air Pollution	Water sprinkling at dust generating area	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.3.2			Tarpaulin cover on vehicle carrying loose construction/excavated materials	Every week	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.3.3			Tarpaulin cover on loose construction/ excavated materials	Every week	JUSNL Subdivision/Division/Circle

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
					Office/ JPSIP PIU
4.3.4			Number of vehicle not having valid PUCC certificate	Every Month	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	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.4		Water/Soil Pollution	Availability of Septic tanks and soak pits/modular bio-toilets	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.5.1		Erosion and sediment	Measures adopted to prevent erosion	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.5.2			Availability of peripheral site drainage channel, sedimentation tank	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.6		Depletion of water resource	Water conservation measures adopted at construction and labour camp	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
4.7		Alteration /diversion of natural drainage channel	Diversion of natural drainage channel passing through the GSS Site	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5.1	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	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
5.2		Local Woman Community	Physical observation of the labour camp before commencement of construction and during construction period.	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU

Sl. No.	Project Phase /Activity	Potential Impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
6	Occupational health and safety	Injury and sickness of workers	Awareness of workers, use of PPE by workers	Every 15 days	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
7.1	Blasting (in case of hard rock formation)	Noise and Vibration	Measures adopted to control noise and vibration at blasting site	Every 15 days	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
7.2		Damage to Structure	Record of any damaged and repaired structure	Every one month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
7.3		Occupational health and safety	Measures adopted to control fly rock, safety measures adopted for transport and storage of explosives, use of protective equipment, measures adopted for access restriction at blasting site	Weekly during blasting work	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
8	Health, Hygiene, Safety and Security of Workers in Labour Camp **Operation and Maintenance**	Labour camp related EHS and Hygiene Issues	Condition of labour camp, awareness of workers, complainant register	Every 15 days	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
9	Drainage of storm water	Water/Soil Pollution	Availability of internal and peripheral site drainage channel, sedimentation tank and oil-water separator at outfall of peripheral site drainage channel	Every Month	JUSNL Subdivision/Division/Circle Office/ JPSIP PIU
10.1.1	Handling and disposal of waste	Water/Soil Pollution	Municipal disposal arrangement for GSS, Availability of composting pit		JUSNL Division/Circle/ JPSIP PIU
10.1.2			Availability of authorization letter, Annual return (Form 4)	Annually	JUSNL Division/Circle/ JPSIP PIU
11	Storage and handling of SF6	Emission of most potent GHG causing climate change	Leakage and gas density/level	Monthly	JUSNL Division/Circle/ JPSIP PIU
12.1.1	Occupational health and safety of staff	Injury/ mortality to staff during O&M work	Accident-Incident register	Monthly	JUSNL Division/Circle/ Head Office

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

8.3 INSTITUTIONAL SETTING AND IMPLEMENTATION ARRANGEMENTS

The responsibility of implementing each of the provisions of the ESMP has also been indicated against the respective provisions. The institutional responsibilities as mentioned in the Section 5.1 of the Environmental and Social Management Framework would be primarily followed in case of execution of the project. 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 are being implemented by the Contractor. 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.

8.4 GRIEVANCE MECHANISM

A three tier Grievance Mechanism as suggested in the Section 4.2.3 of the Environmental and Social Management Framework would be used for handling any grievances of community related to the project.

8.5 COMMUNICATION PLAN

Through the process of consultation and disclosures, JPSIP would ensure that the project information is 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 ***Table 8.3***.

Table 8.3 Summary of Consultation Framework

Project Phase	Activity	Details	Responsible Agency	Target Stakeholders
Planning	Securing of Land for substation Site	Identification of sensitivities around the site and common property which might get affected	Contractor along with the JUSNL Circle/Divisional	Community People especially the land owners adjacent to the site, Revenue Officer , Village Panchayat
Construction	Commencement of Construction	Communicate about the activity and period of activity.	Contractor along with the JUSNL Circle/Divisional	Community People especially the land owners adjacent to the site, Village Panchayat
Operation	Commencement of operation	Communicate about the date of start of operation	JUSNL Circle/Divisional	Community People especially the located

Project Phase	Activity	Details	Responsible Agency	Target Stakeholders
		and charging of transmission line		adjacent to the site and transmission line, Village Panchayat

8.6 *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 Ranchi Division and all the Executive Engineers and Assistant Engineers in the Ranchi 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 Ranchi Zone and all the Superintending Engineers of the Ranchi Zone would be the members of Tier 2 level. They would hear the aggrieved and also review the proceedings of the Ranchi 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 Ranchi 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 5***) 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 development of the substation may create some impacts on air quality, community health and safety during the construction phase. However, most of these impacts are temporary in nature and can be mitigated with proper mitigation measures. Overall, the development of the 132/33 KV Meral 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 recommended mitigation measures suggested would result in reduction of adverse impacts on air quality, ground water etc. though there would be a few permanent residual impacts like change of land use. On the positive side, the project is going to lead to betterment of economic conditions in terms of increase of local employment and business opportunities.

To conclude, the adoption and implementation of ESMP will lead to a reduction of environmental and social impacts triggered by this project, result in compliance to national/state regulatory framework as well as meet World Bank's requirements with regard to environmental and social performance.

Annexure 1

List of Sub Projects in JPSIP

PHASE-I (10)

Sl. No	Name of GSS / Transmission Line	Capacity	Length of TL
Scheme – D			
1	132/33 Kv GSS Irba (2x50 MVA)	100 MVA	
2	132 KV D/C 3 ph Irba- Kanke Transmission Line		23.598 km
3	132 kV D/C 3 Ph. Irba - Ratu Transmission line		42.678 km
Scheme – E			
1	132/33 kV GSS at Shikaripara (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Dumka - Shikaripara Transmission line		51.30 km
Scheme – H			
1	132/33 kV GSS at Silli (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Silli - Chouka Transmission line		52.185 km
Scheme – O			
1	132/33 kV GSS at Mahuadanr (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Latehar– Mahuadanr Transmission line		86.72 km
Scheme – P			
1	132/33 kV GSS at Angada (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Silli – Angada Transmission line		39.048 km
3	132 kV D/C 3 Ph. Angada – Irba Transmission line		34.529 km
Scheme – S			
1	132/33 kV GSS at Jarmundi (2x50 MVA)	100	
2	LILO of 132 kV D/C 3 Ph. Dumka–Deoghar Transmission line at GSS Jarmundi		3.69 km
Scheme – X			
1	132/33 kV GSS at Chakuliya (2x50 MVA)	100	
2	LILO of both 132kV Bahragora - Dhalbhumgarh Transmission line at GSS Chakuliya		21.64 km
Scheme – Q			
1	132/33 kV GSS at Hansdiha (2x50 MVA)	100	
2	LILO of 132 kV Lalmatia - Dumka Transmission line at GSS Hansdiha		3.36 km
3	132 kV D/C Hansdiha - Jasidih Transmission line		43 km
Scheme – T			
1	132/33 kV GSS at Amarapara (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Amarapara – Godda Transmission line		67.45 km
3	132 kV D/C 3 Ph. Amarapara - Pakur Trans. line		24.75 km

PHASE-II (7)

Sl. No	Name of GSS / Transmission Line	Capacity	Length of TL
Scheme-A			
1	132/33 kV GSS at Chainpur (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Chainpur - Mahuandanr Tran. line		53.63 km
3	LILO of 132 kV Gumla - Simdega Transmission line at GSS Chainpur		10 km
Scheme - G			
1	132/33 KV GSS Sundarnagar (2x50 MVA)	100	
2	LILO of 132 kV Ramchandrapur - Jadugoda Old Transmission line at GSS Sundarnagar		17.50 km
Scheme - K			
1	132/33 kV GSS at Ramkanda (2 x 50 MVA)	100	
2	32 kV D/C 3 Ph. Ramkanda - Garhwa (220KV GSS) Transmission line		60 km
Scheme - N			
1	132/33 kV GSS at Chhatarpur (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Chhatarpur - Daltonganj (220 kV GSS) Transmission line		41.53 km
3	132 kV D/C 3 Ph. Chhatarpur - Japla Transmission line		29.09 km
Scheme - W			
1	132/33 kV GSS at Kolebira (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Kolebira–Kamdara Transmission line		38.63 km
3	132 kV D/C 3 Ph. Kolebira – Simdega Transmission line		16.44 km
Scheme – AA			
1	132/33 kV GSS at Chouka(2x50 MVA)	100	
2	132 kV D/C 3 Ph. Chouka - Tamar Transmission line		27.60 km
Scheme – R			
1	LILO of one Ckt of 132 KV D/C 3 ph Chaibasa-Manoharpur Transmission Line at132/33 KV GS/S at Goelkera including with 2 nos. of 132 kV bay		14 km

PHASE-III (10)

Sl. No	Name of GSS / Transmission Line	Capacity	Length of TL
Scheme – F			
1	132/33 kV GSS at Meral (2 x 50 MVA)	100	
Scheme – I			
1	132/33 kV GSS at Panki (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Chhatarpur - Panki Transmission line		50 km
Scheme – J			
1	132/33 kV GSS at Nagar Untari (2 x 50 MVA)	100	
2	132 kV D/C 3 Ph. Nagar Untari - Garhwa Trans. line		15.85 km
Scheme – V			
1	132/33 kV GSS at Kandra (2x50 MVA)	100	
2	LILO of 132 kV D/C 3 Ph. Chandil – Rajkharsawan Transmission line at Kandra		10 km
Scheme – Y			
1	132/33 kV GSS at Kurdeg (2x50 MVA)	100	
2	132 kV D/C 3 Ph. Kurdeg – 220/132 kV Simdega GSS Transmission line		45 km
Scheme – Z			
1	132 kV GSS at Chandwa (2x50 MVA)	100	
2	132 kV D/C Chandwa – Latehar Transmission Line		30 km
Additional Scheme-1			
1	132/33kV GSS at Sarath (2 x 50 MVA)	100	
2	132k DC Sarath - Palojori TL		20.10 km
4	132k DC Sarath - Chitra TL		15.14 km
Additional Scheme-2			
1	132/33kV GSS at Surda (2 x 50 MVA)	100	
2	132 kV D/C Surda - Jadugoda Transmission line		20.81 km
3	132 kV D/C Surda – Musabani (DVC) Transmission line		4.6 km
4	132 kV D/C Surda - Bharagora Transmission line		43.04 km
Additional Scheme-3			
1	132/33kV GSS at Naudiha (Palamu) (2 50 MVA)	100	
3	132k DC Naudiha - Chhatarpur TL		18.49 km
Additional Scheme-4			
1	132/33kV GSS at Narayanpur (Devipur) (2 x 50 MVA)	100	
2	LILO of 132kV DC Jamtara - Madhupur TL at Narayanpur (Devipur)		27 km

Annexure 2

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 form 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 form 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 form 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
v) Wildlife Protection Act, 1972

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 3

Special Conditions of Contract for Meral Substation

SCC 1.1	The Contractor shall ensure that adequate erosion and sediment control measures are undertaken during the construction of the substation. In addition to the standard engineering techniques bio-engineering techniques as stated in the Annexure 10 of the ESMF would be adopted for slope stabilization.
SCC1.2	The Contractor shall ensure that the cut and fill slopes would be protected using standard engineering practices including bio-engineering techniques as stated in the Annexure 10 of the ESMF as appropriate.
SCC1.3	The Contractor should ensure that the Labour staying at site is provided with water conforming to IS: 10500. In case ground water is being provided with water from tube wells /bore wells the contractor should install adequate filtration systems to remove the fluoride.

Annexure 4

Format for Reporting of ESMP Implementation

JHARKHAND POWER SYSTEMS IMPROVEMENT PROJECT

ENVIRONMENTAL MANAGEMENT PLAN
MONTHLY IMPLEMENTATION STATUS REPORT

Name of the Substation_____ Period/Month _____

EMP Reference	Activities	Observation/ Status till end of last Observation/ Period	Status till end of this Period
8.	Site Preparation		
8ai	Has the pre-construction equipment checks been carried out (use additional sheets to provide the monitored Leq values)		
8aii	Is regular equipment maintenance being carried out? (Use additional sheets to provide maintenance log)		
8aiv	Has monthly noise monitoring been carried out for DG sets		
8av	Has any permission been provided by Chief Engineer for night time work?		
8bi	Has quarterly air quality monitoring been carried out during the earthwork?		
8biii	Is PUCC certificate log book being maintained on regular basis?		
8biv	Instrument, machine, vehicle maintenance log book should be maintained on regular basis		
10ci	Has the Cut and fill slopes been protected with using standard engineering practices?		
10.ci	Has peripheral site drainage channel and provision of oil-water separator been made for the site?		
10di	Has septic tanks and soak pits/modular bio-toilets would be provided at construction camp?		
10ei	Are best practices been adopted for ground water usage?		
10g	Has the safety practices been undertaken during the construction? Please explain in details whether barricading, reflective tapes has been undertaken?		
10g	What steps has been taken for coordination with local communities?		
10h	What initiatives have been taken to prevent obstruction to traffic?		
11	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?		

EMP Reference	Activities	Observation/ Status till end of last Observation/ Period	Status till end of this Period
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 5

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	
Address	
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: 1. Letter 2. Verbal/Telephonic
Reviewed by (Name /Position of Official reviewing Grievance)
Action Taken
Whether Action Taken has been communicated to the Complainant: Yes/No

Annexure 6

DGMS Prescribed Permissible Limit of Ground Vibration

DGMS Prescribed Permissible Limit of Ground Vibration

Type of Structure	**Dominant Excitation Frequency, HZ**		
	<8 HZ	8-25 HZ	>25 HZ
(A) Building/ Structure not belong to the owner			
1. Domestic house/structures (Kutchcha, Brickes & Cement)	5	10	15
2. Industrial Building	10	20	25
3. Objects of historical & Sensitive Structures	2	5	10
(B) Buildings belongs to the owner with limited span of life			
1. Domestic houses/structures	10	15	20
2. Industrial buildings	15	25	50

Annexure 7

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 be around 50 workers (including the unskilled labourers) for construction of substation. Since the skilled workers will be employed from outside the region and there may be also possibility of bringing in unskilled labourers from outside the region (in case of unavailability of unskilled labour from the local area), it 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 percent 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 8

Socio-Economic Survey format

Socio Economic Survey Form for Proposed Grid Sub Station Site of JPSIP

Form No		Village Name	
Domicile No		Name of the Surveyor	
Name of the Informant		Signature	
Relationship with HOH		Date	

A1. What Caste Do You Belong				**A2.** What is Your Religious Group				**A3**.Do You Have BPL Ration Card	
General	SC	ST	OBC	Hindu	Muslim	Christian	Sikhs	Yes	No
①	②	③	④	①	②	③	④	①	②

Member Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
B1.1 Name	HOH												Write down the names of all person who live and eat together in this household (sharing same kitchen) starting with head
B1.2 Relationship													
B1.3 Sex	**Is the NAME male or female?**												
	M	M	M	M	M	M	M	M	M	M	M	M	
	F	F	F	F	F	F	F	F	F	F	F	F	
B1.4 Age	**How old was NAME on the last birthday?**												
B1.5 Education	**The class till which the person has been educated.**												
	①	①	①	①	①	①	①	①	①	①	①	①	Illiterate
	②	②	②	②	②	②	②	②	②	②	②	②	Primary (class 3)
	③	③	③	③	③	③	③	③	③	③	③	③	Secondary (Class 10)
	④	④	④	④	④	④	④	④	④	④	④	④	Higher (graduate)
	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	Technical
	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	Vocational
B1.6	**Is the NAME working?**												
	①	①	①	①	①	①	①	①	①	①	①	①	Yes
	②	②	②	②	②	②	②	②	②	②	②	②	No
B1.7 Occupation	A. **The main activity at the place of job?**												This may have multiple entries
	①	①	①	①	①	①	①	①	①	①	①	①	Agriculture
	②	②	②	②	②	②	②	②	②	②	②	②	Agri Labour
	③	③	③	③	③	③	③	③	③	③	③	③	Non Agri Labour
	④	④	④	④	④	④	④	④	④	④	④	④	Business/Trade
	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	Govt. Service
	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	Private Service

	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	Maid Servant
	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	Others
B1.8	**What was the main reason for the NAME not working?**												To be filled for persons who are not working.
	①	①	①	①	①	①	①	①	①	①	①	①	No work available
	②	②	②	②	②	②	②	②	②	②	②	②	Seasonal inactivity
	③	③	③	③	③	③	③	③	③	③	③	③	Household family duties
	④	④	④	④	④	④	④	④	④	④	④	④	Old/young
	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	Handicapped
	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	Others
B1.9 Income	**How much does the NAME earn in a month?**												
	①	①	①	①	①	①	①	①	①	①	①	①	Rs. 0-Rs. 2000
	②	②	②	②	②	②	②	②	②	②	②	②	Rs. 2000-Rs. 5000
	③	③	③	③	③	③	③	③	③	③	③	③	Rs. 5000 and 10,000
	④	④	④	④	④	④	④	④	④	④	④	④	10,0000+
C1.1 Skills	**What is the skill possessed by the person?**												
													e.g.: traditional artisans, carpentry, mason, weaving, garage mechanic, nursery, others (please mention)
D1.1 Which of the following are availed by the family	**General Scheme** 1. Old age Pension Scheme 2. Widow Pensison Scheme 3. Pradhanmantri Awas Yojana 4. Chief Minister Health insurance scheme 5. Udyami Sakhi Mandal Yojana (To empower rural women) 6. ARYA scheme (To attract rural youth in agriculture in Jharkhand) 7. Vimrao Ambedkar Awas Yojana for widow in Jharkhand **Scheme for Tribal people** 1. PTG Dakiya Yojana (Free rice scheme for primitive tribal group) 2. Eklavya Model Residential Schools for Tribal Student 3. Development and Marketing of Tribal Products 4. Scheme for Minimum Support Price for Minor Forest Produce 5. Educational Fellowship and Scholarship for Higher Education of ST Students. 2017-2018" 6. National Overseas Scholarship for ST candidates 7. Pre and Post Matric Scholarship 8. Establishment of Ashram Schools in Tribal Sub-Plan Areas 9. Centrally Sponsored Scheme of Hostels for ST boys and ST Girls **Others (Please Specify)** …… ……												
E1.1	A. What is the drinking water source for the family?												

Amenities	Piped Water □	Tube Well □	Well □	Pond □	Any other, specify……
	B. What is the source of water for domestic use?				
	Piped Water □	Tube Well □	Well □	Pond □	Any other, specify……
	C. Is the water source used by you or other families also	Only by the HH □			Shared by other families □
	D. Availability of Household Electricity			Yes □	No □
	E. Are there Primary Schools nearby (within 1 – 1.5 km)			Yes □	No □
	F. Are there Secondary Schools nearby				
	G. Are there Colleges nearby				
	H. Are there Hospitals nearby	Private Hospital □		Govt. Hospital □	None □

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 **Minor**			

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 Air and 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, Soil & Drainage

Impact	Impact on Land use, Soil & Drainage		
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 Surface Water Bodies

Impact	Impact on Surface Water Bodies			
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 Water Resources

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**			

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 **Minor to 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 **Moderate**			



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