NEPAL ELECTRICITY AUTHORITY

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

OF

SUPPLY AND INSTALLATION OF NEW 33/11kV SUBSTATIONS

(Combined ESMP Final Report)

Submitted To:

Grid Solar and Energy Efficiency Project
Nepal Electricity Authority
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ABBREVIATIONS AND ACRONYMS

CF	Community Forest
CFUG	Community Forest User Groups
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FY	Fiscal Year
GIS	Geographic Imaging System
GoN	Government of Nepal
GRC	Grievance Redress Committees
GSEEP	Grid Solar and Energy Efficiency Project
ha	Hectare
HHs	Households
km	kilometer
kV	Kilo Volt
m	meter
MC	Metropolitan City
M/RM	Municipality/ Rural Municipality
MOWRI	Ministry of Water Resources and Irrigation
MVA	Mega Volt Ampere
NEA	Nepal Electricity Authority
no.	Number
PA	Protected Areas
PAF	Project Affected Families
PAW	Project Affected Wards
RAP	Resettlement Action Plan
SEA/SH	Sexual Exploitation and Abuse/ Sexual Harassment
SS	Substation
TL	Transmission Line
VCDP	Value Chain Development Programme
WB	World Bank

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Execituve Summary

Introduction

NEA- Grid solar and energy efficiency project (GSEEP) project funded by World Bank have proposed the construction of 13 new Substation Project in different district of Nepal, to support the Nepal power supply network, increase the system efficiency, reduce the system loss and provide ease access of electricity to the community.Since Grid Solar and Energy Efficiency Project proposed the implementation of 33/11kV Substation in Chitwan, Nuwakot, Makwanpur, Lalitpur, Kavrepalanchowk, Dhading, Sindhuli, Sindhupalchowk, Ramechhap and Dolakha districts by utilizing the World Bank fund, in this regard an environmental and social management plan is required by the World Bank for implementing the project.

Objective

The objective of the study is to provide the baseline information of the project site, identify and predict the beneficial and adverse impacts caused by the project and propose the mitigation and enhancement programs.

Study method

Literature review, public consultation with the community, local people, Project affected families (PAFs), household survey, group discussion with CFUG's, project-affected ward (PAWs) representative interview, walk through survey, geographic information system analysis were some important tools used for data collection.

Project Description

The sub-project sites lies in Chitwan, Nuwakot, Makwanpur, Lalitpur, Kavrepalanchowk, Dhading, Sindhuli, Sindhupalchowk, Ramechhap and Dolakhadistrict. The affected municipalities are Bharatpur M.C., Manhari R.M., Thaha M. Bagmati R.M., Kakani R.M., Mahankal R.M., Roshi R.M., Mahabharat R.M., Khaniyabas R.M., Dudhauli M., Baiteshwor R.M., Ramechhap M. and Lisankhu Pakhar R.M..

Existing Environmental and Social Setting

Physical environment

Devnagar substation, Manahari Substaion, Raigaun Substation, Palung Substation lies in flat terrain, Dudhauli substation lies in the fragile topography of Churia region. Katunje Substation, Jharlang Substation, Mahabharat Substation, Kakani Substation, Unichour Substation, Mude Substation, Sanghutar Substation, and Namdu Substation lies in mid-hill topography of Nepal.

Biological environment

Vegetation and forest resources, mammals and birds, and rare and protected species of flora and fauna found in the subproject area are studied in a biological environment. The proposed projects mainly lie in the Upper tropical, Tropical, Sub-tropical, Lower tropical and temperate climatic region, which influence the presence of vegetation and wild animals. Substation project doesn't lies in any national park, wildlife reserve, and protected area.

Socio-economic environment

The subproject sites of proposed 33/11 kV substations are located in one metropolitan city, three municipalities and nine rural municipalities of ten districts of Nepal. The total area of the project affected wards is 228.58 sq.km. According to CBS 2011, the total population of project affected wards is 51,714 with 24,731 male and 26,983 female.

Project Impact and mitigation measures

The project doesn't lie in any protected areas except for Manhari and Devnagar. All the project has no significant impact in any sensitive ecosystem and has avoided areas of historical and cultural significance. The land to be used for the substations has been already acquired by NEA and there is no issue of encroachment or presence of squatters and encroachers. Some of the impactsdue to construction of substation projects are associated with clearing of vegetation, loss of agricultural landsand disturbances during construction, waste management of the labor camp, occupation, and community health safety during construction.

Environmental management activity

This environmental management/mitigation plan would provide clear guidance to the project authority and contractor on when and how the mitigation measure should be implemented.

Environmental Monitoring Plan

NEA/ESSD is responsible for regular monitoring and reporting of the implementation of the project. Ministry of Energy, Water Resource and Irrigation (MoEWI), Department of Electricity Development (DoED), and local bodies will also be involved during the monitoring.

The environmental and social monitoring and reporting will also include assessment of project level impactsregularly.

Reporting

NEA/ESSD is responsible for regular monitoring and reporting on the implementation of the project. Ministry of Energy, Water Resource and Irrigation (MoEWI), Department of Electricity Development (DoED), and local bodies will also be involved during the monitoring.The environmental and social monitoring and reporting will be carried regularly

1 Introduction

1.1 Background

Nepal Electricity Authority (NEA) is the central organization established in 2042 B.S as an undertaking of the Government of Nepal. It is the national organization under the Ministry of Water Resources and Irrigation (MOWRI) which is involved in the generation, transmission and distribution of the electricity in the country and is responsible to make electricity available to all consumers within Nepal through central grid operation.

Over the decade, NEA's operations have suffered from high level system loss and poor system performance at the peak demand. The network voltages remain excessively low in many parts of country. The major cause of the low system voltage has been identified as lack of required number of the distribution system and high system loss. The network supplying the system is heavily overburdened and has exceeded technical and economic loading level at many places causing the deficit voltage power to consumer. In this context, NEA- Grid solar and energy efficiency project (GSEEP) project funded by World bank have proposed the construction of 13 new Substation Project in different district of Nepal, to support the Nepal power supply network, increase the system efficiency, reduce the system loss and provide ease access of electricity to the community.

As per the Environment Protection Rule 2020, environmental studies are not required for the implementation of 33kV transmission line and 33/11kV substation. Since Grid Solar and Energy Efficiency Project proposed the implementation of 33/11kV Substation in Chitwan, Nuwakot, Makwanpur, Lalitpur, Kavrepalanchowk, Dhading, Sindhuli, Sindhupalchowk, Ramechhap and Dolakha districts by utilizing the World Bank fund, in this regard an environmental and social management plan is required by the World Bank for implementing the project.

The proposed 13 new 33/11kV Substations project have been selected in such manner that it would excise settlement areas, inbuilt structures, religious places, schools, and other community structure, wherever possible. During the field study of these projects, it was found that there is no such significant obstruction raise in planned/ proposed development projects.

The documentprepared for the proposed new substation projects is to provide Environmental and Social responsibility of NEA-GSEEP during the construction and post-construction phase of these projects. The measures focus on environmental (such as air and noise pollution, biodiversity loss, and land-use change) and social aspects (such as the protection of social values

and religion, social facilities like schools, health, water supplies etc., local stakeholder's need, the safety of workers and communities and the availability of appropriate land for substation and associated facilities). This ESMP also gives an overview of the E&S Management System that is being implemented to ensure systematic and effective execution of commitments, including roles and responsibilities between the PIA/Implementation Consultant and the Contractor.

1.2 Objectives and Scope ofthe study

The main objective of the study is to provide the baseline information of the project site, identify and predict the beneficial and adverse impacts caused by the project and propose the mitigation and enhancement programs.

Specific objectives

The specific objectives of the study are as follows:

- Preparation of project location map showing the project area in map of Nepal.
- Preparation of project accessibility map including substation site.
- Preparation of map with substation site in GIS
- Preparation of geological map of the project area
- Landuse and landuse pattern of the substation site
- Topographic and geomorphology – Landscape and topographic condition of the substation.
- Geological: General geological information of the region and project area
- Existing and proposed developments like road, transmission line, settlement, and other crossings.
- Vegetation/forest resource at substations, including forest type, category, major species associated species
- Identify the plant species found near substations including their conservation status and ethnobotanical uses.
- Collect the information about the wildlife found in the project area including their important habitat, conservation status, and occurrence in the project area
- A sampling of vegetation using quadrate sampling, identification of species, estimation of the number of different species of trees, and pole size plant to be felled
- Identify the forest areas in substation as per forest category (Government, community, private, leasehold, and religious)
- Data encoding and analysis

- Identification of positive and adverse impact during construction and operation phases
- Identify and recommend most appropoate mitigation measures to offset the risks and impacts along with respomsbile agencies for implementation, timeline and recources.
- Preparation of mitigation measures for the adverse impact such as loss of private and community land by substation.
- Preparation of Environmental and Social Management Plan report showing details of the monitoring parameters, schedules, locations, methods. The plan shall also specify manpower requirement, organization, grievances management and budget.

1.3 Study Methodology

For the preparation of ESMP report of the proposed thirteen 33/11kV substation projects, different methods and methodologies were adopted. Literature review, public consultation with the community, local people, Project affected families (PAFs), household survey, group discussion with CFUG's, project-affected ward (PAWs) representative interview, walkthrough survey, geographic information system analysis were some important tools used for data collection. The different methodologies applied in ESMP study are discussed below;

1.3.1 Desk study

Review of published literature related to substation ESMP study, review of the substation in google earth, the study of a topographic map, geological map, land-use map, Rural Municipality/Municipality profile, ward profile, Centre Bureau of Statistic data, analysis of primary data collected in field survey,etc.

1.3.2 Field Investigation

Identification of substation location, investigation of the physical, biological socioeconomic, and cultural aspect of proposed project-affected wards, a household survey with PAFs, Ward level PRA in the project-affected ward by a team of experts, Identification of positive and negative environmental and social impacts of the project, Identification of environmental and social mitigation measures, Formulation of environmental and social monitoring plans.

1.3.3 Public Consultation

Conduct meeting with a representative of the ward office, affected Community Forest User Groups (CFUGs), local institutions, local people including affected households and communities, Indigenous People, Key informant, Identification of capacity building needed by various implementing entities and formulation of training plans, etc.

1.4 Layout of the Report

ESMP has been structured in five chapter, they are as follows:

Chapter 1: Introduction

Provide the Introduction of the project, its implementing agencies, objectives of the study, scope of the study, and study methodologies.

Chapter 2: Project Description

It describes the project location, substation area, substation features, and construction planning.

Chapter 3: Existing Environmental and Social Setting

It outlines the existing environmental and social baseline condition of the project affected wards, district.

Chapter 4: Project Impact and Mitigation Measures

It describes the project impact on the environment and social aspect of the project implementing location, impact matrix, and adopted mitigation measures to cope with impact govern by a project in the environmental and social dimension of the location.

Chapter 5: Environmental Management Activities and Organization Setup

It outlines the environmental and social impacts and correspondig mitigation measures , requirements of permits and approval for construction of the project, tree clearing, land acquisition, relocation of infrastructure etc. This chapter also highlights the compensation and rehabilitation plan regarding land/house acquisition, compensatory plantation plan, health, and safety plan, grievances redress plan. The chapter also proposed the Environmental monitoring plan, institution arrangement, and mechanism of monitoring, Environmental management cost, and reporting.

2 Project Description

2.1 Project Location

The Sub-project locations under this package cosists of 13 substations in 10 districts of Province 3 representing Bagmati Pradesh. Brief description of each site coverig key information such as exact location of the sites, land area of sub-station, date of land acquired and the name of owners in case of newly acquired lands are presented in the sections below and Table 1.

Devnagar SS of Chitwan District

The sub-project site Devnagar SS (33/11kV, 20/24 MVA) is located in ward no.6 of the Bharatpur Metropolitan City, Chitwan. The total area of substation is 0.67 Ha (1 Bigha). The land for substation was acquired by the project on 2076/11/15 B.S. (27th Feb, 2020) from Suryanath Neupane. There are no obstruction of trees and buildingsin the substation site.The proposed SS site is connected to E-W Highway and local ring road from Godrang to Devnagar. The nearest settlement from the SS site is Panday chowk.

Manhari SS of Makwanpur District

The sub-project site Manhari SS (33/11kV, 6/8 MVA) islocated at Manahari Rural Municipality-08, Beluwatole, MakwanpurDistrict. The total area of substation is 0.52 ha (15 kattha 5 dhur).The land for substation was acquired by the project on 2076/08/17 B.S. (1st Dec, 2019) from Ram Chandra Bartaula. There are no trees, buildings and other structures in the substation site. The proposed SS is accessible from E-W highway which lies less than 50m from the substation area. The nearest settlement from the SS site is Beluwa Tole.

Raigaun SS of Makwanpur District

The sub-project site Raigaun SS (33/11kV, 6/8 MVA) islocated at Bagmati Rural Municipality-08, Raigaun, Makwanpur District. The total area of substation is 0.52 ha (15 kattha 7 dhur).The land for substation was acquired by the project on 2076/10/09 B.S. (23rd Jan, 2020) from Tara Rai. There are no trees, buildings and other structures in the substation site. The proposed SS is accessible from Jhurjhure to Raigaun Road via Madan Bhandari Lok Marga. The nearest settlement from the SS site is Hattiban.

Palung SS of Makwanpur District

The sub-project site Palung SS (33/11kV, 6/8 MVA) islocated at Thaha Municipality-02, Makwanpur District. The total area of substation is 0.36 ha (7 ropani, 15 aana).The land for substation was acquired by the project on 2076/10/26 B.S. (9th Feb, 2020). The land was pre owned by three brothers: Arjun Bista, Kalakh Bahadur Bista and Muga Devi Bista. There are no

trees, buildings and other structures in the substation site. It is an agricultural land. The proposed SS is accessible from Palung Agro Motor bato via Tribhuwan Highway. The nearest settlements from the SS site areBista Tole and Phat Bazar.

Kakani SS of Nuwakot District

The sub-project site Kakani substation (33/11kV, 6/8 MVA) is located at Kakani Rural Municipality-07, Nuwakot District. The total area of substation is 0.50 ha (10 ropani).The land for substation was acquired by the project on 2076/11/16 B.S. (28th Feb, 2020). The land was pre owned by Akal Bahadur Tamang. There are no trees, buildings and other structures in the substation site. It is an agricultural land. The proposed SS is accessible from Madyawarti Marga. The nearest settlements from the SS site is Kakani.

Unichaur SS of Lalitpur District

The sub-project site Unichaur substation (33/11kV, 6/8 MVA) islocated at Mahankal Rural Municipality-01, Lalitpur District. The total area of substation is 0.50 ha (10 ropani). It's a NEA owned land. There are no trees, buildings and other structures in the substation site. It is an agricultural land. The proposed SS is accessible from Pasang Lhamu Highway Road. The nearest settlements from the SS site are Unichaur andBukhel.

Katunje SS of Kavrepalanchowk District

The sub-project site of the new substation namely Katunje SS (33/11kV, 6/8 MVA) is located at Katunje, ward no. 7 of Roshi Rural Municipality of Kavre district. The total area of substation is about 0.89 ha (17.52 ropani). The land for substation was acquired by the project on 2077/07/08 B.S. (23rd Dec, 2020) from Mohan Bahadur Tamang and Roshan Lama. There are no obstruction of trees and buildingsin the substation site.The proposed SS siteisconnected to B-P Highway (black-topped), Thali-Chaur Road (Gravel Road) and Khairani- Galbadorangba Sadak. The nearest settlements from the SS site is Katunje.

Jharlang SS of Dhading District

The sub-project site of the new substation namely Jharlang SS (33/11kV, 6/8 MVA) is located at Jharlang, ward no. 2 of Khaniyabas Rural Municipality of Dhading district. The total area of substation is about 0.58 ha (11.5 ropani). The land for substation was acquired by the project on 2077/06/04 B.S. (20th Sept, 2020) from Aaita Tamang, Bhati Tamang, Kaujong Tamang, Harka Si Tamang, Fusur Tamang, Devran Tamang, Chinjhom Tamang, Kancha Tamang, Mensurapriti Tamang. There are 9 trees that needs to be felled but no obstruction of buildingsin the substation

site.The proposed SS site is connected to Bachala-Jharlang Road. The nearest settlements from the SS site and is Kokhim.

Mahabharat SS of Kavrepalanchowk District

The sub-project site of the new substation namely Mahabharat SS (33/11kV, 3/8 MVA) is located at Gokule, ward no.1 of Mahabharat Rural Municipality of Kavrepalanchowk district. The total area of substation is about 0.50 ha (10 ropani). The land for substation was acquired by the project on 2076/09/25 B.S. (10th Jan, 2020) from Shingadhoj Jimba. There are no obstruction of trees and buildings in the substation site.The proposed SS site is accessible by Taldhunga-Jobla-Tagthali-Gokule via Madan Bhandari Lok Marga. The nearest settlements from the SS site are Gokule and Arubot.

Dudhauli SS of Sindhuli District

The sub-project site of the new substation namely Dudhauli SS (33/11kV, 6/8 MVA) is located at Srijana nagar, Dudhauli, ward no. 10 of Dudhauli Municipality of Sindhuli district. The total area of substation is about 0.50 ha (10 ropani). The land for substation was owned by Dudhauli Municipality. There were no obstruction of trees and buildingsin the substation site.The proposed SS site is connected to Madan-Bhandari Lokmarga (black-topped). The nearest settlements from the SS site is Golfora .

Namdu SS of Dolakha District

The sub-project site of the new substation namely Namdu SS (33/11kV, 6/8 MVA) is located at Namdu, ward no. 6 of Baiteshwor Rural Municipality of Dolakha district. The total area of substation is about 0.50 ha. The land for substation was acquired by the project from Rajesh Uprety. There are 16 trees to be felled, but no structures will be disturbed in the substation site.The proposed SS site is connected to Lamosangu-Jiri highway and Namdu-Marbu road. The nearest settlement from the SS site is Namdu bazaar which is about 200m far from the substation area.

Sangutar SS of Ramechhap District

The sub-project site of the new substation namely Sangutar SS (33/11kV, 6/8 MVA) is located at Sangutar, ward no. 5 of Ramechhap Municipality of Ramechhap district. The total area of substation is about 0.38 ha. The land belongs to NEA. There are no obstruction of trees or buildings in the substation site.The proposed SS site is connected to Likhu Corridor Road;

earthen road. The nearest settlement from the SS site is Sangutar bazaar which is about 400m far from the substation area. The construction work of this substation has been completed and 33kV line was not needed.

Mude SS of Sindhupalchowk District

The sub-project site of the upgraded substation namely Mude SS (33/11kV, 6/8 MVA) is located at Mude, ward no. 5 of Lisankhu Pakhar Rural Municipality of Sindhupalchowk district. The total area of substation is about 0.40 ha. The land belongs to NEA. There are no obstruction of trees and buildingsin the substation site.The proposed SS site is connected to Lama-Sanghu-Jethi Sadak highway; gravel road. The nearest settlement from the SS site is Mude bazaar and Sarre Danda along the main highway which is about 800m far from the substation area.The construction work of this substation has been completed and 33kV line was not needed.

Land Acquisition

The land required for the substation was acquired by the project as per Land Acquisition Act, 1977 (2034 BS) of Nepal, Clause 27 which includes a provision of land acquisition directly through negotitations or on “willing buyer willing seller” basis. As per the provisionmade in this Clause,the land price was determined through tripatriate negotations between the land owners, NEA and a price fixation committee formed under the Chair of Chief District Officers of respective districts. Key procedures followed for land acquision involved notice publication for land acquisition by NEA, negotiation and determinatiomn of lcompendation rates, payment of compensation to all land owners and legal transfer of land to NEA.

Table No. 1- Summary of the project site

S.N.	Sub-Project	Location	Land Area	Land owner	Date of land acquired	Land Status
1.	Devnagar SS	Devnagar, Bharatpur M.C.-02	0.67 ha	Suryanath Neupane	27th Feb, 2020 A.D.	Land Purchased by NEA and ownership has been transferred to NEA
2.	Manhari SS	Mahari R.M.-08	0.52 ha	Ram Chandra Bartaula	1st Dec, 2019 A.D.	Land Purchased by NEA and ownership has been transferred to NEA
3.	Raigaun SS	Raigau, Bagmati R.M.-08	0.52 ha	Arun Lama Bal	23rd Jan, 2020 A.D.	Land Purchased by NEA and ownership has been transferred to NEA
4.	Palung SS	Bista Tole, Thaha M.-02	0.36 ha	Arjun Bista, Kalakh Bdr Bista and Muga Devi Bista	9th Feb, 2020 A.D.	Land Purchased by NEA and ownership has been transferred to NEA
5.	Unicharu SS	Mahankal R.M.-01	0.50 ha	NEA Owned Land	2005 AD	Land Purchased by NEA and ownership has been transferred to NEA
6.	Kakani SS	Kakani R.M.-07	0.50 ha	Akal Bahadur Tamang	28th Feb, 2020	Land Purchased by NEA and ownership has been transferred to NEA
7.	Katunje SS	Katunje, Roshi R.M.-07	0.89ha	Mohan Bdr Tamang, Roshan Lama	23rd Dec, 2020	Land Purchased by NEA and ownership has been transferred to NEA
8.	Mahabharat SS	Gokule, Mahabharat R.M.-01	0.50 ha	NEA Owned Land	10th Jan, 2020	NEA Owned Land
9.	Jharlang SS	Jharlang, Khaniyabas R.M.-02	0.58ha	Aaita Tamang, Bhati Tamang, Kaujong Tamang, Harka Si Tamang, Fusur Tamang, Devran Tamang, Chinjhom Tamang, Kancha Tamang, Mensurapriti Tamang	20th Sept, 2020	Land Purchased by NEA and ownership has been transferred to NEA
10.	Dudhali SS	Dudhauli M.-10	0.50 ha	Land provided by Dudhauli Municipality	6th May, 2022	Land Provided by Municipality
11.	Namdu SS	Namdu, Baiteshwor R.M.-06	0.50 ha	Rajesh Uprety		Land Purchased by NEA and ownership has been transferred to NEA
12.	Mude SS	Mude, Lisankhu Pakhar R.M.- 05	0.38 ha	NEA Owned Land		NEA Owned Land
13.	Sangutar SS	Sangutar, Ramechhap M.-03	0.40 ha	NEA Owned Land		NEA Owned Land

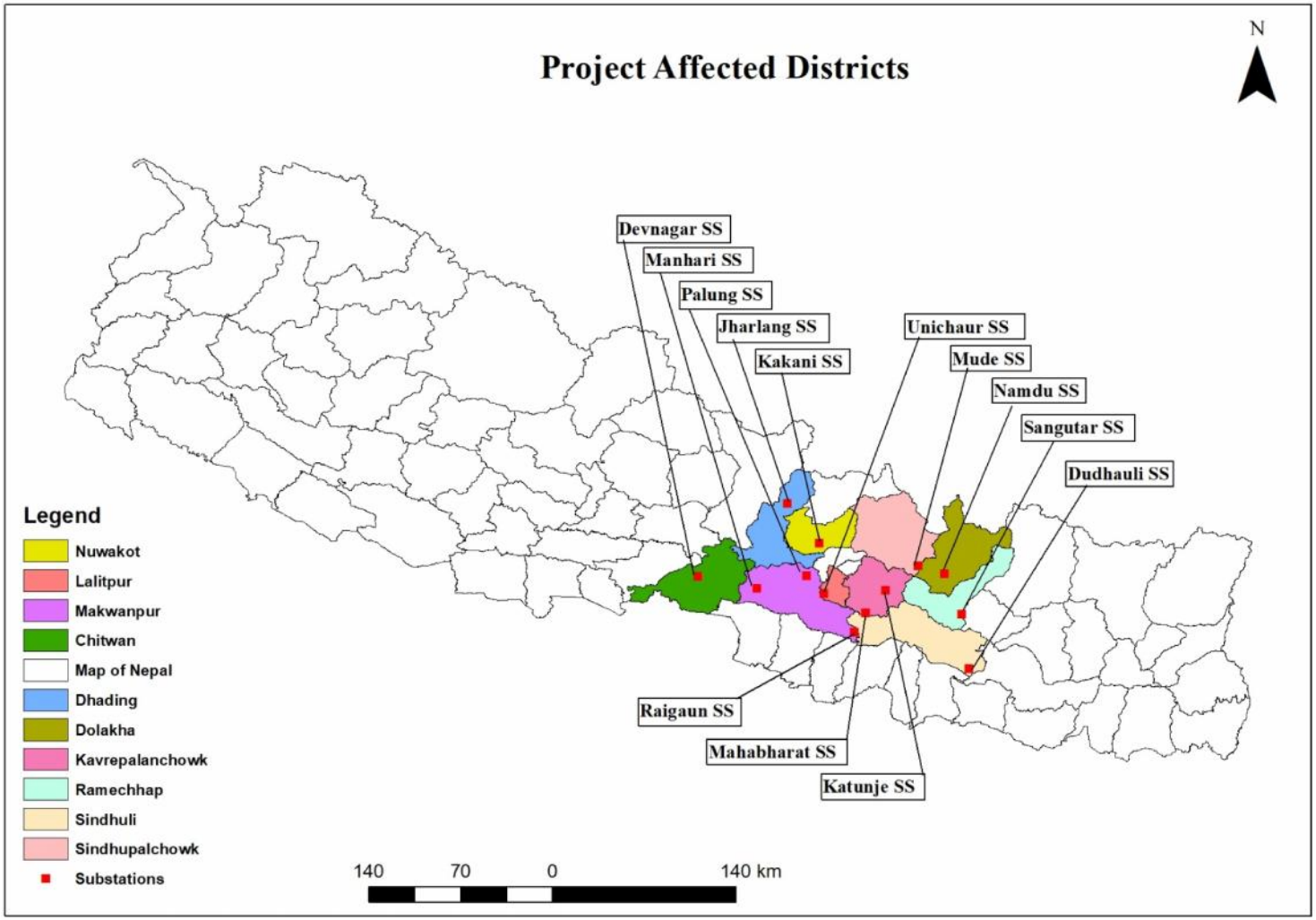

Figure 1: Project Location Map

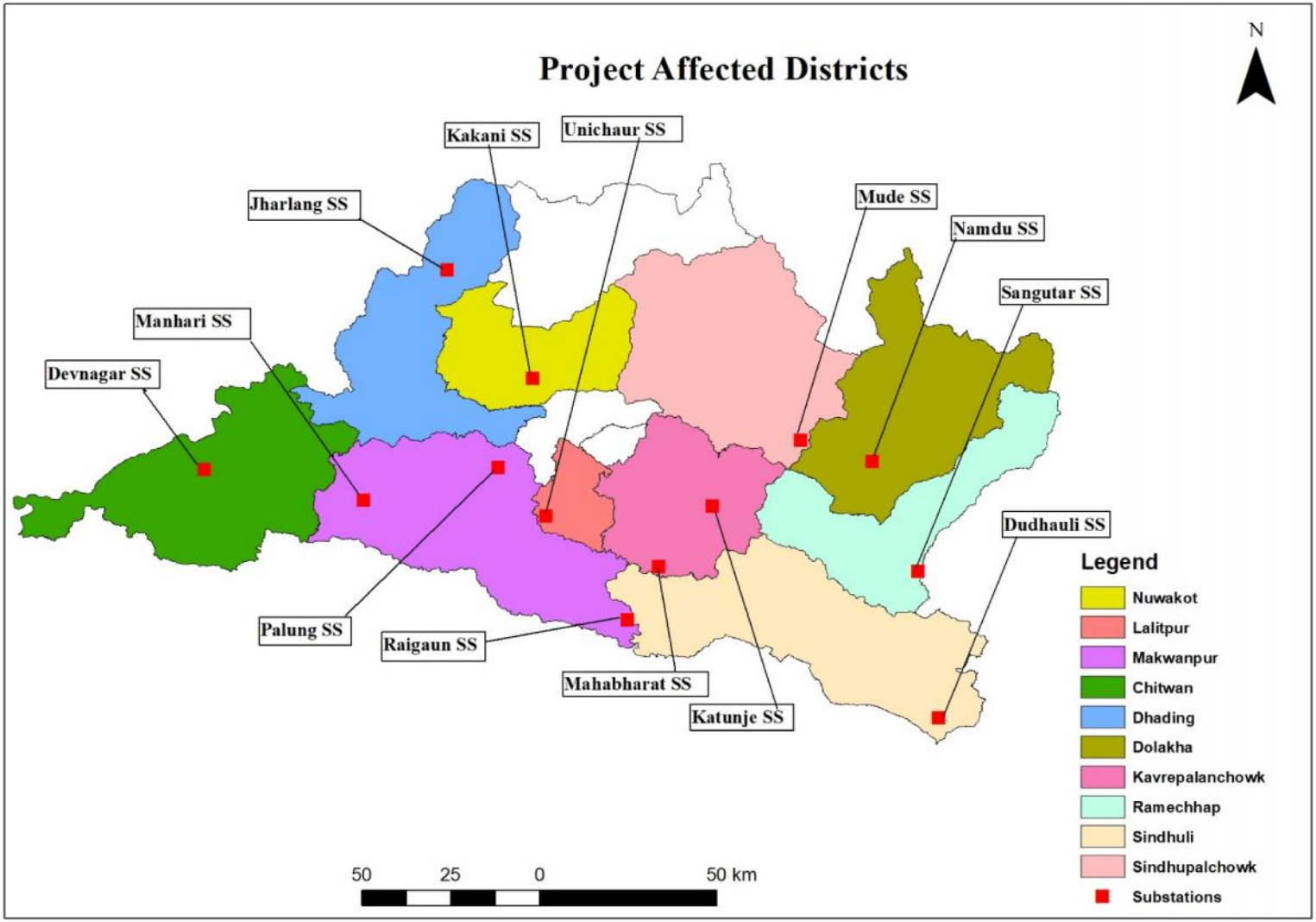

Figure 2: Project Location Map

Table No. 2: Geographical locations and altitude of sub-project sites

S.N.	Sub-Project	District	Municipality/ Rural Municipality	GPS Location		Altitude
				Latitude	Longitude	
1.	Devnagar SS	Chitwan	Bharatpur M.C.-02	27°36'49.26"N	84°24'29.23"E	192 m
2.	Manhari SS	Makwanpur	Mahari R.M.-08	27°32'5.63"N	84°48'39.53"E	313 m
3.	Raigaun SS		Bagmati R.M.-08	27°13'55.81"N	85°28'44.84"E	181 m
4.	Palung SS		Thaha M.-02	27°38'5.87"N	85° 3'22.84"E	1816 m
5.	Unicharu SS	Lalitpur	Mahankal R.M.-01	27°31'5.77"N	85°21'25.04"E	1985 m
6.	Kakani SS	Nuwakot	Kakani R.M.-07	27°50'31.73"N	85°14'17.55"E	1565 m
7.	Katunje SS	Kavrepalanchowk	Roshi R.M.-07	27°31'7.21"N	85°41'37.14"E	965 m
8.	Mahabharat SS		Mahabharat R.M.-01	27°21'58.98"N	85°33'27.20"E	991 m
9.	Jharlang SS	Dhading	Khaniyabas R.M.-02	28° 6'57.26"N	85° 1'21.90"E	1534 m
10.	Dudhali SS	Sindhuli	Dudhauli M.-10	26°59'11.58"N	86°16'1.71"E	193 m
11.	Namdu SS	Dolakha	Baiteshwor R.M.-06	27°37'55.35"N	86° 5'54.28"E	1406 m
12.	Mude SS	Sindhupalchowk	Lisankhu Pakhar R.M.- 05	27°41'11.78"N	85°55'4.49"E	2429 m
13.	Sangutar SS	Ramechhap	Ramechhap M.-03	27°21'19.62"N	86°12'54.84"E	650 m

2.2 Substations

Devnagar SS

Manahari SS

Palung SS

Raigaun SS

Unichaur SS

Kakani SS

Sangutar Substation

Katunje Substation

Jharlang Substation

Mahabharat Substation

Dudhauli Substation

Mude Substation

Namdu Substation

Figure 3: Substation location on google map

2.3 Project Features

Table No. 3: Project Features

Substations	District	Municipality/ Rural Municipality	Area covered by Substation	Voltage level	Substation capacity	Funding Agency
Devnagar SS	Chitwan	Bharatpur M.C.-02	0.67 ha	33kV	20/24 MVA	NEA-GSEEP/WB
Manahari SS	Makwanpur	Mahari R.M.-08	0.52 ha	33kV	6/8 MVA	NEA-GSEEP/WB
Palung SS		Thaha M.-02	0.52 ha	33kV	6/8 MVA	NEA-GSEEP/WB
Raigaun SS		Bagmati R.M.-08	0.36 ha	33kV	6/8 MVA	NEA-GSEEP/WB
Kakani SS	Nuwakot	Kakani R.M.-07	0.50 ha	33kV	6/8 MVA	NEA-GSEEP/WB
Unichaur SS	Lalitpur	Mahankal R.M.-01	0.50 ha	33kV	6/8 MVA	NEA-GSEEP/WB
Katunje SS	Kavrepalanchowk	Roshi R.M.-07	0.89 ha	33kV	6/8 MVA	NEA-GSEEP/WB
Mahabharat SS		Mahabharat R.M.-01	0.50 ha	33kV	3/8 MVA	NEA-GSEEP/WB
Jharlang SS	Dhading	Khaniyabas R.M.-02	0.58 ha	33kV	6/8 MVA	NEA-GSEEP/WB
Dudhauli SS	Sindhuli	Dudhauli M.-10	0.50 ha	33kV	6/8 MVA	NEA-GSEEP/WB
Namdu SS	Dolakha	Baiteshwor R.M.-06	0.50 ha	33kV	6/8 MVA	NEA-GSEEP/WB
Sangutar SS	Ramechhap	Ramechhap M.-03	0.38 ha	33kV	6/8 MVA	NEA-GSEEP/WB
Mude SS	Sindhupalchowk	Lisankhu Pakhar R.M.- 05	0.40 ha	33kV	6/8 MVA	NEA-GSEEP/WB

Source: Detailed design Report, GSEEP

2.4 Construction Planning

The implementation of the proposed project comprises the construction and upgrading of thirteen substations. Atotal of 6.35 ha land has been acquired for all substation in ten subproject districts viz Chitwan, Makwanpur, Lalitpur, Nuwakot, Kavrepalanchowk, Dhading, Sindhuli, Sindhupalchowk, Ramechhap and Dolakha District. The construction work of all the substations is expected to be completed by the end of 2022 AD.

2.4.1 Preliminary Works

Preliminary works for the proposed 13 new 33/11 kV substations (12 will be newly constructed and Mude substation will be completely upgraded)projectsconsist of carrying the detailed design and engineering study. The detailed design and engineering study will carry out the longitudinal profiles, geological field test and laboratory testing, topographic study, etc., contract award, and mobilization of the contractor.

2.4.2 Land

Table No. 4: Land required by substation under different category

S.N.	Project Sites	Landuse (Sq.m)			
		Agricultural Land	**Forest**	**Others**	**Total**
1	Devnagar Substation	0.67 ha	-		
2	Manahari Substation	-	-	0.52 ha	
3	Palung Substation	0.52 ha	-		
4	Raigaun Substation	-	-	0.36 ha	
5	Kakani Substation	0.50 ha	-		
6	Unichaur Substation	0.50 ha	-		
7	Katunje Substation	0.50 ha	-	-	-
8	Jharlang Substation	0.50 ha	-	-	-
9	Mahabharat Substation	0.50 ha	-	-	-
10	Dudhauli Substation	-	-	0.50 ha	-
11	Namdu Substation	0.50 ha	-	-	-
12	Sangutar Substation	0.38 ha	-	-	-
13	Mude Substation	-	-	0.40 ha	-
Total		4.57 ha	-	1.78 ha	**6.35 ha**
Others landuse: - Grassland, Barren Land, Bush, etc.					

2.4.3 Requirement of workforce

During the construction stage of the substation , approximately 70-80 people will be employed in each site for the construction activities and transportation of material including 15 skilled (Engineers and Overseer), 30-35 Semi-skilled and 25-30 unskilled(Labor). The workforce will be used for the entire construction period (12 months)but their involvement may vary depending

upon the subprojectsite. land terrain and accessibility. The constructing contractor of the subproject will deploy the required manpower as per their preferences but priority will be given to the local people, mainly the poor and disadvantaged groups.

2.4.4 Materials used for the construction of a substation

Different materialswill be used for the construction of the project. From the review of a similar 33kV/11 kV substation project, the materials used during the construction work are as follows

a. Steel Tubular Poles
b. ACSR "Dog" Conductor
c. DISC and PIN Insulator with hardware
d. Pole accessories
e. Stay sets
f. Cement, bricks, and aggregate
g. Other essential material as per the requirement

Such construction material will be arranged by the contractor on a turnkey basis before construction. Other materials like cement, aggregates, and sand for the substation foundation construction will arrange as per the requirement by the contractor, and construction safety equipment will be provided by the contractor as applicable as per site condition.

2.4.5 Camps and storage areas

Land required for the labor camps and storage of construction material will be taken on lease around substation area for thirteen substation projects. Storage of construction materials will also require use of land. However, uncultivated low quality lands will be rented for such purpose. Likewise, the area designated for the camps will also lead to temporary loss of cultivation of land. . Both temporary mobile camps and storage sites will be located in the same location. The impact of these facilities will be low in magnitude, site-specific, and for a short duration.

2.4.6 Spoil management

The foundation excavation for the substation will generate ahuge spoil and will be calculated during the construction phase only.Spoil generated from the substation will be managed in the prescribed area selected by the project.

2.4.7 Project Duration

The total duration for construction of the substation project will take a minimum of 1-year from the date of contract award. The contract will expire on 31st Dec, 2022.

3 Existing Environmental and Social Setting

The project includes thirteen33/11kV substations proposing in ten districts i.e. Devnagar substation in Chiwan district, Manahari substation, Palung substation and Raigaun substation in Makwanpur district,Katunjesubstation and Mahabharat substationin Kavrepalanchowk district, Kakani substation in Nuwakot district, Unichaur substation in Lalitpur district, Jharlangsubstation inDhadingdistrict, Dudhauli substation in Sindhuli district, Namdu substation in Dolakha district, Sangutar substation in Ramechhp district and Mude substation in Sindhupalchowk district. For the purpose of study, the study area is defined as the substation site and its close surrounding including settlement area, an agricultural area, forest, and other vegetation, built-up infrastructure, and facilities etc. Any built-up structure, settlement area, forest area that falls under the substation is defined as a highly impacted area.

The locations of the proposed substation project vary largely in terms of elevation, topographic factor, climate, geology forest type, social composition etc. The environmental and social impacts of the project are also likely to vary depending upon the environmental and socio-economic setting. The ESMP reflects the environmental and social setting baseline information based on the field study, literature review, CBS profile, District profile, Municipality and Rural Municipality Profile, and other published sources.

3.1 Environmental Baseline

3.1.1 Physical Environment

The proposed thirteen 33/11kV substation projects are located in the different topographical, climatic,and geological setting of Nepal.Devnagar substation, Manahari Substaion, Raigaun Substation, Palung Substation lies in flat terrain, Dudhauli substation lies in the fragile topography of Churia region.Katunje Substation, Jharlang Substation,Mahabharat Substation, Kakani Substation, Unichour Substation, Mude Substation, Sanghutar Substation, and Namdu Substation lies in mid-hill topography of Nepal.The topography, landuse, climatic condition, geomorphology and geology, air and noise condition, watershed, and drainage pattern that will l be influenced due to the construction of the project has been discussed in the physical environment. The details of the physical environment of 13 sub-projects are given in the table below:

PhysicalEnvironment

Table No. 5: Details of physical environment of the sites

S.N.	Project Component	Description
1.	Devnagar Substation project	• The elevation of proposed project is at 192 msl; • Sub-tropical climatic zone, the climate here is mild, and generally warm and temperate. When compared with winter, the summers have much more rainfall. Absolute extreme maximum and minimum temperatures prevailed in Chitwan district are 36.7°C and 17.7°C respectively; the average annual precipitation of the Chitwan district is 2150mm. • Located in terai zone which consists of rocks such sandstone, conglomerates, quartzite, shale and micaceous etc. The project consists of alluvial soil; • The project area is apparently clean in terms of pollution level on air and noise as the sub-project lies in rural part of metropolitan. The project area is not industrialized, so the only source of air and noise pollution is vehicular movement along the earthen road. Biomass burning for cooking contributes little pollutants to the ambient air; • The slope of area is flat plain; so chances of water logging is possible. • The proposed project have no possibility of landslide and erosion or land instability
2.	Manahari Substation project	• The elevation of proposed project site is at 313msl; • Sub-tropical climatic zone, the climate here is mild, and generally warm and temperate. When compared with winter, the summers have much more rainfall. Absolute extreme maximum and minimum temperature prevailed in Chitwan district are 36.7°C and 17.7°C and Makwanpur respectively 37°C and 26°C. The average annual precipitation of the Makwanpur district is 2000mm. • Located in terai zone which consists of rocks such sandstone, conglomerates, quartzite, shale and micaceous etc. The project consists of alluvial soil; • The sub-project area is apparently clean in terms of pollution level on air and noise as the sub-project lies in rural area. Biomass burning for cooking contributes little pollutants to the ambient air. • The main source of noise pollution in the project area could be the high number of vehicular movement along the highway. Other impacts may be disturbances at work site due to crowded movement of people in the market and high traffic volumes in roads. • Other human induced activities such as deforestration, extraction of boulders and river materials from Manahari river leading to floods and land slides.
3.	Raigaun Substation project	• The elevation of proposed project is at 181 msl; • Sub-tropical and Temperate climate, dry winter, hot summer. Monsson influenced by humid subtropical climate. Average annual maximum and minimum temperature prevail in Makwanpur district are 26.7°C and 15.1°C in respectively; Average annual precipitation is 1961.4mm • Located in valleys within the Churia Hills filled up by coarse to fine alluvial

S.N.	Project Component	Description
		sediments. • The sub-project area is not industrialized, so the only source of air and noise pollution is due to vehicular movement along the Hetauda - Faparbari road. The overall status of air and noise quality found to be within the acceptable limit;
4.	Palung Substation Project	• The elevation of proposed project is at 1816 msl; • Sub-tropical and Temperate climate, dry winter, hot summer. Monsson influenced by humid subtropical climate. Average annual maximum and minimum temperature prevail in Makwanpur district are 26.7^{o}C and 15.1^{o}C in respectively; Average annual precipitation is 1961.4mm • Located in Mahabharat range the site consist of Schist, phyllite, gneiss, quartzite, granite and limestone belonging to the Lesser Himalayan. • The ssub-project area is not industrialized, so the only source of air and noise pollution is due to vehicular movement along the Tribhuvan highway and local earthen raod. The overall status of air and noise quality found to be within the acceptable limit;
5.	Unichaur Substation Project	• The elevation of proposed project is at 1985msl; • Climate is characterized by relatively high temperatures and evenly distributed precipitation throughout the year. The Köppen Climate Classification subtype for this climate is "Cfa" (Humid Subtropical Climate). Annual average maximum and minimum temperature prevail in lalitpur district are 18.8^{o}C and 8.2^{o}C respectively; • Located in mid hill region, geology consist; Schist, phyllite, gneiss, quartzite, granite, limestone geologically belonging to the Lesser Himalayan; • The sub-project area is apparently clean in terms of pollution level on air and noise as the sub-project site lies in non-industrial area, so the main source of air and noise pollution is due to vehicular movement along the Kanti Lokpath. The overall status of air and noise quality found to be within the acceptable limit;
6.	Kakani Substatoin Project	• The elevation of proposed project is at 1565 msl; • Climate is characterized by subtropical, temperate however some region of Nuwakot district lies in sub alpine to alpine zone. The Köppen Climate Classification subtype for this climate is "Cwa" (Monsoon-influenced humid subtropical climate). Annual average maximum and minimum temperature prevail in Nuwakot district are 23.6 ^{o}C and 12.4^{o}C respectively; • Located in midland and fore Himalayan region, geology of the district consists; Schist, phyllite, gneiss, quartzite, granite, limestone geologically belonging to the Lesser Himalayan and Gneisses, schists, phyllite and marbles mostly belonging to the northern edge of the Lesser Himalayan Zone; • The project area is apparently clean in terms of pollution level on air and noise as the sub-project lies in rural area. So the only source of air pollution is from dust, smoke generated by vehicular movement along the earthen road. Biomass burning for cooking contributes little pollutants to the ambient air; • The main source of noise pollution in the sub project area is the vehicular movement along the earthen road. Others source of noise in the area relates to the anthropogenic activities of rural population. In general, the noise level in the area is near to the natural state;

S.N.	Project Component	Description
7.	Katunje Substation project	• The elevation of the proposed project is at 971msl; • Upper tropical climatic zone, the climate here is mild and generally warm and temperate. When compared with winter, the summers have much more rainfall. Absolute extreme maximum and minimum temperature prevail in Kavrepalanchowk district are 23.1^{o}C and 11.9^{o}C respectively; the average annual precipitation of the Kavrepalanchowk district is 1311.3 mm. • Located in mid hill zone which consists of rocks such as phyllite, quartzite, slate, etc. The project consists of alluvial deposition and genle rocky slope; • The project area is clean in terms of pollution level on air and noise as the sub-project lies in rural part of the rural municipality. The project area is not industrialized, so the only source of air and noise pollution is vehicular movement along the earthen road. Biomass burning for cooking contributes little pollutants to the ambient air; sub-project location has terrace land; so, there is no chances of waterlogging. •
8.	Jharlang Substation project	• The elevation of the proposed project is at 1544 msl; • Sub-tropical climate zone, the climate here is mild and generally cold and temperate. When compared with winter, the summers have much more rainfall. Absolute extreme maximum and minimum temperatures prevailed in Dhading district are 28.58^{o}C and 12.25^{o}C. The average annual precipitation of the Dhading district is 2121.2 mm. • Located in hill zone, the site consists of rocks such as Gneiss, migmatite etc. The project consists of alluvial soil; • The sub-project area is clean in terms of pollution level on air and noise as the sub-project lies in a rural area. The substation project area is not industrialized, so the only source of air pollution is from dust, smoke generated by vehicular movement along the earthen road. Biomass burning for cooking contributes little pollutants to the ambient air. • The main source of noise pollution in the project area is the vehicular movement along the local road. Others source of noise in the area relates to the anthropogenic activities of the rural population such as deforestration, extraction of boulders and other materials leading to landslides and flooding. • The project site is located in hill with gentle slope and terrace land, the sub project has no risk of flooding. • Land acquired by the proposed substation is 10 ropani. The substation will be built in the agricultural land.
9.	Mahabharat Substation project	• The elevation of the proposed substation project is at 990 msl; • Upper tropicalclimate zone, dry winter, hot summer. Absolute extreme maximum and minimum temperature prevail in Kavrepalanchowk district are 23.1^{o}C and 11.9^{o}C respectively; the average annual precipitation of the Kavrepalanchowk district is 1311.3 mm. • Located in hilly region with rugged terrain and alluvial sediments. • The substation project area is not industrialized, so the only source of air and noise pollution is due to vehicular movement along the local road. The overall status of

S.N.	Project Component	Description
		air and noise quality found to be within the acceptable limit; • Land acquired by a substation is about 10 ropani. The land acquired by the project used to be agricultural land.
10.	Dudhauli Substation Project	• The elevation of the proposed substation project is at 190 msl; • Lower tropical climate region, dry winter, hot summer. The average annual maximum and minimum temperature prevail in Sindhuli district are 27.2^{o}C and 15.8^{o}C respectively; Average annual precipitation is 1698.8 mm. • Located in Terai range which consists of sandstone, fluvial, calcareous soil. • The substation project area is not industrialized, so the only source of air and noise pollution is due to vehicular movement along the local earthen road. The overall status of air and noise quality found to be within the acceptable limit; • Land acquired by the substation project is about 10 ropani . The land acquired by the project is barren land;
11.	Namdu Substation Project	• The elevation of proposed project is 1414 msl; • Subtropical climatic zone, the climate here is warm and temperate. When compared with winter, the summers have much more rainfall. Absolute extreme maximum and minimum temperature prevail in Dolakha district is 14.4^{o}C and 5^{o}C respectively; the average annual precipitation of the Dolakha district is 1553.3mm. • Located in hill, the site consists of rocks such schist, phyllite, gneiss, conglomerates, quartzite, shale, ultisols and micaceous etc. The project area consists of alluvial soil; • The project area is apparently clean in terms of pollution level on air and noise as the sub-project lies in rural part of municipality. The project area is not industrialized, so the only source of air and noise pollution is vehicular movement along the road and the road construction activity. Biomass burning for cooking contributes little pollutants to the ambient air; • The terrain of area is diverse and stepped landscape with stable land area; Land acquired for substation is about 10 ropani. There were agricultural activities in the area during the field survey.
12.	Sangutar Substation Project	• The elevation of proposed project is at 645 msl; • Tropical climatic zone, the climate here is hot and moderate. The summers have much more rainfall and winter is quite dry. Absolute extreme maximum and minimum temperature in Ramechhap district is 19.7^{o}C and 9.2^{o}C respectively; the average annual precipitation of the Ramechhap district is 1377 mm. • Located in mid-hill region which consists of rocks such bed rock, boulders, gravel, sandstones etc. The project consists of alluvial soil; • The project area is apparently clean in terms of pollution level on air and noise as the sub-project lies in rural part of metropolitan. The project area is not industrialized, so the only source of air and noise pollution is vehicular movement along the earthen road. Biomass burning for cooking contributes little pollutants to the ambient air; • The slope of area is flat terrain; so, chances of water logging is possible. • Land acquired for substation is about 0.38 ha. It was agricultural land but there

S.N.	Project Component	Description
		have been no agricultural activities in the area for one year. • The proposed project has possibility of landslide and erosion or land instability because of the steep topography and the undergoing road development.
13.	Mude Substation	• The elevation of proposed project is at 2430 msl; • Temperate climatic zone, the climate here is cold and temperate. When compared with winter, the summers have much more rainfall. Absolute extreme maximum and minimum temperature prevail in Sindupalchowk district is 17.4^{o}C and 7^{o}C respectively; the average annual precipitation of the Sindupalchowk district is 2034mm. • Located in mid-hill which consists of rocks such sandstone, phyllite schist, limestones, and carbonaceous materials etc. The project consists of alluvial soil; • The project area is apparently clean in terms of pollution level on air and noise as the sub-project lies in rural part of metropolitan. The project area is not industrialized and far from settlement, so the only source of air and noise pollution is vehicular movement along the earthen road. Biomass burning for cooking contributes little pollutants to the ambient air; • The terrain of area is plain; so, chances of water logging is possible. • Land acquired for substation is about 0.40 ha. There was already a substation in this site which will be upgraded now. The proposed project has no possibility of landslide and erosion or land instability.

3.1.2 Biological Environment

Vegetation and forest resources, mammals and birds, and rare and protected species of flora and fauna found in the subproject area are studied in a biological environment. The proposed projects mainly lie in the Upper tropical, Tropical, Sub-tropical, Lower tropical and temperate climatic region, which influence the presence of vegetation and wild animals. Substation project doesn't lies in any national park, wildlife reserve, and protected area. During the field visit, it was observed that in all studied substation lies in agricultural and other land categories.Tree species and wildlife were not affected by the construction of substations.

Table No.6 : Details of biological environment of the sub-project area.

S.N.	Project Component	Description
1.	Devnagar Substation project	No obstruction of trees and other rapidly growing vegetation in the substation area. The land used to an agricultural land but there has been no farming acitivities in the area for the past 2 years. The area lies close (<500 m) to Chitwan NP buffer zone. The substation area is surrounded by agricultural land.
2.	Manahari Substation project	No obstruction of trees and other rapidly growing vegetation in the substation area. The land is barren. Sal (*Shorea robusta*)dominant Simpani Devkot CF is located on the northern side which lies less than 30 m from the substation area. Parsa National Park buffer zone lies (>1 km) on the southern side of the substation area and is not affected by the project.
3.	Raigaun Substation project	The substation area is an agricultural land and there is no obstruction of trees and other rapidly growing vegetation. It does not lie within the protected area (national park, wildlife reserive or conservation area).
4.	Palung Substation Project	The substation area is an agricultural land and there is no obstruction of trees and other rapidly growing vegetation. It does not lie within the protected area (national park, wildlife reserive or conservation area).
5.	Unichaur Substation Project	The substation area is an agricultural land and there is no obstruction of trees and other rapidly growing vegetation. It does not lie within the protected area (national park, wildlife reserive or conservation area).
6.	Kakani Substation Project	The substation area is an agricultural land and there is no obstruction of trees and other rapidly growing vegetation. It does not lie within the protected area (national park, wildlife reserive or conservation area).
7.	Katunje Substation project	The substation area does not consist of trees or other rapidly growing vegetation. No natural forest occur in the substation area and it does not lie within the protecte area (national park, wildlife reserive or conservation area).
8.	Jharlang Substation project	The substation area is an agricultural land covered by 9 trees which needs to be felled during the construction of the substation. There are 5 chillaune (*Schima wallichii)* and 4 painyu (*Prunus cerasoides*) tree species in the area. No natural forest occur nearby the

S.N.	Project Component	Description
		substation. It does not lie within the protected area (national park, wildlife reserive or conservation area).
9.	Mahabharat Substation project	The substation area is an agricultural land and there is no obstruction of trees and other rapidly growing vegetation. East and west sides of the substation are covered by chillaune (*Schima wallichii*) species but it doesnot need to be felled. It does not lie within the protected area (national park, wildlife reserive or conservation area).
10.	Dudhauli Substation Project	The substation area is devoid of trees and other prominent type of vegetation. It is a barren land. No natural forest occur in the substation area and it does not lie within the protected area (national park, wildlife reserive or conservation area).
11.	Namdu Substation Project	The substation area is an agricultural land covered by some trees which needs to be felled during the construction of the substation. There are about 4 chillaune (*Schima wallichii)*, 3 Kutmero (*Litsea polyantha*), 4 Simal (*Bombax ceiba*) and 5 painyu (*Prunus cerasoides*) tree species in the area. It does not lie within the protected area (national park, wildlife reserive or conservation area).
12.	Sangutar Substation Project	The substation area is devoid of trees and other prominent type of vegetation. It is a barren land. It does not lie within the protected area (national park, wildlife reserive or conservation area).
13.	Mude Substation	The substation area does not consist of trees or other rapidly growing vegetation. No natural forest occur in the substation area and it does not lie within the protecte area (national park, wildlife reserive or conservation area).

3.1.3 Socio-Economic and Cultural Environment

The subproject sites of proposed 33/11 kV substationsare located in one metropolitan city, three municipalities and nine rural municipalities of ten districts of Nepal. The total area of the project affected wards is 228.58 sq.km. According to CBS 2011, the total population of project affected wards is 51,714 with 24,731 male and 26,983 female. There are diverse ethnic caste groups residing in the subproject affected wards along with indigenous caste groups: Gurung, Newar, Magar etc. The details are given in table below.

Table No. 7 : Ward level social baseline information of the sub-project sites

S.N.	Project Site	RM/M	Ward no.	Area (sq.km.)	HHs	Population			Caste/Ethnic Group
						Total	M	F	
1.	Devnagar SS	Bharatpur M.C.	2	1.34	4164	16218	8035	8183	Chettri, Brahmin
2.	Manahari SS	Mahari R.M.	8	7.8	581	2777	1334	1443	Janjati, Chettri, Brahmin, Dalit,
3.	Palung SS	Thaha M.	2	14.64	908	4024	1860	2164	Janjati
4.	Raigaun SS	Bagmati R.M.	8	33.19	730	3722	1736	1986	Janjati, Dalit,
5.	Kakani SS	Kakani R.M.	7	19.33	708	3238	1559	1679	Janjati, Chettri, Brahmin, Dalit,
6.	Unichaur SS	Mahankal R.M.	1	12.59	334	1697	813	884	Janjati, Chettri, Brahmin, Dalit,
7.	Katunje SS	Roshi R.M.	7	8.49	497	2399	1162	1237	Janjati, Chettri, Brahmin, Dalit,
8.	Mahabharat SS	Mahabharat R.M.	1	19.96	359	2260	1145	1115	Janjati, Chettri, Brahmin, Dalit,
9.	Jharlang SS	Khaniyabas R.M.	2	61.13	410	2219	1033	1186	Janjati, Chettri, Brahmin, Dalit,
10.	Dudhauli SS	Dudhauli M.	10	19.84	1120	5420	2504	2916	Janjati, Chettri, Brahmin, Dalit,
11.	Namdu SS	Baiteshwor R.M.	6	10.8	760	2845	1306	1539	Janjati, Chettri, Brahmin, Dalit,
12.	Sangutar SS	Ramechhap M.	3	9.05	500	2342	1021	1321	Janjati, Chettri, Brahmin, Dalit,
13.	Mude SS	Lisankhu Pakhar R.M.	5	10.42	620	2553	1223	1330	Janjati, Chettri, Brahmin, Dalit,
Total				**228.58**	**11691**	**51714**	**24731**	**26983**	

Note: HH= Household, M=Male, F=Female

Accessibility

All the subproject sites are accessible by road round the year. And the construction of the substation will not be affected by the condition of the existing roads. The details of the access road to the subproject sites is given below.

Table No. 8: Details of the access raod to the sub-project site

S.N.	Name of the project site	Name of the access road	Remarks
1.	Devnagar SS	Panday chowk bazar main road	Accessible from E-W highway
2.	Manahari SS	E-W highway	The site is less than 50 meter north from E-W highway
3.	Palung SS	Palung Agro motor road	The site is beside the road
4.	Raigaun SS	Jhurjhure to Raigaun road	The site is beside the road
5.	Kakani SS	Tokha-Chhahare road	The site is less than 50 m north from the highway
6.	Unichaur SS	Madyawarti Marga joining Lele Chaughare Bhukhel	The site is beside the road
7.	Katunje SS	B-P highway	The site is at 300 m south from the highway which is connected by a feeder road
8.	Mahabharat SS	Taldhunga-Jagthali-Gokule Road	The site is 20 m north from the highway
9.	Jharlang SS	Bachala-Jharlang Road	Feeder road connects the site with the highway
10.	Dudhauli SS	Madanbhandari Lok Marga	The site is less than 50 m from the highway
11.	Namdu SS	Namdu-Marbu road	The road is accessible from Lamu-Sanghu Jiri road
12.	Sangutar SS	Likhu Corridor road	The site is beside the road.
13.	Mude SS	Lamu-Sanghu Jiri Road	The site is beside the road.

4 Project Impact and Mitigation Measures

The SIDP is classified as category B on the environmental ground due to limited adverse impact on environmental and social impacts which is site-specific, largely reversible, and can be readily addressed through mitigation measures.

The Devnagar and Manahari substation lie nearby the protected area buffer zone. Other project doesn't lie in any protected areas. All the project has no significant impact in any sensitive ecosystem and has avoided areas of historical and cultural significance. The land to be used for the substations has been already acquired by NEA and there is no issue of encroachment or presence of squatters and encroachers. Some of the impacts due to construction ofsubstation projects are associated with clearing of vegetation, loss of agricultural lands and disturbances during construction, waste management of the labor camp, occupation, and community health safety during construction. Most of the impacts associated with the construction of the projects are limited and can be addressedwell and are temporary in nature. Impact and its mitigation measures proposed are presented in the matrix in section 4.1. The measures will be implemented during different phases of the project implementation

4.1 Impacts and mitigation matrix

4.1.1 Environmental Impacts

The physical and biological impact associated with the construction and operation of the project presented in table 4.1 the construction and operation of the proposed thirteen 33/11 kV substation project has minimum impact on the physical aspect of the project location and are site-specific and can be minimized. Land-use change during the pole erection will be restored to its original condition as far as possible. Details of impact and mitigation measures adopted during the implementation of the project are given in table 4.1

4.1.2 Social Impacts

The land required for substations has been already owned by the NEA and there are no issues of illegal encroachments in the sub-project sites. Social screening was carried out in all sites prior to land acquisition and no adverse social impacts were identified. However, some minor impactswere identified like noise, dust, accident, issue related to labor-management like labor camp hygiene and sanitation, potential conflict between local community and labor etc which could occur during construction phase of the projects. The adverse impact related to social issues and the potential mitigation measures are presented in table 4.3

The proposed substation sub-projects do not result in any kind of physical displacement as the lands acquired are free from residential houses as well as encroachers and squatters. In some subprojectareas , the substation lands lie in private agricultural land or community land which results inloss of culrivated lands, loss of crops and trees. But these losses were considered while paying compensation to the land owners during land acquisition. The compensation for the loss of trees and crops will be included at the time of purchasing the substation area. The poles will be installed in such manner that avoids private land while carrying out the contruction activities but if it falls under private land, NEA has no provision to provide compensation for 33 kV line and poles.

The substation lands are already acquired by paying compensation to the land owners and will have minimal impacts during construction. However, construction activities of substations might affect the surrounding areas and will require due care and attention to avoid the potential damages of standing crops.If the implementation of the project causes the loss of crops and private land in the substation area, the project will provide cash compensation for the loss. The compensation for the standing crops and private trees will be fixed based on the productivity and economic value in coordination with the district agriculture office under the leadership of project authorized personnel, representative of the projected/corresponding ward/RM/Municipality and the affected people. The compensation will be provided to the owners if the construction work causes loss of crops during construction period.

The construction of the 33kV/11 kV substation project does not have other social issues in terms of loss of properties like houses, income source, employment, and access to natural resources. Such an impact was avoided during the social screening of the project affected areas.

4.1.3 Impacts on Indigenous People:

The subproject works do not cause any adverse impacts on indigenous people like loss of income, employment, or restricted access to their resources for livelihoods. The affected IP households who sold their land to the project are compensated the land price at replacemet value. . A total of 14 households belonging to different IP groups received such compensation which also covered cost for land purchase in similar area. During the purchase of lands with the IPs, it was made sure that all these households owned other lands and had sufficient income for their livelihoods so that they were not pushed to impoverishment. It was also ensured that these households were economically better off after disposing the land as they were able to make investment in better options. The project will also provide new opportunities for them in

different ways i.e., employment in project works, increased business opportunities andincreased income during construction, increased land value, transfer of skills, etc.

The project will undertake regular communication and consultations with stakeholders, mainly the affected IP groups and ward/RM/Municipal representatives before and during the implementation/construction of the project to appraise the progress of the project and its impacts and also collect the opinion and views. Affected IPs needing assistance will be identified and specific supports will be providedin coordination with local bodies. Records of the consultation with PAF and representatives of local authority will be documented and maintained by the project.

S.N	Potential Issues	Project Issues	C/O Phases	Impacts	Mitigation Measures
	4.1 Physical Environmental Issues				
1	Changes in Landuse	All sub-project sites	C	The landuse changes due to construction of substation. Proposed project will be altered altogether 6.35 ha. of land under substation, labor camp set up and material storage. This will alter the existing landuse pattern of the project area.	• The labor camp will be proposed in the barren land and the temporary facilities setup for the construction will be restore and rehabilitated to original status to minimize the land use impact
2	Air Quality	All sub-project sites	C	The construction activities and transportation of material will generate dust, fugitive smell due to vehicular movement, which may cause temporary air pollution and have a health impact onthe community. Open burning of solid wastes from labor camps and use of firewood also pollute the surrounding	• Water will be sprayedon the access road to reduce the dust problem. • Open burning and use of firewood will be prohibited • Clean fuel source will be provided to labor for cooking • Regular maintenance of construction vehicles and machinery will be done
		All sub-project sites	O	No impact on air quality during the operation phase	• No mitigation measures will be taken
3	Noise Quality	All sub-project sites	C	Noise will be generated by the vehicular movement during the construction period. The noise and vibration by machinery during construction are insignificant because of the project nature (33/11 kV) which is expected though have an insignificant interruption to community	• The construction work will be limited to daytime as far as possible • Informed local community before starting the construction activities • Measurement of the noise level in the respective schedule in the construction phase. • Construction hours will be done only on normal days
		All sub-project sites	O	Noise generated during the operational phase will be generally from a vehicular movement which is expected to negligible	• No mitigation measures required during the operation phase
4	Waste Management	All sub-project sites	C	The improper disposal of the solid waste, muck, and fecal waste generated from the construction works, labor camps might cause the sanitary problem to construction labor and the local community	• Domestic Solid waste segregation is biodegradable will be buried. • Recycle wastes such as plastics, metal can, the glass will be collected and segregate respectively and managed as per practice. • No waste will be disposed along the public road and places in the project surrounding

					• Construction workers were aware of managing the waste from labor camps. • The contractor should build the toilet as per the number of labor involved in the construction and should be responsible for waste management at construction sites and labor camps.
			O	The personnel involved in the operation phase will generate the domestic solid waste	• The domestic waste consists of organic waste and can be easily managed by burying or through a municipal waste collection system. Solid waste should be managed as per municipal practice.
	4.2 Biological Environmental Issues				
5	Impact on Forest Area and Standing Trees	All sub-project sites	C	Namdu substation and Jharlang Substation has a total of 25 trees that will be cleared during the construction of substation.	• Since it lies in the private land, no need to carry such plantation activity.
6	Impact on Wildlife	All sub-project sites	C	Construction of substation does not restrict the habitat and wildlife movement.	• No mitigation measures are required.
	4.3 Social Issues				
1	Land, Crop, and tree loss in private land	All sub-project sites	C	All the substation lies in agricultural farmland.	• Cash compesation at replacement value is paid to all land owners disposing land to NEA. • Owners were allowed to harvest the crops /trees prior to the start of construction works.
		All sub-project sites	O	No impact during the construction phase	• No mitigation approach will be adopted
2	Impact on indigenous People	All sub-project sites	C	Indigenous people and women will likely be affected, lost income, etc.	• The project will provide some assistance to such group of people in form of community support program like livelihood enhancement program, skill development programme based on the requirement of the needed community as per the decision of NEA management.
3	Occupational Health and Safety of labors	All sub-project sites	C	Impact on health and safety of the workers and there may be occupational injuries to the workers.	An on-site medical facility and first-aid will be provided for the construction workers. • Personal protective equipment (Hard hats, gloves, and

				Accidents and injury of labors during construction of subproject works.	steel-toed shoes with rubber soles) for workers will be provided, when necessary, to minimize health and safety risks. • Education on basic hygienic practices to minimize the spread of tropical diseases, including information on methods of transmission and protection will be given. • Prohibition of drugs and alcohol on the construction site. • Fencing of the construction sites with signboards required. • Any incidence of accidents will be reported to World Bank within 24 hours of occurance.
		All sub-project sites	O	Impact on health and safety of project personnel in operational phases	• All occupational health and safety requirements are in place on sites during the operation period. • The operational Manual and professional training manual will be at all times in the facility. • There will be sufficient funds available to carry out periodic maintenance and repairs of equipment.
4	Change in aesthetic Value	All sub-project sites	O/C	The construction of the substation would result in an immitigable visual impact because it would create a change to the existing landscape. It would introduce blockage and glare. This may destroy natural beauty.	• The significant impact of substations on aesthetic value cannot be mitigated completely.
5	Labor influx, labor camps and issues related to child and forced labor	All sub-project sites	C	An increase in the number of labor leads to the issue of health and sanitation of the workers and also the solid waste management produced in the labor camp. Potential use of child labor and forced labor. Discrimiantion of labors in terms of wage rates, gender and other discriminations.	• Since the number of labor will be very small for each subproject site, labor camps will be established within the premises of the substation area. • The labor camp will be provided with a simple dry pit toilet constructed on hard ground and far from water sources. • First aid kits will be maintained for preliminary treatment in emergencies. • The domestic solid waste generated in the project area will be either buried in designed landfill areas or

					converted into compost. • Piped water from nearby communities or tankers will be provided to the workers for drinking water purposes. • Contracotrs will be made aware to comply with possible labor issues and managing them properly.
		All sub-project sites	O	Likelihood of construction workers who may reside in the construction site after their work..	• The construction workers will be returned and the construction camp will be destroyed. •
6	Structure loss	All sub-project sites	C	Potential impacts on private and public structures due to construction activitie	• Compensation will be provided to the owners as per the prevailing law and agreement between the contractors and land/ property owners.
		All sub-project sites	O	No impact in the operation phase	• No mitigation measures required
7	Construction Related transportation and carrying of material	All sub-project sites	C	An increase in the vehicle movement for transportation of construction material, which increase the traffic flow can cause the dust problem in the project location and also emission from the vehicle create temporary air pollution, increase in the probability of road accident and issues in pedestrian safety	• Manage the vehicle movement in such a manner that the project location will have less traffic and cover the loaded trucks to minimize the dust problems • Use water spray to reduce the dust problem during loading and unloading of construction material • Regular maintenance of the machinery used for construction to reduce the emission and noise pollution,As far as possible, regulate the vehicle movements in low traffic hours • Implement safety procedures during transportation of construction material to avoid road accidents and loss of life of construction labor • Placement of traffic signs and construction-related precaution signs in a strategic place in the community to avoid accidents.
			O	No impact in the operation phase	No mitigation measures required
8.	SEA/SH issues	All sub-project sites	C	Increase in number of labors may lead to misconduct, unacceptable acts, sexual favour and sexual abuses	• The labor camp should be located far from the community or settlements. • Restrictions on consuming any kinds of alcohol and

					tobacco during the construction phase. • Restrict labors from going out of labor camps unless it's necessary. • Separate labor camps for male and female labors
			O	No impact in the operation phase	• No mitigation measures required

5 Environmental management activities and Organizational setup

5.1 Environmental Management Plan

5.1.1 Impact Mitigation Matrix

This environmental management/mitigation plan would provide clear guidance to the project authority and contractor on when and how the mitigation measure should be implemented. The identified impacts due to project activities and the mitigation measures and responsible bodies are explained in the table below.

S.N	Issues	Issues/Impacts	Mitigation Measures	Location	Timing of Action	Estimated Cost	Institutional Responsibility	
							Implementation	Supervision
5.1	**Common Issues for all substation Projects**							
1	Changes in Landuse/temporary requirement of land	Land clearance for substation and other facilities such as labor camps, storagefacilities	The camp site/storage and temporary facilities will be built in the substation area.The site will be restored to original status to minimize the impact on land.	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP
		The land (6.35 ha)for the substation will be permanently used for construction of infrastructure.	The land owners of substation sites are or will be compensated at replacement price. The owners will continue cultivation of crops in the remaining lands as they were doing before the project implementation.	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP
2	Air Quality	The transportation of the construction materials, substation construction and vehicular movement of project activities will generate the dust in the surrounding area of the project	Spraying of the water along the earthen and local road use by project, near settlement. Helmets and mask will be labor/workforce	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP

3	Noise Quality	Noise generated from the vehicular movement, machinery and construction works will degrade the noise quality of the project area surrounding	Regular inspection and maintenance of the construction vehicle and machinery, limiting the construction work in daytime and earmuff will provided to worker as per need	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP
4	Waste management	The improper disposal of solid waste like cement bags, iron bars and other construction leftover and waste from the labor/labor camps might cause the sanitary problem to the local people and worker themselves.	Domestic Solid waste segregation are biodegradable will be buried, recycle wastes such as plastics, metal can, glass will be collected and segregate respectively and managed as per practice, Nowaste will be disposed along the public road and places in project surrounding, Construction worker were aware of managing the waste from labor camps, Contractor should build the toilet as per number of the labor involved in the construction.	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP
		The personnel who involved during the operation phase will generate domestic sold waste.	Domestic solid waste will be managed by burying in pits.	Sub-Project Sites	Operation	Project Cost	GSEEP	GSEEP /ESSP
5	Construction Related	Increase in the vehicle movement for	Manage the vehicle movement in such manner	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP

	transportation and carrying of material	transportation of construction material, which increase the traffic flow can cause the dust problem in the project location and also emission form the vehicle create temporary air pollution, increase in probability of road accident and issues in pedestrian safety	that the project location will have less traffic and cover the loaded truck to minimize the dust problems, Use water spray in the to reduce the dust problem during loading and unloading of construction material Regular maintenance of the machinery used in construction to reduce the emission and noise pollution from machinery, As far as possible and practicable, maintain the vehicle movement in low traffic hours, Implement safety procedures during transportation of construction material to avoid the road accidents and loss of life of construction labor. Locals also be provided awareness programs to prevent potential accidentsin the construction sites; children safety will be given higher importance in areas where schools are close to the construction sites.					

6	Occupational Health and Safety of labors	Impact on health and safety of the workers and there may be the occupational injuries to the workers.	On-site medical facility will be set up to provide the primary health facility to workers, Personal protective equipment (safety helmets, gloves and steel toe shoes with rubber soles will be provided to worker Awareness on basic hygiene practices will be provided to workers	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP
7	Change in aesthetic Value	The construction of the substation would result in an immitigable visual impact because it would create a change to the existing landscape. It would introduce blockage and glare. This may destroy natural beauty.	The impact on the aesthetic values due to project construction cannot be mitigated completely	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP
5.2 Specific issues								
1	Impact on land and standing crops due to substation	There may be loss of standing crops during construction	Cash compensation for each substationland will be provided by the project. Preference will be given to construction of the substation during the lean season to avoid the loss of standing crops.	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP

			In case of loss of standing crops, project will provide the cash compensation for the loss fixed on the basis of productivity of the area determined by DAO under leadership of project manager, representative of corresponding ward/RM or Municipality and affected people					
2.	Labor influx, labor camps and issues related to child/forced labor	Labor influx from outside may lead to the issue of health and sanitation of the workers and also the solid waste management produced in the labor camp.Other issues may include use of child/forced labor	Since the number of labor requirement is small for each project, labor camps will be established within the project premises. Labor camp will be provided with simple dry pit toilet far from water sources First aid kits will be maintained in the labor camps for emergency Waste generated from the labor camp will be buried or managed in designated landfill Locally, available piped water or tanker will be provided to worker for drinking and other purpose	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP

3.	Water logging	Substation land that lies on a flat land has a possibility of water logging during monsoon season.	Drainage pipes will be connected to the nearest drainage canal to offload the unwanted drains.	Sub-Project Sites	Construction	Project Cost	Contractor	GSEEP /ESSP
4.	Tree Cutting	25 trees needs to be cleared from Jharlang and Namdu Substation sites.	Trees will be felled and managed by the contractor before the construction of the substation starts.	Namdu and Jharlang SS	Construction	Project Cost	Contractor	GSEEP /ESSP

5.1.2 Permits and Approval

Permit and approval relevant to the proposed project construction is shown in the table

Issues	**Authority**	**Approval and permits**
Tree clearing and government-owned land	MoFSC, DFO and DAO	Approval and Permit
Tree Clearing in CF	CFUG	Approval
Works in Private Property and land	Landowners	Approval
Relocation or disturbance to infrastructure such as telephone line, footrails and tracks ectc	Respective authority, local user groups, RM development committee, Ward Office	Approval

5.1.3 Grievances redress plan

Grievance redress mechanism (GRM) will be established to allow project affected families/households (PAFs/HHs), community or other stakeholders to appeal any disagreeable decisions, practices, and activities arising from compensation for assets, environmental and community concerns related to the project. GRM for any infrastructure project provides an effective approach for complaints and resolution of issues of of the affected households/community. Considering this, a Grievance Redress Cell (GRC) has been established at the project level at PMU which consist of the following members.

Project Coordinator, Coordinator

Project Manager, 33 kV DSE & R Component, Member Secretary

Officer from Concern Rural Municipality/Municipality, Member

Secretary, from Concern Rural Municipality/Municipality, Member

The field-level GRC will be formed after the commencement of work in the site. Till then, the project level GRC will look after the grievances if any. The GRC maintains registration books and files to keep the records of complaints filed by the affected people and community. The GRC seeks to resolve the issues quickly to expedite the project works without resorting to expensive and time-consuming legal actions. The budget for setting up the grievance cell has been provided by the PMO itself.

All the grievances or complaints filed at local level will be resolved by the field level GRCs. However, grievances not resolved locally or beyond the capacity of local GRC will be forwarded to the GRC at the center which will be responsible to address them on a timely manner.

5.1.4 Stekholder engagement and Public Disclosure

Disclosure of ESMP is expected to be helpful to the local people to be aware about the project and provision of compensation and other assistance. The ESMP report will be disclosed to NEA-ESSD Website. The hardcopy of the project will be kept in the CDO office of the project affected district, ESSD office and ESSD project unit office. The copy of ESMP will be disclosed on the World Bank website and project-related websites.

6 Environmental Monitoring Plan

Monitoring is an essential aspect of the environmental and social management plan. Effective monitoring of the whole project cycle, will assist in the implementation of the monitoring plan and coordination of work of the project with concerned stakeholders as well as identify the unexpected problems/outcomes that might arise across the physical, biological and socio-economical sector and facilitate the correction of the problems on time. . Land use pattern, settlement, health and safety, infrastructure, implementation of the mitigation measures are the few areas of monitoring.

NEA/ESSD is responsible for regular monitoring and reporting of the implementation of the project. Ministry of Energy, Water Resource and Irrigation (MoEWI), Department of Electricity Development (DoED), and local bodies will also be involved during the monitoring.

The environmental and social monitoring and reporting will also includeassessment of project level impactsregularly.

To assess the work progress and evaluate the effectiveness of the mitigation measures proposed for the project, the project will undertake monitoring as follows.

a. Construction Monitoring

During the project construction period,regular monitoring will be carried to assess construction induced effects and impacts on day to day basis. In addition, compliance monitoring will also be conducted as per project ESMF. .

b. Impact Monitoring

Impact monitoring will be carried out to assess the actual level of impact due to project construction. The impact monitoring includes:

- The impact of the project on the physical, biological and socio-economic, and cultural environment of the project area,
- The accuracy of the predicted impacts during the EMP,
- The effectiveness of the mitigation measures, and
- Identify the emerging impacts due to project activities or natural processes and develop remedial action.

6.1 Compliance Monitoring

The compliance monitoring will be conducted to monitor the compliance of the proposed mitigation measures and monitoring activities during construction phase of the project. The compliance monitoring will mainly focus on;

- Timely and quality implementation of the Environmental Management Plan
- Compliance of the tender clauses by the contractors
- Compliance of the mitigation measures, and
- Overall environmental and social performance of the project.

Table No. 8: Environmental Monitoring Plan

S.N.	Parameter	Indicators	Method	Location	Schedule
A	**Construction Monitoring**				
Impact Monitoring					
Physical					
1	Air Quality	Dust around the project area	Observation	Settlement near substation	Twice in the season
2	Noise Quality	Decibel(dBA) as per GoN Standard	Measurement of Noise level using an instrument	Settlement substation	Twice in the season
3	Waste Management	Unpleasant odor and visual impact	Observation	Labor camp/ construction sites	Weekly during construction
4	Construction-related transportation and hauling of materials	Use of water spray and placement of hoarding board around the construction sites	Direct observation	Construction area	Construction period
5	Occupational Health and Safety issues	Impacts on health of the workers; No. of accidents; use of personal protective instrument by the workers	Inspection of the construction place; Records of diseases and accidents	Construction sites	Continuous during construction period
6	Employment	No. of local people	Records kept by management	Construction area	Continuous during the construction

S.N.	Parameter	Indicators	Method	Location	Schedule
		employed by the project			period and annually during operation
7	Labor camp	Toilet and drinking water facility, availability of first aid kids in a labor camp	Observation, consultation with the labor force	Construction area	Construction period
Biological					
1	Vegetation clearance and felling of a tree	Substation construction	No actions needed	All the project sites	During the Construction Period
2	Wildlife	Wildlife Habitat and clearance	Observation, discussion with local people, keeping a record of wildlife, birds, and reptiles	All the project sites	During the Construction Period
Social Environment					
1	Land loss/ RoW Land	area occupied by a single pole	Consultation with the affected people, CDC decision, project records	Affected area	During Construction
2	Crops/tree loss	Actual damage to standing crops or loss of cropping season for particular area and compensation payment for crops/fruit/tree losses	Observation and discussion with affected people, contractor and project	All project area	Construction Period
Compliance Monitoring					
1	Provision of clauses related to environmental and social	Yes/No	Review, inquiry and consultation	Kathmandu Office	Preconstruction phase

S.N.	Parameter	Indicators	Method	Location	Schedule
	safeguard mitigation measures in tender document and allocation of adequate budget for implementation of environmental mitigation measures identified in ESMP and monitoring works				

Note: - Environmental and social issues and mitigation measures identified in this ESMP will be subjected to updated during the project construction period and mitigation measures will be revised and implemented accordingly if any

7 Institutional arrangement and mechanism

NEA-ESSD and GSEEP are chiefly responsible for the monitoring and reporting of the implementation of the mitigation measures adopted for the project in coordination with the local authority and concerned ministry and departments.

8 Reporting

NEA/ESSD is responsible for regular monitoring and reporting on the implementation of the project. Ministry of Energy, Water Resource and Irrigation (MoEWI), Department of Electricity Development (DoED), and local bodies will also be involved during the monitoring.

The environmental and social monitoring and reporting will be carried regularly.

The experts from ESSD will visit the project site as per requirement for the environmental monitoring of the project and prepare the monitoring report. The project manager's office (PMO) will be responsible for the distribution of the report to the concerned agencies. The detail of monitoring parameters, schedule, method, and agencies to be consulted during construction and operation phases for the physical, biological and socio-economic, and cultural environment is presented in the table 8..

9 Environmental Management Cost

The mitigation cost and CSP for the proposed project should be atleast 0.5% - 1% of the total project cost. The amount is for implementation of the mitigation measures and monitoring activities adopted in this ESMP report.

10 Annexes

10.1 Photographs of Field Surveys

Tapping point at Rakathum Substation

Public consultation near Rakathum Substation

Proposed Katunje substation location

Public consultation near Katunje Substation

Proposed Jharlang Substation location

Consultation meeting with locals at Kintang

Kintang bazar

Consultation meeting at ward office 2, Khaniyabas R.M.

Consultation meeting at Taldhunga

Consultation meeting at ward office 9, Bagmati R.M.

Market

Consultation meeting at ward 4, Khanikhola R.M.

Proposed Mahabharat Substation

Consultation meeting at Majhitar Phedi

Meeting at ward office 8, Dudhauli M.

Meeting at ward office 9, Dudhauli M.

Consultation meeting at Ward 10, Dudhauli M.

Proposed Substation Location

Consultation meeting

Sangutar Bazar

Proposed Substation Site

Consultation meeting

Mude Bazar

Consultation Meeting at ward office