



Final Report

Environmental and Social Impact Assessment (ESIA) for 271.6km, 400kV Extra High Voltage Wajaale-Hargeisa-Berbera Transmission Line.

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ACRONYMS

AoI	Area of Influence
AAAC	Aluminium Alloy
ACSR	Aluminium with a Steel Core for Strength
AIDs	Acquired Immunodeficiency Syndrome
AoI	Area of Influence
AS	Al Shabaab
BEC	Berbera Electricity Company
BFD	Bird Flight Diverter
BI	Burning Index
BMP	Biodiversity Management Plan
C-ESMP	Construction Environment and Social Management Plan
C-ESMP	Construction Environmental and Social Management Plan
CH	Critical Habitat
CHMP	Community Health and Safety Management Plan
CIA	Cumulative Impact Assessment
CLO	Community Liaison Officer
CMP	Campsite Management Plan
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CoC	Code of Conduct
CR	Critically Endangered
CSR	Corporate Social Responsibility
DD	Data Deficient
EAPP	Eastern Africa Power Pool
ECMWF	European Centre for Medium Range Weather Forecasts
EHS	Environmental Health and Safety
EHV	Extra High Voltage
EIA	Environmental Impact Assessment
ELF	Extremely Low Frequency
EMF	Electric and magnetic fields
EN	Endangered
EPRP	Emergency Preparedness and Response Plan
ERA	European Reanalysis
ESF	Environmental and Social framework
ESHS	Environmental, Safety, Health and Security
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESPs	Energy Service Providers
ESSs	Environmental and Social Standards
FAO	Food and Agricultural Organization
FGD	Focus Group Discussions
GBV	Gender Based Violence
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIIP	Good International Industry Practice

GM	Grievance Mechanism
GRM	Grievance Redress Mechanism
GSW	Galvanized Sheet Wire
HDV	Heavy-Duty Vehicles
HH	Households
HIV	Human Immuno Virus
HoA	Horn of Africa
HOAI	Horn of Africa Initiative
HR	Human Resources
HSDG	High Speed Diesel Generator
HSE	Health Safety and Environment
HV	High Voltage
IBA	Important Bird Area
IBAT	Integrated Biodiversity Assessment Tool
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ICT	Information Communication Technology
IDA	International Development Agency
IFC	International Finance Corporation
IFIs	International Financing Institutions
IGAD	Intergovernmental Authority on Development
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
KII	Key Informant Interviews
kV	Kilo Volt
kW	Kilo Watts
LDV	Light Duty Vehicles
LMP	Labour Management Procedures
LPG	Liquified Paraffin Gas
LRP	Labour Recruitment Plan
LV	Low Voltage
MCH	Mother and Child Health
MoA	Ministry of Agriculture
MoAD	Ministry of Agriculture Development
MoECC	Ministry of Environment and Climate Change
MoEM	Ministry of Energy and Minerals
MoERD	Ministry of Environment and Rural Development
MoPD&E	Ministry of Pastoral Development and Environment
NBSAP	National Biodiversity Strategy and Action Plan
NCCP	National Climate Change Policy
NDP	Somaliland National Development Plan
NGOs	Non-Governmental Organisations
NO2	Nitrogen Oxide
NSR	Noise Sensitive Receptors
NTL	Non-Technical Summary
NTS	Non-Technical Summary
NUPB	National Urban Planning Board

NUPI	National Urban Planning Institute
O&M	Operation and Maintenance
OCN	Other Country Nationals
OHSP	Occupational Health and Safety Plan
OHTL	Overhead Transmission Line
OSCP	Oil Spill Contingency Plan
OSRP	Oil Spill Response Plan
PAPs	Project Affected Persons
PIIM	Project Induced In-migration
PIU	Project Implementation Unit
PM	Particulate Matter
POPs	Persistent Organic Pollutants
PPCB	Pollution Prevention and Control Plan
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
RCC	Reinforcement Cement Concrete
ROW	Right of Way
RPF	Resettlement Framework
SCAA	Somaliland Civil Aviation Authority
SEA	Sexual Exploitation and Abuse
SEP	Stakeholder Engagement Plan
SF6	Sulphur Hexafluoride
SGBV	Sexual and Gender Based Violence
SH	Sexual Harassment
SLHDS	Somaliland Health and Demographic Survey
SLPF	Somaliland Police Force
SMP	Security Management Plan
SOPs	Standard Operating Procedures
SPU	Special Protection Unit
SRAMP	Security Risk Assessment and Management Plan
STDs	Sexually Transmitted Diseases
STIs	Sexually Transmitted Infections
Tas	Near Surface Air Temperatures
TBD	To Be Done
TL	Transmission Line
Tmax	Maximum Temperatures
TMP	Traffic Management Plan
ToR	Terms of Reference
TSP	Total Suspended Particles
TVET	Technical and Vocational Training
USD	United States Dollar
V/m	Volts per Meter
VAC	Violence Against Children
VBIED	Vehicle Borne Improvised Explosive Device
VOC	Volatile Organic Compounds
VOPs	Vantage Observation Points



VU	Vulnerable
WBG	World Bank Group
WHO	World Health Organization
WMP	Waste Management Plan
ZoI	Zone of Influence

EXECUTIVE SUMMARY

This Environmental and Social Impact Assessment (ESIA) Study Report presents an assessment of the potential environmental and social risks and impacts associated with the proposed construction of the High Voltage (HV) Wajaale-Hargeisa-Berbera 400kV double circuit transmission line and related facilities ('the Project'). The project is a 271.6 km line, starting from Wajaale and terminating at a substation in Berbera.

This ESIA report has been prepared by **EMC Consultants Limited** (appointed by Eastern Africa Power Pool) for Ministry of Energy and Minerals (MoEM), Somaliland (the "Proponent") is part of the 550 km transmission line starting from Debre-Zeit to Hurso and then from Jigjiga-Tog Wajaale on the Ethiopian side into Somaliland from Tog-Wajaale to Hargeisa and terminating in Berbera. Separate ESIA studies have been prepared for the other sections of the transmission line.

PROJECT FINANCIER

The project is financed by the World Bank under the The Horn of Africa Horn of Africa Regional Power System Transformation Project (P179036)

PROJECT PROPONENTS

Eastern Africa Power Pool

The Eastern Africa Power Pool (EAPP) is a regional institution established in 2005 to coordinate cross-border power trade and grid interconnection among nations of the Eastern Africa region¹. The EAPP secretariat has established a Project Implementation Unit (EAPP-PIU), headed by a Project Manager, a social specialist and environmental specialist who will provide safeguards support to the project.

Ministry of Energy and Minerals

The vision of the Ministry of Energy and Minerals is to contribute to Somaliland's social and economic development through the sustainable utilisation of the country's energy, minerals, and petroleum resources for the benefit of Somaliland people by 2030. The MoEM has established a Project Implementation Unit (MoEM-PIU), headed by a Project Manager and dedicated staff, which include a social specialist and environmental specialist who will provide safeguards support to the project.

ESIA OBJECTIVES

The ESIA objectives are identify and assess potential beneficial and adverse environmental and social impacts and risks, including direct, indirect, induced environmental and social impacts associated with project activities including ancillary and associated facilities (if any); and develop proposed measures to avoid, reduce, mitigate, and/or compensate for identified adverse environmental and social risks and impacts, including the institutional

¹ The EAPP has thirteen (13) member states that signed the Inter-Governmental Memorandum of Understanding (IGMOU) and fourteen utilities that signed the Inter Utility Memorandum of Understanding (IUMOU). The pool countries comprises: Burundi, Djibouti, Democratic Republic of Congo (DRC), Rwanda, Egypt, Ethiopia, Kenya, Sudan, Tanzania, Uganda, Libya, South Sudan and Somalia; with indications that Eritrea may join soon. The General Secretariat of the EAPP is based in Addis Ababa, Ethiopia with a mandate to coordinate the development and functioning of the power pool.

arrangements, timing and required capacity building to implement all such measures and monitor their effectiveness.

ESIA METHODOLOGY AND APPROACH

Specific methods used for the study include (i) literature review, (ii) field surveys, and (iii) stakeholder consultations. Consultations were held with key informants, project affected persons, local communities, and other interested stakeholders along the project corridor.

PROJECT DESCRIPTION

The Project comprises the following key components:

- 400kV electrical transmission line (271.6km starting from Wajaale-Hargeisa-Berbera)
- Substations in Hargeisa and Berbera but whose locations are currently undetermined and hence not part of the ESIA. A separate ESIA will be prepared for the substations once details that would enable determination, identification and prediction of impacts are known.

There are no associated facilities² in this Project.

BASELINE BIOPHYSICAL AND SOCIO-ECONOMIC ENVIRONMENT

Climate: Berbera features a hot arid climate (Köppen BWh). It has long, sweltering summers and short, hot winters, as well as very little rainfall. Average high temperatures consistently exceed 40°C or 104°F during nearly four months of summertime (June, July, August and September). Hargeisa in general has a tropical climate. The day temperatures range from 24°C (74°F) in January to 31°C (87°F) in May. The climate zone of the Gebiley district is semi-arid (Moist) with a bimodal rainfall pattern: shorter fall (September-November) and longer spring (end of March-mid June), which leads to two harvest periods. Annual rainfall in the Gebiley district ranges from 292mm to 568mm and the average temperature ranges from 20°C-24°C.

Topography: The elevation profile of the transmission line from Wajaale to Berbera is generally sloping downwards from an altitude of about 1742m asl at SAP3-2 to 212m asl at SAP3-20 at Berbera.

Flora and Fauna: The dominant species of flora along the transmission line include *Acacia tortilis* (Umbrella Thorn Acacia), *Commiphora africana* (African Commiphora), *Boswellia papyrifera* (Frankincense), *Balanites aegyptiaca* (Desert Date) and *Tamarix spp.* (Tamarisk). The mammalian species along the transmission line route include Rüppell's Fox, *Hyaena hyaena*, Stripped hyaena, Common genet, Common slender mongoose, Aardvark, Rock Hyrax, Warthog, Hamadryas Baboon, Abyssinian Hare, Somalian grass rat, Crested porcupine, Geranug, Pelzeln's Gazelle, Salt's Dik-dik and Speke's gazelle.

² "Associated Facilities" means facilities or activities that are not funded as part of the project and are: (a) directly and significantly related to the project; and (b) carried out, or planned to be carried out, contemporaneously with the project; and (c) necessary for the project to be viable and would not have been constructed, expanded or conducted if the project did not exist.

Avifauna: There are 2 IBA's within a distance of between 10km and 50km from the transmission line route Boorama Plains and Gacan Libaax with avifauna species that are categorized as Critically Endangered (CR) and Endangered (EN). 5 species are classified as CR and 10 species classified as EN. The common avifauna observed along the transmission line route include *Lamprotornis suburbus*, *Lanius somalicus*, *Merops albicollis*, *Pterocles exustus* Pied Kingfisher (*Ceryle rudis*), Lesser Crested Tern (*Thalasseus bengalensis*), Greater Crested Tern (*Thalasseus bergii*), Sooty Gull (*Larus hemprichii*), Brown Booby (*Sula leucogaster*), Black-winged Stilt (*Himantopus himantopus*), Sandwich Tern (*Thalasseus sandvicensis*), White-breasted Cormorant (*Phalacrocorax lucidus*) and Yellow-billed Stork (*Mycteria ibis*).

A biodiversity scoping report and terms of reference for biodiversity management plan has been prepared; this ESIA will later be updated based on a full BMP.

Soils and Geology: Along the project transmission route, the dominant soil types are Leptosols, Vertisols, Cambisols and Regosols. The dominant geology is sandstones, limestones, sand, silts, gravels, and biotite and/or amphibole schists. Gabiley, Hargeisa and Berbera lie within a tectonically active region characterized by the East African Rift system.

Hydrology: There is only one perennial river along the transmission line route (Togga Baba). Along the project transmission line route, the rivers crossed by the project include 1 main river Togga Baba and 5 small rivers namely Togga Maroodijeex, Togga kodayare, Togga Dacarbudhug Caloola, Togga, Xyod-Balae Abdaal and Togga Cabaadweyne.

Land Cover and Land Use: Land cover along the transmission line is mainly shrubland, sparse vegetation and farmland.

SOCIO-ECONOMIC AND CULTURAL BASELINE

Location and Size: The proposed 271.6km Wajaale-Hargeisa-Berbera 400 kV EHV power transmission line including substations and dispahtc centre is located in the regions of Marodi-Je and Sahil and passes through Hargeisa before trajectoring to Berbera. 3 districts namely Gebiley, Hargeisa (located in Marodi-Je region) and Berbera (located in Sahil region) are traversed by the project and 22 villages.

Demographics and Household Composition: Majority (91.2%) are male household heads and the remaining 8.8% of the households are headed by females, categorized as single, widowed, or divorced. The average family size is 6.2 persons per household. The estimated household population per affected village and based on the socio-economic survey range between 50 to 2,000 households. There are slightly more male than female population and it is about 91.2% and 8.8% respectively. The age structure of the surveyed household members is dominated by youthful population. Majority (92%) of the household heads are married, and the remaining are widows (7.9%), divorced (1.3%) and never married (0.2%).

Economy and Livelihoods: Along the transmission route, the land tenure is freehold with all the households owning the land under customary law.

Settlement Patterns and Housing: Most houses observed in the project affected villages are made from local materials. Majority (89%) of the households are living in mobile housing structures which is common among Somali pastoralist and agro-pastoralist communities and the remaining 11% of the households live in non-mobile fixed housing structures which is common. None of the residential structures has modern features such as an inside bathroom or toilet or running water.

Education: Majority of the schools in all the villages traversed by the transmission line are primary schools. The proportion of illiterate household heads in the project affected villages in terms of education attainment is significantly high (48.1%) depicting a situation where majority of the household heads have not attended any kind of education, formal or informal.

Health: Out of the 22 villages in the study area, only 5 villages have a health facility referred as Mother and Child Health (MCH) care center. The rest of the villages lack a health facility and have to travel to other villages or districts to seek health services. The MCH lack essential resources (material and human) to sustain the operations.

Energy: Households in the project affected villages use biomass energy in the form of firewood and charcoal as the sole source of energy in the area for cooking and for other socio-economic purposes.

Water and Sanitation: The water supply situation in the villages along the transmission line is exceptionally severe. This is due to its very low rainfall. Boreholes, *Berkeds* and dams constitute the primary source of water with 46% of the population in the villages traversed by the transmission line. The sanitation of households along the transmission line is poor, as most of the households have no organized disposal system for the human excreta or other domestic waste.

STAKEHOLDER ENGAGEMENT

Stakeholders were identified, mapped, and consulted as part of the ESIA study in line with the ESS 10 with respect to stakeholder consultations. The consultations targeted communities who were in the project Area of Influence (AoI) and hence likely to be directly or indirectly affected by the project. Consultations also targeted key institutions including Director of Energy Department (MoEM), Ministry of Employment, Social Affairs and Family, Ministry of Agriculture Development, Ministry of Environment and Climate Change, National Energy Commission, Municipality of Hargeisa; Director of Disaster Risk Management and Social Affairs, Gebiley Municipality Social Service Director and local community members within the AoI along the transmission line. A total of 478 persons were consulted with 313 (male) and 165 (female). The key issues and concerns emanating from the consultations are highlighted below and were incorporated in the ESIA in relation to mitigation measures.

- Community health and safety during construction and operation
- Air emission impacts during construction
- Cultural conflict between foreign workers and local community members
- Land acquisition impacts and concerns regarding compensation.
- Solid waste management during construction.
- Noise pollution during construction
- Influx of workers and associated impacts
- Conflict and competition over scarce resources (between workers and local communities) especially water.
- Impacts on grazing land (denial of access or restricted access)

A Stakeholder Engagement Plan (SEP) including a Grievance Mechanism (GM) has been developed for the Project and is appended to this ESIA (Annex B). This document identifies Project stakeholders as well as the commitments of the Project owner with regard to stakeholder engagement and grievance management as the Project progresses.

ESIA DISCLOSURE

The report upon approval by Republic of Somaliland will be disclosed on MoEM website, as well as World Bank's external website. Summaries of the ESIA will be disclosed to PAPs in culturally appropriate languages and formats using feasible engagement techniques such as Focus Group Discussion (FGDs) and public barazas, in accessible locations and in a timely manner that ensures meaningful consultations and considering any mobility, literacy and disability challenges.

IMPACT ASSESSMENT AND MITIGATION MEASURES

Potential Beneficial Impacts

- Stimulation of the local economies
- Reduction in fuel costs
- Avoided generation capacity costs
- Reduced operations costs:
- Reduced transmission system improvements costs
- Improved power supply
- Education and health
- Reduced GHG emissions

Potential Negative Impacts and Mitigation Measures

The negative impacts identified in this ESIA during the planning, construction, operation and decommissioning phase of the project, including waste generation (hazardous and non-hazardous), air pollution, noise pollution and vibration, risks of erosion of exposed soil, occupational health and safety risks, community health and safety impacts, impacts on flora, fauna and avifauna, modification and deterioration of the landscape, strain on water resources used by local communities, increase in social maladies, labour influx gender based violence, sexual exploitation, abuse and harassment, displacement (resettlement) impacts will be limited to the transmission line ROW/wayleaves and can be mitigated using the measures proposed in the ESMP as well as the preparation and implementation of C-

ESMP. The mitigation measures of the potential negative environmental and social impacts and risks from each of the major activities are outlined in the ESMP and include (i) effective use of Personal Protective Equipment (PPE) to minimize such risks during construction and operation phase; (ii) implementing traffic management measures to minimize accidents; (iii) implementing a labor influx measures to minimize gender-based violence/sexual harassment risks; (iv) employing dust suppression measures during construction, (v) minimizing vegetation clearance and re-vegetating/landscaping cleared areas, (vi) GBV/SEA/SH including signing of Code of Conduct (for workers) (vii) preparation of Construction ESMPs by contractors (viii) development of Water Use Plan informed by the Water Resource Assessment report (Annex H) which recommends drilling of boreholes for use during construction by contractor (ix) development of Biodiversity Management Plan (BMP) specifically addressing impacts on avian fauna including design measures to prevent electrocution and bird collision through industry best practice.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

This ESIA includes an ESMP which details the mitigation measures, environmental monitoring activities, institutional responsibilities, and environmental management capacity building. The relevant ESMP provisions are included in bid documents for contractors.

Construction Environment and Social Management Plan

The Contractor will prepare a comprehensive Construction Environment and Social Management Plan (C-ESMP).

CONCLUSION

This is a much-needed project in view of the benefits of the impacts. Even though there are a number of risks and impacts identified, these are general construction risks that could be managed through application of the mitigation hierarchy and implementation of robust environmental and social management programs coupled with active supervision and monitoring by MoEM-PIU and EAPP-PIU. The project is linear in nature and will only acquire 40m of Right of Way (RoW) along the 271.6km which is 1086.4 Ha and in effect has a moderate footprint thereby minimizing the impact footprint including displacement-related impacts.

The project will provide a reliable supply of electricity to the region and the national grid, which comes along with many benefits. For the project components, which are suggested to be maintained and those where alternatives were provided, an evaluation of the positive and negative impacts was performed, and an ESMP drawn up. The ESIA report has recommended mitigation measures and formulated an environment Management plan for the risks and impacts identified. Further studies such as biodiversity assessment have been recommended.

I INTRODUCTION

I.1 Background of the Project

This Environmental and Social Impact Assessment (ESIA) report has been prepared to inform the design, construction, and operation of the Wajaale-Hargeisa-Berbera 400kV double circuit transmission line (the “Project”) in Somaliland, the autonomous region of Somalia. The project is jointly owned by Eastern Africa Power Pool (EAPP) and Somaliland and is designed to facilitate power trade between Ethiopia and Somaliland, making sure that Somaliland will get access to cheaper and green power from Ethiopia. The project comprises the following:

1. The construction and operation of 271.6 km power transmission line (TL) traversing through the regions of Marodi-Jeh and Sahil, starting from Wajaale (border between Somaliland and Ethiopia) via Hargeisa and terminating at Berbera.
2. Construction of 2 sub stations in Hargeisa and Berbera. The sites for the sub stations have not been identified and therefore this ESIA does not include them. A separate ESIA will be prepared when the locations of the substations are known.

Based on the schematic design, the expected total Right of Way (RoW) of the transmission line is approximately 550km and 40metres wide, starting from Debre-Zeit in Ethiopia, passing into Hurso, then continuing from Jigjiga to Wajale and into Somaliland (Hargeisa) and terminating at Berbera in Somaliland. The scope of this ESIA is limited to the section of the transmission from Wajaale to Berbera through Hargeisa³.

I.2 Project Financier

The project is financed by the World Bank under the Horn of Africa Regional Power System Transformation Project (P179036). The 271.6km Jigjiga-Tog Wajaale 400kV double circuit transmission line is part of the 550km transmission line starting from Debre-Zeit to Hurso and then from Jigjiga-Tog Wajaale on the Ethiopian side into Somaliland from Tog-Wajaale to Hargeisa and terminating in Berbera. Separate ESIA studies have been prepared for the other sections of the transmission line.

I.3 Project Development Objectives

The Horn of Africa Regional Power System Transformation Project (P179036) is a World Bank financed project whose objective is to enhance regional integration of energy supply and to improve energy access in the borderlands in Horn of Africa countries.

I.4 Project Proponents

I.4.1 Eastern Africa Power Pool

The EAPP Secretariat is responsible for the implementation of the International Development Agency (IDA) grant. The EAPP has established a Project Implementation Unit (EAPP-PIU), headed by a Project Manager and dedicated staff, which include a procurement specialist, a financial management specialist, social specialist, environmental specialist, and technical experts. The EAPP-PIU reports to the Secretary General of EAPP.

³ Separate ESIA reports have been prepared for the Debre-Zeit Hurso 330km TL in Ethiopia and 73.1km Wajaale-Berbera TL located in Somaliland) known as the Northern Interconnector.

1.4.2 Ministry of Energy and Minerals

The vision of the Ministry of Energy and Minerals is to contribute to Somaliland's social and economic development through the sustainable utilisation of the country's energy, minerals and petroleum resources for the benefit of all Government of Somaliland people by 2030. The mission of the Ministry of Energy and Minerals is to establish, direct and promote the sustainable utilisation of Government of Somaliland's energy, minerals and petroleum resources to support the country's social and economic development through the development and implementation of policies, strategies and programs that guide, facilitate and coordinate the work of government and all other stakeholders in the energy, minerals and petroleum sectors. The mandate of the Ministry as follows:

- Exploitation of the hydroelectric and other power sources of renewable energy
- Development and implementation of the policies and strategies to develop energy power generation.
- Designing and executing regulatory standards for electricity power generation needed in urban and rural areas.
- Development, facilitation, and promotion of renewable energy and other natural resources for the use by the people of Somaliland
- Designing and execution of regulatory standards for electricity power generation needed in urban and rural areas.
- Issuing of licenses to Electricity Service Providers (ESPs) (adjusted by Presidential Decree).

1.5 Project Justification

The interconnections aim at contributing to the economic development of Somaliland, by extending clean power for domestic and commercial consumption in Somaliland. Specifically, the interconnections will:

- Link power generation facilities in Ethiopia to the main load centers in Somaliland, where an important growth of the electricity consumption is foreseen.
- Favorize the integration of non-dispatchable renewable generation,
- Facilitate cross border regional power trade,
- Improve the security of supply and mitigate the power deficits of the countries.
- Foster the regional integration.

The project is a priority investment under Pillar I of the Horn of Africa Initiative (HOAI), which focuses on delivering physical infrastructure and technical assistance to regional institutions and promoting regional approaches to service delivery. These lines were prioritized in the regional strategies as shown in the Horn of Africa Initiative Ministers communique dated October 18, 2019, Eastern Africa Power Pool (EAPP) Strategic Plan (2018-27) and in the Intergovernmental Authority on Development (IGAD), Regional Infrastructure Master Plan–Energy Sector Report (2020). They form part of the key transmission corridors in EAPP that will result in the interconnection of all 13 EAPP member countries in the next five years that include Burundi, Djibouti, DRC, Egypt, Ethiopia, Kenya, Libya, Rwanda, Sudan, Uganda, and Tanzania South Sudan and Somalia and has the potential to interconnect with the Southern Africa Power Pool and with Egypt and the rest of the Middle East.

Power trade can bring a multitude of benefits to Horn of Africa (HoA) countries including lower operating costs through optimized dispatch, lower investment costs through sharing of reserves and coordinated planning, lower greenhouse gas (GHG) emissions through cost-efficient and regional renewable energy projects, increased sector resilience, increased access and reduced unmet demand, increased viability of investments catering to larger regional markets, improved financial standing of utilities, and a reduced strain on limited state budgets. The benefits from interconnectors with Somalia are especially large since they almost entirely rely on expensive and inefficient fossil fuel resources (diesel and/or heavy fuel oil) for power generation.

1.6 Project Scope and Objectives

The objective of the project is to provide transmission capacity to cater for grid interconnection between Ethiopia and Somaliland. The interconnections aim at contributing to the economic development of Ethiopia and Somaliland which include:

- To link power generation facilities located in Ethiopia to the main load centers located in Somaliland, where an important growth of the electricity consumption is foreseen in presence of generation availability,
- To favorize the integration of non-dispatchable renewable generation,
- To enhance cross border regional power trade
- To improve the security of supply and mitigate the power deficits of the countries.
- To foster the regional integration

1.7 ESIA Objectives

The scope of this ESIA relates to the construction and operation of a 400kV 271.6km transmission line as part of the 550km long Ethiopia-Somalia interconnection project. The purpose of the ESIA is to document the potential effects of the Project and recommend measures to manage and monitor those effects. The main objectives are:

- To undertake screening and scoping of the proposed routes to identify any environmental or social risks or impacts which may affect the feasibility of the proposed alignments while taking into account the findings and recommendations of the feasibility study.
- To review the applicable national environmental and social legislation and policy frameworks that potentially relate to the project.
- To carry out site investigations to collect primary data and review all available relevant secondary literature to establish a comprehensive environmental and social baseline (including physical, biological, social, cultural, economic and security environments) for the project Area of Influence.
- To identify and assess potential beneficial and adverse environmental and social impacts and risks, including direct, indirect, induced environmental and social impacts associated with project activities including ancillary and associated facilities (if any).
- Undertake an assessment of the potential cumulative impacts associated with the proposed project activities.
- To develop proposed measures to avoid, reduce, mitigate, and/or compensate for identified adverse environmental and social risks and impacts, including the institutional arrangements, timing and required capacity building to implement all such measures and monitor their effectiveness.

- To identify potential opportunities and design appropriate measures to maximize complementary economic, financial, environmental, and social benefits of the project.
- To propose measures for ensuring that all adversely affected people, especially those who may be physically or economically displaced (regardless of whether or not they are required to relocate) receive assistance to enable them to improve or retain their pre-project living standards and be able to participate and share the benefits of the development.
- To propose measures for ensuring that impacts on indigenous peoples/communities as defined by ESS7 are avoided, minimized, mitigated and/or compensated, and that mechanisms are designed to ensure their meaningful participation during project planning and implementation, and that they receive culturally appropriate benefits under the project.
- To affirm the presence (or not) of communities who meet the ESS7 criteria in the area of influence along the proposed transmission line. If such indigenous communities are found to be present in the project area, to apply the free, prior, and informed consent requirements as defined by ESS7 to confirm that the project enjoys their broad support and to recommend the culturally appropriate channels for consultations with them in future.
- To assess the potential risks related to labour influx, Gender Based Violence (GBV) especially sexual exploitation and abuse, that could be exacerbated by the activities of the project.
- To conduct public consultation processes for each line that ensures that project affected people and other interested stakeholders are informed about the project and its activities along with possible impacts; and,
- Develop management plans and frameworks to address risks and impacts identified during the ESIA process in line with the requirements of ESS1-8 and 10.
- To advise on project alternatives

1.8 ESIA Methodology and Process

This ESIA Report follows the completion of a Scoping Report in 01/2024 that was submitted to EAPP-PIU. The scoping report provided a description of the baseline environment, a description of the stakeholder engagement for data collection undertaken at the time of writing, and a preliminary appraisal of the potential impacts of the project. The terms of reference (ToR) of the ESIA were provided in the scoping report, presenting the range of issues to be addressed in the ESIA process with regards to the baseline desktop studies and field surveys and to the scope of the ESIA Report.

1.8.1 Area of Influence–Environmental and Social Definition

For the purposes of this impact assessment, the definition of the Area of Influence/Zone of Impact (ZoI)⁴ given in ESS 1 is used. For this Project, the direct AoI/ZoI is the spatial

⁴ The area likely to be affected by: (i) the project and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project; (ii) impacts from unplanned but predictable developments caused by the project that may occur later or at a different location; or (iii) indirect project impacts on biodiversity or on ecosystem services upon which affected communities' livelihoods are dependent. Associated facilities are facilities that would not have been constructed or expanded if the project did not exist and without which the project would not be viable.

extent of the Project footprint and related facilities as well as on the associated effects on the receiving environment. This encompasses the transmission line RoW described as the direct area of influence considered to be: 1km either side of line for the 400 kV (i.e., 2km in width) which encompasses also the 40m transmission line RoW.

1.8.1.1 Environmental AoI

The environmental AoI for the project includes the project transmission line and encompasses the ROW and the surrounding area where potential direct environmental impacts and risks are anticipated. Specifically, for the transmission line, the environmental AoI has been defined to include a buffer of 5km on both sides of the line (10km) and inclusive of the 40m ROW. This AoI encompasses the Project components, ancillary facilities, and the expected spatial extent of potential environmental direct impacts from long-term operation.

1.8.1.2 Social ZoI

The social AoI for the Project includes population settlements and activities in and around the RoW and the surrounding areas where potential direct social impacts and risks are anticipated. 1km zone on both sides of the transmission line is considered to be the composite AoI for direct impacts from the project. The **indirect** AoI encompasses areas potentially affected by cumulative impacts as well as areas that could be impacted indirectly by Project activities. The indirect ZoI will differ between various resources and receptors.

1.8.2 Biophysical Baseline Studies

Under the scope of the biophysical components, field visits to several pre-identified locations were undertaken in order to survey the baseline conditions and identify the main potential impacts of the mentioned project from the start to the end of the transmission line. In order to better systematize the data collection and subsequent analysis, in view of the description of the ecosystems to be crossed and vulnerability and accessibility, all the three route options proposed by feasibility study and within the 1km either side of line/corridor were assessed as direct AoI and 5km on either side of the line as buffer for biodiversity assessment. Before the survey, a literature review was undertaken on the vegetation cover of the area under assessment, and together with analyses of satellite images, this information was used as a basis for the fieldwork. After the desktop analysis, field visits were held in order to collect data for ground-truthing. The different vegetation/habitat types as well as the flora and fauna component were analyzed. The occurrences of the main plant and animal species (mammals, birds, reptiles, and amphibians) were recorded with the assistance of field guides, scientific references, satellite material and other bibliographic resources available.

1.8.3 Socio-Economic Baseline Studies

The geographical focus of this baseline is a socio-economic AoI which was defined as:

Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.'

1. All the settlements totally or partially within a 2km corridor (1km either side of the centre line) running the entire length of the transmission line.
2. As most surveyed settlements are located close to the lands they cultivate, it is expected that most of the impacts, including land-based impacts, will occur within this corridor. Some settlements may be located further away from the 1km corridor and still have cultivated land within the corridor.
3. Information at federal, region and village level has been gathered from secondary sources using publicly available information. Data presented for the socioeconomic Study Area has been gathered from publicly available secondary sources along with primary data gathered during a field visit to the Study AoI.
4. The fieldwork undertaken included a high-level settlement survey, key informant interviews, focus group meetings and ground truthing of points of interest encompassing settlements within the 1km corridor.
5. The field work focused on high level socioeconomic information including demographic estimates (e.g., population size, age, and gender distribution estimates, etc.), main livelihood activities and land uses, land tenure, health and education and access to basic infrastructure and services. The list of engagement activities undertaken, and number of people interviewed/consulted in each of these settlements is presented in Annex A of this ESIA.

As such, the socioeconomic information presented in the baseline focuses to the extent possible on the AoI (i.e. the 2km-10km corridor) based on a combination of data collected during the field visits and additional secondary sources. Information is provided at a higher level (regional) as applicable when local level information is not available or when the general information applies at the local level. It should be noted that specific information relative to land affected households (land ownership status, asset inventories, etc.) was not included in the scope of the ESIA fieldwork. This information will be collected as part of the RAP preparation process.

1.8.4 Stakeholder Consultations

A number of engagements were held with stakeholders at the national, regional, district and village levels (see chapter 6) using public meetings, Focus Group Discussions (FGD) and Key Informant Interviews (KII). Household interviews were also conducted in sampled households in all the 22 villages that the transmission line passes through.

1.8.5 Final ESIA Report Submission

The ESIA will be submitted to EAPP-PIU and MoEM-PIU for review and then to Ministry of Environment and Climate Change (MoECC), the institution mandated to approve ESIA in Somaliland for eventual approval and disclosure. Approved ESIA report will be disclosed on the website for EAPP, MoEM, MoECC as well as World Bank's external website. The summary ESIA report will be distributed in hard copy at the regional and district level to facilitate public access to the document.

1.9 Report Structure

In order to provide clear presentation of the ESIA procedures including their results, conclusions and recommendations, this report is structured as follows:

1. **Chapter 1. Project Overview/Introduction** (this chapter). The chapter introduces the Project by providing details of its location, scope, owner, and developer.
2. **Chapter 2. Project Description.** This chapter describes the background and phasing of the Project, including descriptions of the main and auxiliary facilities, infrastructure, associated facilities, as well as definition of the Project boundaries in the form of the Project area of influence.
3. **Chapter 3. Policy Legal and Institutional Framework.** This chapter provides an overview of the national and international legal framework, within which the Project is to be developed and implemented. Environmental and social legal requirements of the Republic of Somaliland is considered together with the applicable World Bank ESS.
4. **Chapter 4. Baseline Environmental and Socio-Economic Conditions.** The existing environmental and socio-economic baseline is described and characterized in this chapter.
5. **Chapter 5. Stakeholder Engagement and Grievance Management.** This chapter describes the stakeholder engagement process adopted by the Project. It describes the results of consultation activities undertaken earlier and as part of the ESIA process. It also provides stakeholder identification.
6. **Chapter 6. Analysis of Project Alternatives.** The key process solutions are presented as they are seen at the current stage of planning, alongside with considered alternatives and justification of the preferred alternative.
7. **Chapter 7. Assessment of Potential Risks and Impacts.** This chapter presents the assessment of potential environmental and socio-economic impacts, including identification of mitigation measures and monitoring requirements. Impacts of the Project are assessed for each component of the environment. Impacts during the Project implementation are assessed on a topic-by-topic basis. This chapter addresses potential cumulative impacts of the Project and other third-party economic activities in the region.
8. **Chapter 8. Environmental and Social Management.** This chapter describes the approaches to environmental and social management across all Project activities and recommends the management procedures and plans to be adopted to ensure compliance with the applicable international requirements throughout the life of the Project.
9. **Chapter 9. Conclusion** provides summary of the key significant impacts, mitigations, and monitoring, as well as recommendations for further studies to remove uncertainties.
10. **Chapter 10. Annex** contains various annexes of the report

2 PROJECT DESCRIPTION

2.1 Project Location

The proposed Wajaale-Hargeisa-Berbera EHV 400kV transmission line is located in Somaliland and traverses 2 regions i.e. Marodi-Jeh and Sahil starting at Wajaale (border between Ethiopia and Somaliland) passing through Hargeisa and terminating at the proposed Berbera. The line crosses 3 administrative districts (Gebiley, Hargeisa and Berbera) and a total of 22 villages. The administrative locations of transmission line are shown in Figure 2-1.

Figure 2-1: Transmission Line Route



Source: EMC Consultants 2024

2.2 Project Activity Phases

The Project schedule includes the following four phases:

- **Pre-Construction phase (Phase 1):** includes detailed design, acquisition of land for the ROW and ancillary infrastructures (e.g. construction of workers' accommodation, identification of material sites) etc.
- **Construction, pre-commissioning, and commissioning phase (Phase 2):** includes civil works, construction of buildings and installation of site facilities, as well as mechanical and electrical works for transmission line and substations. The construction activities are planned to take approximately 18-24 months including pre-commissioning and commissioning phases. Currently it is foreseen that the main construction activities will start in the third quarter of 2025 and will be concluded in mid-2027.
- **Operations and maintenance phase (Phase 3):** the operation will commence and involve periodic maintenance activities at the Project site facilities and ancillary infrastructure. The design life of the line is of 50 years.
- **Decommissioning phase (Phase 4):** At the end of the planned operational lifetime, the operation of the Project facilities and ancillary infrastructure will be reviewed and either extended or decommissioned. Decommissioning will involve the removal and reuse/recycling/disposal of surface structures and the reinstatement and restoration of the affected sites.

2.3 Project Salient Features and Components

The main purpose of this project will be to evacuate 400kV HV power from Wajaale to Berbera passing through Hargeisa from where it will be energized into the national grid as part of the Ethiopia-Somaliland interconnector.

2.3.1 Extra High Voltage Transmission Line

The proposed transmission lines would be overhead transmission line consists of HV 400kV. Along the 271.6km stretch, it will require the erection of 679 towers, (271.6km*1000m/400m), each will be spaced at average distance of 400m (depending on the terrain and stability of the soil). The transmission line supporting structures will be steel lattice towers of two types-tension and suspension. Tension towers will be installed in angles and suspension towers will be installed along the line as load bearing support. The salient features of the 400kV Wajaale-Hargeisa-Berbera transmission line are given in Table 2.1.

Table 2-1: Project Salient Features

#	Features	Description
1	Voltage Rating	400kV
2	Type of Transmission Line	Double Circuit
3	Width of T/L Right of Way (RoW)	40m
4	Type of Line Support	Steel Towers
5	Conductor	AAAC Ash 180.7 mm ²
6	Conductor Material	Aluminum Alloy
7	Line Insulator	Disc type, Porcelain
8	Type of Connection	Substation
	Tapping point:	Jijiga Substation

	Termination point:	Hargeisa Substation
9	Number of Angle Towers	20
	Approximate number of towers to erect:	679
10	Average/Standard Tower Height (m)	40m
11	Approximate Length of T/L	271.6 km
	Average span between towers over normal topography	400m
12	Total land requires for installing a typical Tower	256m ² (16m x 16m)
13	Standard Distance between phase-to-phase conductors (approx.)	4m

Source: Feasibility Study Report

Table 2-2: Tower Angle Point Locations

Angle points	Easting(X)	Northing(Y)	LONGITUDE	LATITUDE
SAP3_1	250879.460	1039895.220	42° 43' 53.4441" E	9° 24' 00.4519" N
SAP3_2	252613.415	1043799.788	42° 44' 49.4319" E	9° 26' 07.8556" N
SAP3_3	257273.665	1046314.363	42° 47' 21.6170" E	9° 27' 30.6414" N
SAP3_4	273449.341	1045939.217	42° 56' 11.8039" E	9° 27' 21.6618" N
SAP3_5	315234.237	1069013.566	43° 18' 57.7096" E	9° 39' 59.9737" N
SAP3_6	322583.777	1062866.417	43° 22' 59.7383" E	9° 36' 41.0530" N
SAP3_7	351110.085	1047398.884	43° 38' 37.3567" E	9° 28' 21.5757" N
SAP3_8	363606.863	1041236.904	43° 45' 27.8212" E	9° 25' 02.4983" N
SAP3_9	406855.959	1027630.832	44° 09' 06.8526" E	9° 17' 43.7146" N
SAP3_10	407555.345	1027839.115	44° 09' 29.7597" E	9° 17' 50.5502" N
SAP3_11	411673.235	1063039.787	44° 11' 42.0670" E	9° 36' 56.9343" N
SAP3_12	411690.145	1064760.130	44° 11' 42.4892" E	9° 37' 52.9464" N
SAP3_13	446512.758	1089868.242	44° 30' 43.8194" E	9° 51' 32.6003" N
SAP3_14	467651.214	1103424.282	44° 42' 17.4683" E	9° 58' 54.7927" N
SAP3_15	473793.939	1105051.830	44° 45' 39.1929" E	9° 59' 47.9476" N
SAP3_16	475233.061	1105176.724	44° 46' 26.4616" E	9° 59' 52.0472" N
SAP3_17	496275.549	1143162.880	44° 57' 57.5290" E	10° 20' 29.1511" N
SAP3_18	505158.271	1149336.061	45° 02' 49.6493" E	10° 23' 50.1423" N
SAP3_19	510114.067	1144933.246	45° 05' 32.5973" E	10° 21' 26.7526" N
SAP3_20	510258.269	1143971.073	45° 05' 37.3300" E	10° 20' 55.4231" N

Source: Feasibility Study Report

2.3.1.1 Transmission Pylons

The proposed transmission pylons/towers for this project are lattice steel 40meters tall. Each of the many pieces shall be separately manufactured. At the site, each piece shall be tracked, accounted for and assembled into the finished tower. Tower loading shall be calculated according to IEC60826 and EN 50341-1. The towers shall be self-supported steel lattice type 400kV double circuit towers. A minimum of 40-metre right-of-way is needed for the area around the pylons and the spans between the pylons. Spans between

individual towers are typically about 400m, with about five towers needed for each mile of line. The configuration shown below is a barrel type tower in commonly used in Ethiopia and has been considered suitable for application in Somaliland since the country has no standard guidelines for such infrastructures. Figures 2-2 and 2-3 show typical designs for the main types of transmission towers and typical tower foundation to be constructed.

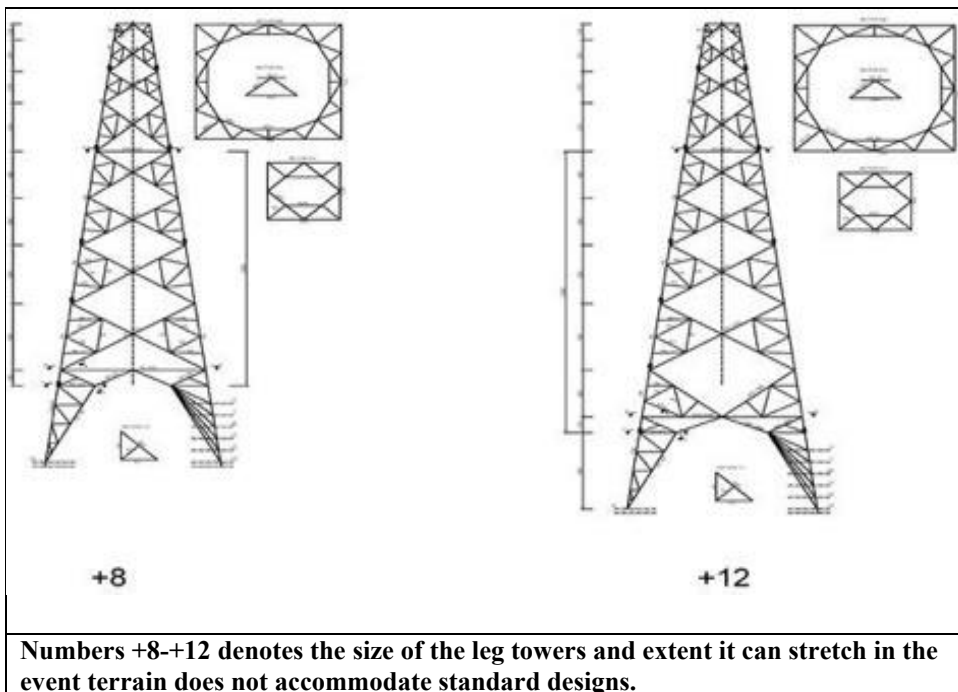
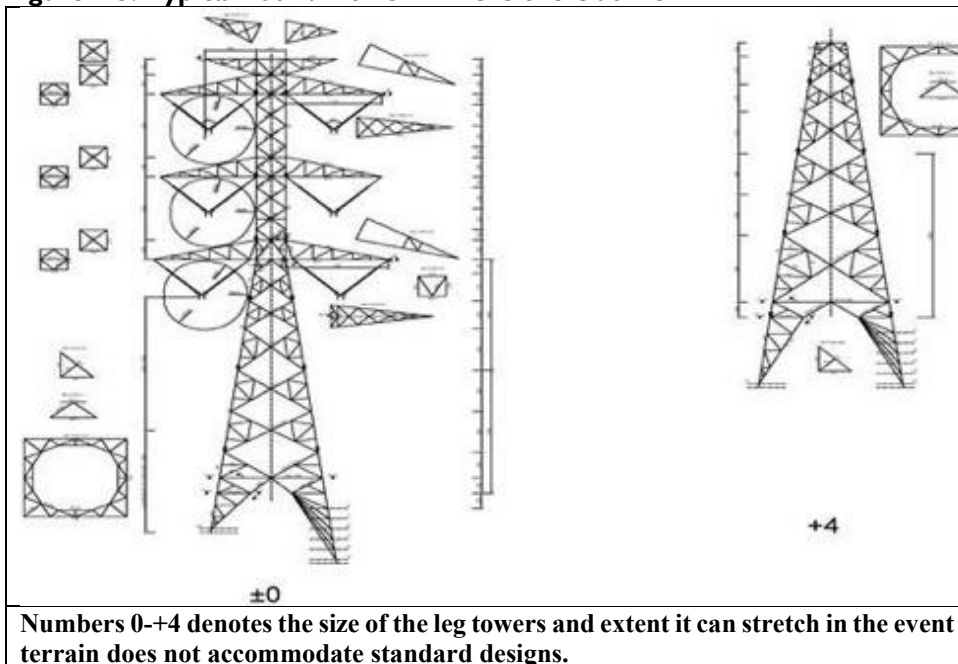
Figure 2-2. Typical Designs of Transmission Pylons



2.3.1.2 Suspension Towers and Dead-end Towers

Suspension towers would be used to hold the conductors along a straight path. Dead-end towers would be used where the line takes a turn or enters a substation. Dead-end towers are stronger and heavier than suspension towers, and more expensive. Most towers proposed for this project would be suspension towers. The expected tower height be in the region of 40m. The base width and weight is expected to range from about 4.5m and 3 metric tons for a line (tangent) tower to about 9m and 6.5 metric tons for the heavy angle tower. Possible dimensions of a typical tower are shown below.

Figure 2-3: Typical 400kV Tower Dimensions Outline



2.3.1.3 Electrical Transmission Lines

The wires that carry the electrical current on the transmission line are called conductors. Conductors are the cables on the transmission pylons that carry the electricity to substations. Conductors are constructed primarily of twisted metal strands, but newer conductors may incorporate ceramic fibres in a matrix of aluminum for added strength with lighter weight. Most high-voltage conductors are made of aluminum with a steel core that gives the cable its required strength. Conductors are often modified to reduce their

reflectivity and brightness. The conductors are attached to the towers using insulators. Insulators are bell-shaped devices that prevent the electricity from jumping from the conductors to the tower and down to the ground. The insulators are made of porcelain or fiberglass and are non-reflective. The conductor would need to be fitted together where one reel of conductor ends, and a new reel begins. Conductor fittings would be made using hydraulic compression. Hydraulic compression uses a press that compresses the fittings on the conductor. Nine conductors (three bundles each with three conductors) would need to be fitted once about every 1.5 to 2 miles, depending on the length of conductor on the reel. The design criteria for the transmission line as adopted for the conceptual design are based on Ethiopia's current practices. The main criteria when concluding on the adopted conceptual design has been to ensure that the various line components are designed in a safe, cost effective and reliable manner. Project design includes the following elements:

- **Lightning Arrestors:** for the lightning arrestor there are two ground wires, on top of the power line, for the entire length of the 271.6 km line and over the conductors, to produce an umbrella effect to protect conductors. The lightning current will be grounded using the ground cables connected to every tower steel structure. The structure is connected to the ground by specific ground connection cables and network in order to meet international best practise specifications. The tower peak is equipped with one single optical fiber cable (OPGW) and one galvanized steel shield wire (GSW).
- **Aircraft Signalling Beacons:** The project includes beacons for aircraft signalling as per the regulations of the country.
- **Bird Flight Diverters:** Devices for avifauna "BFD" (Bird Flight Diverter), consisting of spirals 30cm in diameter, will be attached to the guard cables at regular intervals of suitable length in critical sections. BFD devices are helically shaped, constructed of plastic, white or orange, and fit to the guard cable by winding. At one end these devices have a larger diameter ring protruding from the cable profile. This ring combined with the colour of the device significantly increases the visibility of the cables by the birds, without giving it a bulky appearance and not introducing any significant increase in relation to the area exposed to the wind.
- **Dampers:** Vibrations dampers are considered in the project, averaging one every 200m in every cable (conductors, OPGW and ground cable).
- **Anti-Perching Devices:** The design has incorporated elements that minimise bird and avian collisions e.g., maintaining a wide conductor to conductor phase (energised conductors) spacing (4m), insulation (disc type porcelain insulators) of exposed parts, installation of perch guards, fitting cables with line marking devices in all pylons.

2.3.1.4 Temporary Tower Laydown and Assembly Areas

An area of approximately 40 by 50 meters on each site tower site will be demarcated as a temporary tower lay down and assembly area, to allow for towers to be installed. The total area could include disturbance from vehicles, construction equipment, crane pads, etc. Compacted soils in most of this disturbance area would be broken up and reseeded after project construction to reestablish close to original conditions. While the area directly below and immediately next to the tower is also reseeded, it is considered unavailable for other uses and therefore a permanently disturbed area and a permanent impact.

2.3.1.5 Tower Footings

Tower footings transmission towers would be securely attached to the ground with footings. Footings are assemblies of metal in the ground at each of the four tower corners. There are different types of footings that could be used to secure the towers: plate, grillage, rock anchor, concrete shaft, and pile footings. Most towers on this project would use either plate or grillage footings. Plate footings are used for suspension towers. They consist of a 4-foot by 4-foot steel plate buried about 11 feet deep for each tower foot. Grillage footings are used for dead-end towers. They consist of a 15-foot by 15-foot assembly of steel I-beams that have been welded together and buried 14 to 16 feet deep for each tower foot. Spread footings with rock anchors are required when suspension towers are built on solid bedrock located less than 2 feet below the surface. Six-inch-diameter holes are drilled into the bedrock about 11 feet deep and steel anchor rods are secured within the hole with concrete. Concrete shaft footings are used at river crossings or in areas where towers must sustain a higher load and require additional support.

Concrete shaft footings can be built on solid bedrock or in soils unfavorable for grillage footings. Concrete shaft footings are engineered columns of concrete reinforced by steel rods about 4 to 10 feet in diameter. Footing depth depends on site-specific engineering requirements. Micropile footings are used in rare situations where the typically larger excavation for plate and grillage footings is not appropriate. Four to five 4-12-inch-diameter holes are augured for each footing so that steel rods can reinforce the base. Those rods are then grouped together and capped with a reinforced concrete pile cap. The tower can then be placed atop the concrete piles. For plate and grillage footings, a track hoe would be used to excavate an area for the footings.

The excavated area would be at least 2 feet larger than the plate or grillage footings to be installed (if the soil is loose or sandy, then a wider hole may be necessary). If the soil and rock removed for plate or grillage footings is suitable, it would be used to backfill the excavated area once the footings are installed. Otherwise, suitable soil would be brought in from another location for backfill. For spread footings or concrete shaft footings, a drill would be used to make appropriately sized vertical shafts for the footings. Soil and rock removed for rock anchor or concrete shaft footings would either be spread out onto an approved location or removed from the project area. Once foundations are set and cured, each tower would be assembled in multiple sections off-site. The tower sections would be flown in and installed via helicopter or by a large crane.

2.3.1.6 Right-of-Way

Right of Way (RoW) is required to ensure the safe construction, maintenance, and operation of the power line. The ROW for a transmission corridor includes the land set aside for the transmission line and land set aside for a safety margin between the line and nearby structures and vegetation. Having the safety margin helps avoid the risk of fire and other accidents. The right-of-way width for proposed transmission lines will be 40m. The right-of-way will also be used for access roads where there is none.

2.3.2 Access Roads

Engineers will design the roads to be used by cranes, excavators, supply trucks, boom trucks, log trucks, and line trucks. The road system used to access the transmission towers would be a mix of public and private. MoEM will acquire (through a Resettlement Action Plan) 40m wide easements for the right-of-way. Access will be needed to the transmission tower sites for both line construction and maintenance. Grading and clearing vegetation may be required in some sections of the project for access road construction. Vegetation removal could be required if roads have become overgrown or need to be widened. Improved roads typically require up to a 20-foot-wide disturbance area (including drainage ditches). Depending on the season, roads would be graveled where needed for load bearing, stability, and dust abatement.

Currently, there are no details on other access roads as this will be determined by the contractor and therefore this ESIA does not include the adverse impacts associated with access roads. It is assumed that any new roads will be located within the direct AoI and the inherent construction impacts should be similar to the impacts from general construction phase activities.

In this regard, among the specific mitigations and enhancement measures to implement through the project life cycle included in the ESMP is the requirement for the development and implementation of a separate ESIA and Traffic Management Plan (TMP) for newly constructed access roads to be prepared by the contractor once the access routes are confirmed. However, for existing roads, a framework TMP has been prepared (annex D) to be used as a guide in preparing site specific TMP by the contractor as part of the C-ESMP.

This will include controls over prescribed routes, driver training, vehicle maintenance, speed restrictions, appropriate road safety signage, and vehicle loading and maintenance measures and vetting procedures. It also includes specification for community awareness and safety programs that will be respected and once the works are finished the access may/will be closed and restoration to the original condition will be undertaken.

2.3.3 Contractor's Operational Site/Staging Areas and Workers' Camp

Construction camps are required and may be sited at vantage locations along the route to accommodate workers as well as serving as warehouse for materials and office space. Several temporary staging areas would be needed along or near the transmission line for construction crews to store materials and construction vehicles, and to assemble tower segments for helicopter erection. Staging areas can be from 5 to 15 acres depending on the number of materials and number of locations needed. The contractors hired to construct the transmission line would be responsible for determining appropriate staging area locations. This is yet to be confirmed by contractor (not yet recruited) and therefore associated impacts and risks are not included in this ESIA report since the potential sites are undetermined. However, this ESIA recommends that when a determination is made by contractor (s) to establish workers accommodation camp(s), site specific ESMP for these establishments will be prepared in accordance with Somaliland EIA regulations/proclamation and World Bank ESSs and submitted to Ministry of Environment

and Climate Change (MoECC) for approval and World Bank for clearance before commencement of construction. A framework Campsite Management Plan (CMP) has been prepared to guide in the development of ESIA for the worker's camp by the contractor once recruited (Annex E).

2.4 Project Phases and Activities

2.4.1 Planning (Pre-Construction Phase)

Activities during the planning (pre-construction) phase will include:

- Design of towers type
- Design of foundations
- Plant and line profile.
- Design of access routes
- Operational design

N/B: Detailed design period is 12 months.

- ESIA preparations
- ESIA approval approximately 4-6 weeks
- Obtaining of other relevant licences and permits
- Land acquisition (compensation and resettlement)
- Contractor mobilization
- Workers camp construction
- Identification of material sites

2.4.2 Construction Phase Activities-Transmission Line

There will be several activities during the construction of the transmission line as outlined below.

2.4.2.1 Site Preparation Activities

During this phase, path vertices and singular path points, identification and ground staking and clearance will be undertaken within a 40m corridor. The site preparation phase will include a number of activities as described below.

2.4.2.2 Setting Out

The construction teams will position the intermediate towers based on the approved profile. Where required, basic access tracks will be established to each structure position by moving obstacles such as rocks, levelling high points and filling in holes. The work will be undertaken in such a way to minimise the impact on the environment and surroundings. Existing tracks will be used where possible and new tracks will be made to pole positions where existing access is not available.

2.4.2.3 Pulling and Tensioning Sites

Pulling and tensioning sites are those areas from which the conductor and fiber optic cable are pulled and tightened to the correct tension once they are mounted on the transmission towers. Conductor is packaged and transported on reels that can hold up to 9,500 feet of conductor. Depending on the size of the reel, pulling and tensioning sites (or reel sites or conductor tensioning sites) can be from 1.75 to 3.5 miles apart. These sites are also

dependent on the topography and typically disturb about 0.7 acre each (about 300 feet long by 100 feet wide). A flat area is needed at each pulling site for the large flatbed trailer with the reels of conductor and tensioning machine. Pulling sites are generally placed within the right-of-way; however, where the line takes a turn (at angle points), sites are often outside of the right-of-way. Depending on conditions, the site could be graded, graveled with crushed rock, reseeded, or a combination of these activities.

2.4.2.4 Transmission Corridor Clearing

Construction crews will begin clearing or trimming the transmission corridor where necessary. This includes clearing trees and structures to provide construction crews and their equipment safe access to the work site and enough clearance for the reliable operation of the line. Where tree felling is required, all activities will be supervised by a trained member of staff in line with (Method Statement for Vegetation Clearance-to be developed by contractor prior to construction activities commencement). Tree clearing will be minimized and only removed as necessary. Where structures and crops are required to be removed, the Project Affected Persons (PAPs) as identified in the Resettlement Action Plan (RAP) report, will first and foremost be compensated in accordance with the document before clearing commences. Placement of transmission line structures will be undertaken on every tower site defined plot which is an area of 40 meters on average. Within the plot, the tower structure would be assembled before erection.

To meet electric industry vegetation clearance standards, species of trees deemed non-compatible for transmission corridors must be permanently removed. These are trees that could become tall enough to grow or fall into the high-voltage transmission lines (the maximum height is 1.8m). Any tree (stable or unstable) outside of the acquired transmission line right-of-way deemed a present or future hazard to the transmission line is considered a danger tree and is removed prior to construction of the line. A tree would be identified as a danger tree if it could fall into, bend into, or grow into the conductor or be close enough to the conductor as it swings to cause a flashover of current from the conductor. When construction is complete, disturbed areas will be restored. Native shrubs and ground cover will be allowed to regrow.

For safe and uninterrupted operation of a transmission line, vegetation within a right-of-way is not allowed to grow above a certain height. If vegetation grows or falls close to a transmission line it can cause an electrical arc, which can start a fire, cause an outage of the line, and or injure or kill someone. Management of right-of-way vegetation varies depending on many factors, including vegetation species, height, and growth rates; ground slope and topography; conductor elevation above ground and conductor swing; clearance distance required between the conductors and other objects; and electrical loading on the line.

2.4.2.5 Excavations

Foundation sizes are dependent on the soil conditions, tower type and height; with the biggest foundation footprint for steel lattice towers being 15.4 x 15.4m. In this project, only steel lattice towers will be considered. Typical foundations for this project will be “Pila foundation type” using drillers. The drilling is the best solution to reduce the amount

of ground as it consists of the extraction of a cylinder of 1 meter diameter and 6 meters high on average per leg. Excavations using drillers will be made for the foundations as well as to install the anchors of the towers. In some cases, the foundation is to be “Pad Chimney”. It needs excavators to open the ground to prepare the foundation solution. Typical excavation depths for lattice towers is six meters. Excess soil will be spoiled around the structure and excess dump rock will be uplifted and removed as required. Each excavation will be inspected and tested to confirm its suitability. The foundations are ultimately filled with concrete. Contractors are required to safeguard excavations; this may include erecting a temporary fence or warning solution around the excavation to protect the safety of people and animals. Concrete will be sourced from a ‘ready-mix’ truck which will access the site, or concrete will be mixed on site. Once the excavations have been filled, the concrete requires 28 days for total curing. Meanwhile, after eight days, 80% of the final concrete mechanical resistance is achieved and tower erection could begin after this 8-day period if needed. Typical vehicles on site at all transmission lines include trucks for material and tools transportation, pick-ups for the crews, driller machine and retro excavators as well as light duty vehicles (LDV). The crews will be different depending on the activity to be performed, e.g., for foundations, tower erection or cable stringing.

2.4.2.6 Structure Foundation Installation

The next step in the construction process is to drill foundations for the new transmission structures. The workers will carefully set aside the topsoil, which will be reused. This involves drilling holes, which are then typically filled with concrete for structure foundations. Drilling operations occur for a few days at each new structure location. Once drilling is complete, a steel rebar cage is placed in each hole and concrete is poured to create a secure foundation for the new steel or lattice structure. Concrete trucks are used to deliver the concrete mix for the foundations. During excavation for the foundations that will stabilize the tower, pumping may be required to remove the water (if done during rainy season) and dry the site. The size of the excavation site will depend on the type of soil and the type of tower and anchors will depend on the type of towers installed.

2.4.2.7 Structure Installation

Once the foundation is cured, transmission structure installation will begin. Steel poles often come in sections that are assembled on or near the foundation. Cranes and/or bucket trucks will be used to lift the poles and set them into position on the foundations. Construction crews will assemble or “lace” lattice structures at the site. The structure components will be delivered to the transmission corridor well in advance of this installation process. Generally, it takes one to three days to assemble and erect each new structure. After installation, the structure is grounded for safety purposes.

2.4.2.8 Cable Stringing and Levelling

Conventional stringing will be used throughout using custom built equipment. There are three kinds of cable: conductors, ground wire and OPGW. Cable drums carrying approximately 2000 to 4000m of cable will be delivered to site. The conductors are made of full aluminium alloy (AAAC) or aluminium with a steel core for strength (ACSR). Power transfer is determined by the line voltage and the current. The area of aluminium in the conductors will define the conductivity. Conductors are used singularly, in pairs or in

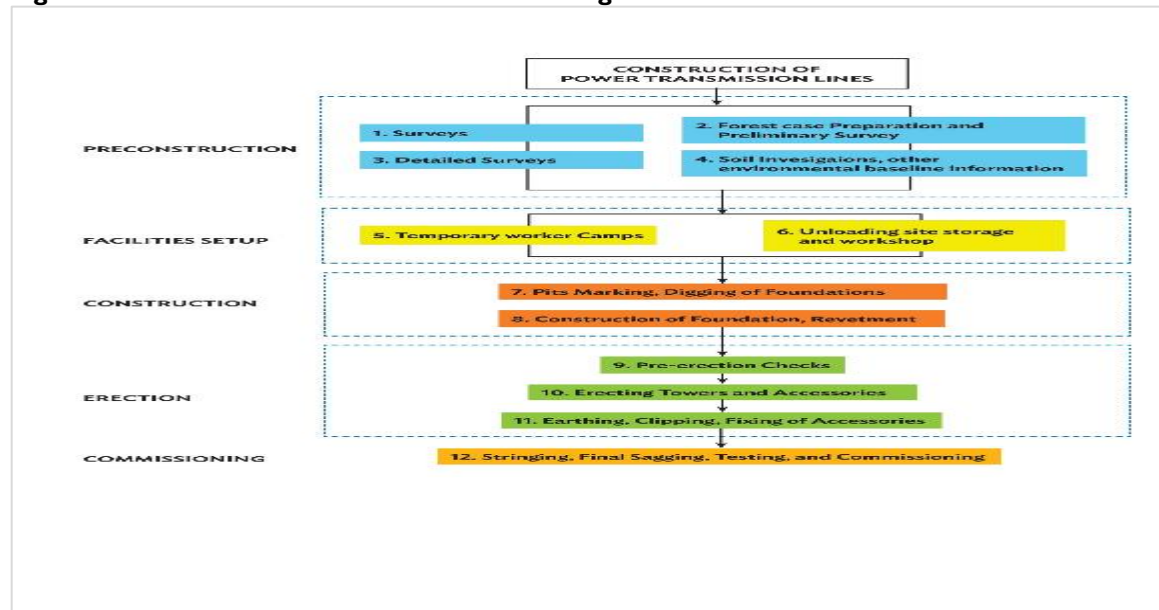
bundles of three, four or six per phase dependent on factors such as audible noise, corona and EMF mitigation. Large diameter running out blocks (pullers and brakes) will be fitted to all the conductor attachment points of the section to be strung and a pilot wire passed through the running out blocks. The pilot wire will be walked out from pole to pole and will then be used to pull the conductor into place. Conductor tension will be monitored throughout by a dynamometer. The puller and brake hydraulic machines apply tension to the cables to elevate them and finally adjust the tension to the design levels. The levelling process consists of elevating the cable's lowest point to the design height through topographic methods, using the leveling plan in the detailed engineering phase. Once the cables are levelled, the last process consists of connecting the different isolated systems between anchorage towers. Jumpers are applied to connect the tranches between anchored towers. These jumpers are simple cables cut in a curve with the shape to avoid possible short-circuits between the phases in the operational period. Once jumpers are applied, electrical test can begin.

2.4.2.9 Restoration and Site Rehabilitation

Site reinstatement and rehabilitation are undertaken for each component of the construction phase, which include the following activities:

- Removal of excess building material, spoil material and waste
- Repairing any damage caused as part of the construction activities.
- Reinstating existing access roads (where applicable)
- Replacing topsoil and planting indigenous grass (where necessary)
- Levelling the ground
- Dismantling the temporary accesses; and
- Repairing any infrastructure that was damaged during the work (roads, fences, etc.).

Figure 2-4: Transmission Line Construction Stages



Source: Feasibility Report

2.5 Construction Materials and Equipment

The following equipment and materials will be required for use during the construction phase of the transmission line. It is expected that construction materials like cement, concrete, gravel, water, aggregate etc. will be sourced from local suppliers and may need opening material sites (quarries, borrow pits etc.). The location of quarry sites, either new or existing, will be determined by the Contractor to suit his method of working but will be subject to the approval of the Project Supervising Engineer including the preparation of stand alone environment and social management plans (ESMPs) for identified green field material sites. Other equipment and machinery etc. will be sourced locally or internationally as highlighted in the table 2-3 below.

Table 2-3: Material and Equipment

Equipment	Source
Trucks	Local and international suppliers
Excavators	Local and international suppliers
Pulleys	Local and international suppliers
Cable drum	Local and international suppliers
Reel and tensioner	Local and international suppliers
Materials	Local and international suppliers
Cement	Local suppliers
Sand	Local suppliers
Concrete	Local suppliers
Aggregate	Local suppliers
Counterpoise wires	Local and international suppliers
Cables	Local and international suppliers
Steel bars	Local and international suppliers
Surge arresters	Local and international suppliers
Breaks	Local and international suppliers
Switches	Local and international suppliers
BED buses	Local and international suppliers

2.5.1 Material Transportation

Some construction equipment and materials will be sourced outside Somaliland through sea and air transport. Once construction equipment and materials are present in Somaliland, terrestrial shipping (road transport) will be used to convey the equipment to site.

2.6 Transmission Line Operation and Maintenance Phase

During the life of the project, MoEM would perform routine, periodic maintenance, and emergency repairs to the transmission line. For lattice-steel towers, maintenance usually involves replacing insulators. Once constructed, the transmission line and substation will be operated year-round, transmitting electricity to the targeted areas. MoEM will have responsibility to operate the line and will ensure that available paths allow for access to the towers for maintenance. Access will be directly from the main roads, along existing access

roads or from the corridor of the transmission line. During normal operation, transmission lines require very little intervention. The only exception is periodic inspections and vegetation management, which are discussed below. Inspections are periodically done using tracked or other ground vehicles. MoEM typically conducts routine inspection patrols of its transmission lines. Patrols are essential to determine where line maintenance is needed and ensure the continued reliability of the transmission system. Patrol teams look for damaged insulators, damaged support members, washed-out roads, hazardous vegetation, encroachments, and problems indicating that a repair may be needed. Maintenance vehicles would use access roads where established and maintenance workers may walk through agricultural fields to avoid damage to crops. In emergencies and some other situations, vehicles and equipment would need to be driven through fields and could cause damage to crop, vegetation, and other property. MoEM determines the damages and, if appropriate, compensates landowners for these damages.

Wayleave maintenance is used to assure safe clearance between conductors and vegetation and to allow passage for inspections on foot or by vehicles. Vegetation also would be maintained along the line for safe operation and to allow access to the line. The project area would need continual vegetation maintenance. Vegetation management is a critical function; failure to manage vegetation can potentially lead to black-outs resulting from a combination of heavy electrical loads, high ambient temperature and low wind speed allowing a critical line to sag close enough to a tree which can cause a ground fault to occur. The servitude will need to be cleared occasionally to ensure that vegetation does not interfere with the operation of the lines. MoEM will ensure on-going maintenance from time to time, in conformance with transmission line maintenance processes. Although normal operation requires minimal intrusion into the wayleave, line or tower failures can result in the reintroduction of heavy equipment, work crews, excavation, and materials transport. The maintenance will include: -

Box 2-1: Maintenance Aspects

- Routine RoW maintenance through clearing of vegetation
- Structure maintenance and repairs (pylons, electrical wires)
- Environmental maintenance
- Emergency works

2.7 Decommissioning Phase Activities

The decommissioning procedure will be provided as part of the maintenance manual during handover of the completed Project. Because of its long-life cycle, the circumstances under which the line might ultimately be decommissioned and abandoned are difficult to foresee. Towers may be upgraded/renewed based on cost/benefit analysis and new technologies. However, if decommissioning is undertaken, MoEM shall be required to prepare specific Decommissioning Management Plan at the time. Therefore, the decommissioning procedure shall include site-specific rehabilitation plans for the footprint of the project. All regulatory requirements will be complied with for the decommissioning phase. The decommissioning procedure will include site specific rehabilitation plans for the footprint of the project and will be executed by the MoEM. The decommissioning activities will include: -

Box 2-2: Decommissioning Activities

- Dismantling the pylons
- Dismantling the foundations and structures
- Dismantling of electrical lines
- Rehabilitation of the disturbed areas

2.8 Construction and Operation Phase Resources Required

2.8.1 Land Requirements

On the bases of the proposed routing and engineering design (271.6km length and 40m ROW), the project would affect a significant area of land for the construction and installation of tower foundations along the transmission line route. Total land required for the construction of the transmission line is estimated at 1086.4Ha and RAP study to be carried out will determine the number of PAPs, assets, and livelihood activities that will be impacted by the project. Additional land (temporarily) will be required for the construction of camps, administration offices, store, and workshop.

2.8.2 Construction Staff

During Phase 1, workers are expected to increase on site during the peak of the construction activity, working 8 hours per day with overtime of 2 hours. Construction work will be implemented on a rotation or shift system basis. The work force is recommended to consist of at least 50% Somali workers (national) while the rest will be other country nationals (OCN). However, this percentage may be challenging to achieve in view of the lack of skill sets in Somaliland and these positions for OCN may be taken by Ethiopians hence the development of Labour Management Procedures (LMP-Annex G) to guide the recruitment process. A typical crew can usually construct about 10miles of transmission line in 4 months. In areas where terrain is steep, progress may be slower. Construction of roads and tower pads (if required) usually takes about 3 to 5 months including close-out repairs of any roads damaged during construction. The remainder of the construction period would include connecting the new line and other existing lines into the substations, and tower site restoration work. The transmission line would be constructed by two or more construction contractors. A typical transmission line construction crew and equipment for a 400-kV line would include the following:

- Types of workers will consist of unskilled labourers. The remaining workers will include semi-skilled and skilled positions such as project managers, engineers, forepersons, drivers, equipment operators, engineers, foremen, drivers, equipment operators, and electricians.
- 20 to 30 construction workers (70-100 at the peak of construction; actual workforce numbers would vary over time).
- 45 vehicles (pickups, vans, trucks)
- Bucket trucks
- 1 conductor reel machine
- 3 large excavators (bulldozers, backhoes) 1line tensioner, 1 puller, 1reel trailer, skycranes; 1 to 2 large (210-ton) and mid-sized (50-ton) cranes
- Road construction equipment (dump trucks, rollers, graders, dozers, excavators, water truck).

- The workers' camp is envisioned to host approximately 100 persons at the peak of the project

A Labour Management Procedures (LMP-Annex G) for the entire project has already been developed and will guide development of Labour Recruitment Plan (LRP) by the contractor. Internationally recognised worker conditions, health, safety, and environment standards for workers will be applied. It is typical for this kind of construction to have a mix of skilled, semi-skilled and unskilled workers as part of the workforce. Whereas the contractor will be at liberty to hire workers as per skills required, he/she will be encouraged to source for workers from the local community as much as possible. This will reduce instances of negative impacts related to labour influx, Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) as well as provide jobs and income to the local community. A Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH Action Plan-Annex F) and Labour Management Procedures (LMP) (Annex G) have been prepared for the project and the contractor (s) will be required to develop in a consultative manner site specific LRP guided by the framework LMP.

2.8.3 Water Resources

Somaliland is classified as a water scarce country. In the view of this, it was necessary to carry out a water resource assessment to identify the potential water sources for the project and the compare it against the computed water demand which will inform on the viability of the project and reduce potential conflict with the local community during the project implementation phase. During the construction stage, construction teams will require water for use during construction works (concrete mixing, slab, washing vehicles) as well as for drinking by the construction workers. Although the number of construction workers are expected to vary throughout the project period, two scenarios were considered; the first scenario considered 100 workers being the peak number estimated from the ESIA report while the second scenario considered 552 people based on the correlation from a similar project that was undertaken in Djibouti. In the two scenarios, it was determined that the water demand for scenario one was 15 m³/day while the water demand for scenario 2 was 82.8 m³/day.

The average span between two pylons is about 400m, consequently about 680 number of pylons will be needed, each pylon will require 4 No. foot blocks resulting to a total of 2716 block for the entire project. The water demand for the construction works was estimated as 19.8m³/day.

The proposed project traverses 10 villages with an estimated number of 9,150 households and an average household size being estimated at about 6.2 resulting to a total population of about 56,730 people within these villages. Based on this, two scenarios were developed to determine the host population living within the project corridor. The first scenario considered a 12 km corridor, 6km from the powerline centerline in both ways this was assumed to be the furthest distance a person walking on foot can take to a water source, under this scenario it was assumed that 80% of the villages' population will be served which results to about 45,384 People. The second scenario considered a corridor of 2km wide, 1km from the power route centerline in both ways, this is the 30-minute walk distance

adopted by WHO 2011 for individuals to access water points, under this scenario it was assumed that 50% of the hosts population will be within the corridor which resulted to an estimate of 28,365 People. The water demand for the local population was computed on the World Health Organization (WHO 2011) recommendation of a minimum of 50 l/c/d for basic needs. The local community aggregated water demand for the population estimate of 45,384 persons for the 12Km corridor is 2269.2m³/day, while for the total population of 28,365 persons for the 2Km corridor is 1418.25m³/day.

The water resources in the project area include hydraulic structures such as wells, underground tanks, hillside lakes/dams and boreholes. Water resources are highly dependent on the variability of precipitation which is highly erratic within this region thus they are not permanent throughout the year. However, boreholes offer a fairly sustainable water supply sources and have been selected in the computation of the water balance analysis. The water balance was carried out by comparing the borehole water sources versus the water demand. 12 No. boreholes have been mapped within the corridor that could be exploited, and which have a cumulative sustainable yield of at 621.6m³/day with an average yield of 51.8m³/day per borehole. It is also important to note that most of the boreholes were concentrated on the last half of the powerline transmission route. The aggregated water demand presented six scenarios and compared against the available resources as shown in table 2-4.

Table . Water Balance Scenarios

	Description	Scenario 1 (m ³ /day)	Scenario 2 (m ³ /day)	Scenario 3 (m ³ /day)	Scenario 4 (m ³ /day)
A	Construction workers water demand	15	15	82.8	82.8
B	Concrete works water demand	19.8	19.8	19.8	19.8
C	Local community water demand	2269.2	1418.25	2269.2	1418.25
D	Total water demand	2304	1453.05	2371.8	1520.85
E	Available borehole water	621.6	621.6	621.6	621.6
F	Deficit in m ³ /day (E-D)	1682.4	831.45	1750.2	899.25

Source: EMC Consultants

The following variables were used for calculating the water demand for each of the six scenarios:

- In all the scenarios water demand for concrete works is 19.8m³/day and local community water consumption of 50l/c/d was adopted to calculate the total local community consumption.
- Scenario 1: Number of workers 100 consuming 15m³ per day and using population estimate of 45,384 with a total local community consumption of 1,682.4m³/day.
- Scenario 2: Number of workers 100 consuming 15m³ per day and using population estimate of 28,365 with local community consumption of 831.45m³/day.
- Scenario 3: Number of workers 552 consuming 82.8m³ per day and using population estimate of 45,384 with a total local community consumption of 1750.2 m³/day.

- Scenario 4: Number of workers 552 consuming 82.8m³ per day and using population estimate of 28,365 with a total local community consumption of 899.2 m³/day.

Based on the water resources assessment study it was demonstrated that the available water resources cannot meet the demand for all the scenarios considered and therefore the project will exacerbate existing water deficit if it uses the community water sources. Considering that the project area is arid region, with scarce water resources that is greatly influenced by climate, and the water balance analysis findings it is recommended that the project invests in its own water sources, boreholes would be most suitable.

The project should undertake hydrogeological studies and sites with highest water potential to be given priority when establishing camp sites as the highest water demand for the project is for use by the workers. Nevertheless, other interventions available that can be considered include: increasing the storage capacity of the tanks at the water points such as dams and dug wells that have been mapped along the powerline route. Additionally, the water resources assessment report mapped nine dams (potential water sources) along the corridor that can be explored for use by the project. These dams will require rehabilitation measures such as installation of water intake pumps etc or as may deem necessary which will be handed over to the host community after project.

The water resources assessment study on the distribution and water needs of local populations along the route made it possible to assess overall that the project will not generate any deterioration of water resources or desertification processes. However, it was recommended that particular attention to the proper management of wastewater will be required by construction of installation of septic/biodigesters at the campsites and avoiding any environmental impact through the storage of wastewater, the storage of oils and hydrocarbons.

The investment in new water sources by the project will have a net benefit effect on availability of water supply. Therefore, it is recommended that the new water sources be handed over to the community after project completion.

The abstraction of water for construction by the contractor will be expected to follow national regulations and guidelines and permitting requirements. Contractor will be required to submit a water use plan prior to commencement of construction activities. During operation phase, the water use requirements will be low and required by the staff managing the sub-station and periodically if required in maintenance works e.g., repairs on foundations that may need concrete mixing etc. Refer to Annex H (Water Resources Assessment Study) which will be used by the contractor in developing site specific Water Use Plan for the project.

2.8.4 Material Sites

Borrow pits and/or quarries will be identified during the detailed engineering design stage of the project. Borrow pits may be required for extraction of suitable material for the access road construction to the transmission line wayleave. As indicated in section 2.5, all

material sites identified by the contractor will require preparation of environment and social management plans (ESMPs). It is noted that no involuntary resettlement is envisioned.

2.8.5 Energy

Electricity is needed during for construction phase in camp sites, offices, active worksites etc., and for lighting at night in the campsites and if necessary, in cases where construction occurs at night (based on regulatory approvals). Electricity may be supplied using diesel generators or temporary electricity connections as will be determined by the contractors.

2.9 Construction and Operation Wastes and Emissions

2.9.1 Effluent Waste

Construction effluent waste will emanate from construction camp (s) (if established) and from mobile toilet facilities that will be used by workers along the transmission line while at work and away from their area of residence (workers accommodation camps). Wastewater will also emanate from activities related to washing/cleaning of equipment and vehicles.

2.9.2 Solid Waste

Construction waste will comprise general domestic waste from construction camp(s) including sanitary and food waste, office waste, organic material, small volumes of wastes arising from mobile plant, chiefly waste from lubricating oil and packing materials (e.g., crates). Human waste will also emanate from the construction camp (s) if established and workers on site will also generate human wastes and will require mobile toilets. Construction wastes will include among others:

- Used electrical wires.
- Cement waste
- Construction packaging materials (cement bags, packaging wastes)

During the decommissioning phase, the primary waste will be the scrap metal from the steel lattice towers, insulators and cables. Several trucks will be required to transport wastes generated through the decommissioning phase to appropriate waste disposal sites. These vehicles will consume diesel and produce air emissions as a waste.

2.9.3 Harzadous Waste

During the construction activities, heavy equipment and motor engine driven equipment will be fuelled with diesel oil. In addition, portable diesel power generators will be used. During the operation phase, portable diesel power generators will be used to supply energy at the substation in case of emergency (blackouts). Transformer oil will also be used using the operation phase of the substations.

The operation of workers' camp may lead to the generation of health care wastes from the site camp clinics. Other wastes may include batteries, paints, oil, and solvents generated during the construction and operation phase. Hazardous wastes (e.g., swabs, used bandages, sharps/syringes, fluorescent lamps, detergents, clinical waste, spent lubricants and filters) will be generated in various quantities. Domestic wastes will be disposed in landfills located in Hargeisa (Hargeisa Southern Dumpsite and Hargeisa Waste Landfill) and

Berbera Landfill located in Berbera. Hazardous health care wastes will be incinerated in the existing incineration facilities in the various health centres specifically those in Hargeisa and Berbera. A framework Waste Management Plan (WMP) has been developed (Annex I) to be used in preparation of site specific WMP by the contractor as part of C-ESMP.

2.9.4 Gaseous and Dust Emissions

The use of motorised equipment during construction will generate gaseous emissions in the project area of influence. Motorised vehicles and equipment including trucks, excavators etc will generate among other SO_x, NO_x and PM₁₀. Dust will also be generated by movement of motorised vehicles. The gaseous emissions during the operation phase are not significant but will also include SO_x, NO_x and PM₁₀ that will be generated by operation and maintenance vehicular teams. Sulphur Hexafluoride (SF₆) is also expected to be emitted from the electrical switchgear and from leakage and during maintenance throughout the lifetime of the project.

2.9.5 Noise Emissions

The use of motorised equipment during construction will generate noise emissions in the project area of influence. Motorised vehicles and equipment including trucks, excavators etc will generate noise during construction, operation, and decommissioning phases of the project. Construction phase noise levels will be generated by construction plant and equipment such as excavators, lifting equipment, dumper trucks, compressors, generators, etc. During the operation phase, noise will be generated from the sub station operation and from the humming/hissing noise as a result of the corona effect.

2.10 Schedule for Implementation and Workforce

The timeframe needed for construction of the project is about 18-24 months. Line construction generally would occur after road construction. Construction work would be staged with one type of activity taking place in one area (such as road construction) and another activity taking place in another area where roads exist (such as vegetation removal and tower construction).

3 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This chapter sets out the legal, policy and administrative framework within which the Project will be developed. It identifies the applicable lender requirements and national standards. The proponent through this ESIA will conform to the Somaliland legislative and regulatory framework, World Bank's Environment and Social Standards (ESSs) and General Environmental, Health and Safety (EHS) Guidelines (2007). Where there is a difference between national Somaliland standards and WB's ESSs, the latter will prevail.

3.1 Constitution of Somaliland

The Constitution of Somaliland, 2001 contains provisions related to land as a national property and establishes the state responsibility for the land and natural resources. Article 12 notes, "The land is a public property commonly owned by the nation, and the state is responsible for it", and shall take all possible steps to explore and exploit the natural resources which are available in the nation's land or sea. The protection and the best means of the exploitation of these natural resources shall be determined by law.

Article 31 of the Constitution recognizes that every person has the right to own private property, if it is acquired lawfully, and that such property may not be expropriated except for reasons of public interests in the exchange of proper compensation. The private property ownership includes land in which Art. 2(1) of Law No. 8/1999, and 19(a) of Law No. 17 established private ownership of land with the title deed.

Part Two General Principles, Article 12: Public Assets, Natural Resources, and Indigenous Production. According to this article of the Constitution.

1. The land is a public property commonly owned by the nation, and the state is responsible for it.
2. The care and safeguarding of property, endowments and public assets is the responsibility of the state and all citizens; and shall be determined by law.
3. The Government shall have the power to own and possess movable and immovable property; and to purchase, sell, rent, lease, exchange on equivalent value, or otherwise expend that property in any way which is in accordance with the law
4. The central state (government) is responsible for the natural resources of the country and shall take all possible steps to explore and exploit all these resources which are available in the nation's land or sea. The protection and the best means of the exploitation of these natural resources shall be determined by law.
5. Where it is necessary to transfer the ownership or the benefits of a public asset, the transfer shall be effected in accordance with the law.
6. The state shall encourage indigenous economic production such as agriculture, livestock, fisheries, minerals, production of frankincense and myrrh and gum etc., and manufacture based on indigenous products.
7. The payment of Zakat is a cornerstone of Islam, and its administration shall be determined by law.

Part Two General Principles, Article 18 describes also about: Environment and Disaster Relief encompassing the following:

- The state shall give a special priority to the protection and safeguarding of the environment, which is essential for the well-being of the society, and to the care of the natural resources. Therefore, the care of and (the combating of) the damage to the environment shall be determined by law.

Article 19: The Care of the Vulnerable of the Society

- The state shall be responsible for the health, care, development and education of the mother, the child, the disabled who have no one to care for them, and the mentally handicapped persons who are not able and have no one to care for them.

Article 20: Work, Trade, and the Welfare of Employees

- All able citizens have a right and a duty to work. The state shall, therefore, be responsible for the creation of work and the facilitating of the skills training of employees.
- The conditions of work of the young and women, night working and working establishments shall be regulated by the Labor Law.
- All employees have a right to payment appropriate to the work they undertake and are free to enter into agreements with their employers on an individual or collective basis. Forced labour is prohibited.
- The state shall endeavor to create understanding and clear rights between employees and employers and shall accordingly introduce a law (in this respect).
- State employees and members of the armed forces shall be entitled remuneration, pension and to payments for sickness, injury, or disability in accordance with the law.
- The state shall promote the support systems, insurance and safety of employees and shall strengthen the relevant responsible bodies.

Article 31: The Right to Own Private Property

- Every person shall have the right to own private property, if it is acquired lawfully.
- Private property acquired lawfully shall not be expropriated except for reasons of public interest and provided that proper compensation is paid.
- The law shall determine matters that are within the public interest, which may bring about the expropriation of private property.
- In Article 34, it states that: “Every citizen shall have the duty to care for, protect and save the environment”.

3.1.1 Environment Management Law No 79/2018

The Republic of Somaliland with its Environmental matters sector representative, Ministry of Environment has approved an Environmental Management Law No 79/2018. This law expresses the will of the government through its Ministry the rules and responsibilities which must be considered by any actor of the sector as the directive framework in every development endeavor requiring Environmental Impact Assessment (EIA) studies.

The law explains the role and mandatory and regulatory issues of Environmental Impact Assessment (EIA) of developmental projects while conducting EIA in the Democratic

Republic of Somaliland. Under Part 5 of this law (Article 11-17) encompasses fiscal incentives, application for an Environmental Impact Assessment, publication of Environmental Impact Assessment, Submission of fresh EIA report after Environmental Impact Assessment License, Transfer of EIA license, Protection in respect of a license and revocation and cancelation of license. Furthermore, the law explains about: -

- Part 6 (Article 6-7) refers to Environmental Audit and Environmental Monitoring
- Part 7 (Article 8-54) refers to Environmental Quality Standards
- Part 8 (Article 55-63) states about Environment Restoration and Easement Orders
- Part 9 (Article 64-66) states Analysis and Recording
- Part 10 (Article 67) refers about Convention, Agreements, and Treaties on Environment.
- Part 11 (Article 68) states competent part for Environmental Matters
- Part 12 (Article 69-81) states about Environmental Offences

3.1.2 Somaliland Energy and Electricity Act, Law No 81/2018

Article 3- Objectives of the Act

- a) In accordance of the constitution of Somaliland the objective of this act is:
 - b) To improve and develop electricity service
 - c) To regulate and supervise electricity market
 - d) To guide and direct the relationship between the Ministry of the Energy and Minerals and the National Commission of Energy
-
2. In accordance with article 11 of the constitution of the Republic of Somaliland, this Act prohibits different aspects of electricity be a monopoly of certain companies. The Commission has the responsibility to harmonies the procedures with the international standards and law.
 3. The objectives of the act are not confined to that but also include:
 - a) That people in the country should get enough electricity
 - b) Improve the electricity service and customer rights which include ability to seek electricity services from any licensed company with a reasonable competitive price based on just business practices that would enable them to get equal access to a reliable electricity service
 - c) To encourage investment in the electricity, enlarge and develop the sector while accommodating the investors and improving fair competition that enable reasonable profit be derived from electricity business.
 - d) To encourage the development of standards and conditions required for the electricity equipment, technical skills of electricity work, procedural and regulatory methods in electric generating, distribution and use.
 - e) To develop generating different sources energy that include:
 - I. All kinds of energy derived from fossil fuel
 - II. Renewable energy like wind, solar, geothermal, hydropower
 - III. All sources of energy that are economically affordable and based on hybridized and hybrid mini-grids.
 - IV. Importing affordable energy equipment

3.1.3 National Forestry and Wildlife Conservation Law, Act No. 69/2015

The annotated translation of this law was developed with the goal of facilitating understanding and practice of the law by non-native Somali speakers who may not be knowledgeable about the context or history of conservation in Somaliland, and in particular by persons and organization with an interest in wildlife conservation. The law was developed in 2015, gazetted in 2016. According to this law, the Somali *duurjoog* is translated as wildlife, and *duur* means in various instances wildlife as well as forest. This implies that, as per standard international definitions, the concept of wildlife pertains to both flora and fauna. However, in this law, wildlife is used most frequently in reference to animals (especially vertebrates), while other language is used in reference to plant life. Indeed, separate articles lay out the law and consequences of illegal action for the land (plant) resources versus animals. This law also encompasses:

- Wildlife Trafficking: include of animals: Articles 18 (clauses 8-13), 19, 21, 27, and 31, of plants: Article 31 and of charcoal (deforestation): Article 11, Clause 7.
- Environmental democracy
- Public participation: Article 3 (clauses 4-5), Article 10 (clauses 1 and 3), Article 11 (clauses 2 and 4), Article 14 (clause 3), Article 16 (clauses 2e and 2g)
- Citizen justice: Article 18 (clauses 6-7), Article 25 (clauses 1 and -7), Article 26 (clause 1), Article 30 (clause 2)
- Forest and grazing reserves: Article 3 (clauses 7-8), Article 8 (clause 5), Articles 12-14
- Commerce : Article 7 (clause 2); Article 9, Article 11 (clause 7), Article 15, Article 18 (clause 3), Article 21
- Alternative Energy : Article 3 (clauses 10-11), Article 11, Article 16 (clause H)

3.1.4 Somaliland Energy Policy 2010

The main policy goal is to meet the energy needs of Somaliland in a sustainable, cost effective and socially acceptable manner for social and economic development while minimising the negative impacts of energy production and use. The specific objectives are to:

- Increase access to modern affordable and reliable energy services in ways that contributes to poverty reduction.
- Utilize energy as a tool to accelerate socioeconomic development for largely urban and rural populations.
- Establish, maintain, continuously review and improve a legal and institutional framework for effective management and planning of energy services in the country.
- Enhance security of supply of all types of energy forms and services.
- Provide sustainable, cost-effective and various energy sources for all stakeholders in the country.
- Establish and improve systems of energy governance and administration.
- Promote strategies that encourage diversification and switching to alternative energy fuels that enable reduction of pressure from trees as sources of fuel.
- Promote exploration and fast-tracked development of indigenous energy resources especially coal for power generation and natural gas thought to be possible in the country's geological formations.

- Promote strategic actions on environmental management, energy efficiency and conservation as well as prudent health, safety standards and practices.

3.1.5 National Environment Policy, 2015

The Ministry of Environment and Rural Development has developed a National Environmental Policy. The overall vision of the National Policy on Environment is to provide a framework management guide for the management of Somaliland's environment and natural resources so as to ensure that they are managed on sustainable basis and retain their integrity to support the needs of the current and future generation without compromising either of the two.

- The National Policy incorporates a clear set of objectives, guiding principles and strategies that will bind all organizations and individuals to exercise due care to avoid depletion of natural assets and environmental degradation.
- The Constitution of the Republic of Somaliland enshrines matters that relate to the environment and natural resource management thus providing the keystone to the National Policy on Environment. Article 18 of the Constitution affirms that:

“The state shall give a special priority to the protection and safeguarding of the environment, which is essential for the wellbeing of the society, and to the care of the natural resources. Therefore, the care of and (the combating of) the damage to the environment shall be determined by law”.

In Article 34 it states that:

“Every citizen shall have the duty to care for, protect and save the environment”.

- The National Policy on Environment recognizes the requirements set out in the Constitution and acknowledges the responsibility of civil society and all citizens to protect and conserve the environment and all its resources and to manage the environment in all its aspects to fulfill these obligations.
- The National Policy on Environment underlines the commitment of government, in partnership with the people, effectively to manage the environment for the benefit of present and future generations. The aim of this Policy is to ensure sound environmental management within a framework of sustainable development in Somaliland. The Policy is supported by many other policies and strategies developed for other sectors and it now provides a holistic approach, following Millennium Development Goals, to establish a national strategy based upon cross-sectoral consensus for care for the environment.
- The Policy emphasizes that it is the duty of any institution, government or non-governmental organization, any community group or people's organization or any individual that uses or otherwise carries out activities that affect the environment in any way, to exercise proper control to maintain the productivity and integrity of the environment. The Policy is set against a background that includes macroeconomic issues, the Millennium Development Goals, and National Poverty Reduction Strategy and it considers economic incentives for improved environmental management.

3.1.6 National Water Policy

The Republic of Somaliland with its water sector representative, Ministry of Mining, Energy and Water Resources has approved a National Water Policy on the 22nd of June 2004. The National Water Policy expresses the will of the government for the development of the water sector and must be considered by any actor of the sector as the directive framework for their actions. Any action undertaken in the water sector in Somaliland must comply with this policy and the rest of the regulatory framework developed for the sector. This policy is the first element constituting the global regulatory framework for the water sector. These elements are: the National Water Policy, the National Water Strategy, the Water Act and the Water Regulations main goal of the water sector development: to improve availability and access to water in a sustainable and equitable way for all different types of uses, in a manner that is environmentally safe. The Policy also promotes cross-cutting principles that may serve one or several of the previous objectives. Among these principles also provide general guidance for any actor when preparing its intervention includes equitable water use, environmental sustainability, local management, private sector participation, gender approach and decentralization.

According to this policy, surface water is a complementary resource that can help reduce the pressure on groundwater resources. The lower level of quality of this resource makes it more suitable for non-domestic applications, such as: livestock watering, agriculture irrigation, house cleaning, industrial production (except for drinking purposes), sanitation. ponds, dams, ballehs and berkads are the main technologies in use for harnessing surface water. The key policy principles for development and utilization of surface water resources are as follows:

- The promotion of the construction and rehabilitation of ballehs and berkads by other actors than government agencies.
- The co-ordination at central level of the planning of such infrastructure to avoid concentration and risk of conflicts.
- The utilization of such water for domestic purposes must be guided by safe public health practices (treatment, transportation, preservation) to limit the risk of waterborne diseases.

3.1.7 Land Tenure Policy

The Constitution contains provisions related to land as a national property and establishes the state responsibility for the land and natural resources. Article 12 says, “The land is a public property commonly owned by the nation, and the state is responsible for it”, and shall take all possible steps to explore and exploit the natural resources which are available in the nation’s land or sea. The protection and the best means of the exploitation of these natural resources shall be determined by law.

Article 31 of the Constitution recognizes that every person has the right to own private property, if it is acquired lawfully, and that such property may not be expropriated except for reasons of public interests in the exchange of proper compensation. The private property ownership includes land in which Art. 2(1) of Law No. 8/1999, and 19(a) of Law No.17 established private ownership of land with the title deed. 12 Official versions to refer is the Somali and it has same meaning as in this English version

(Somalilandlaw.com). Under the constitution, people have equal rights and obligations before the law and shall not be discriminated on the grounds of clan, birth, gender, property, status, or opinion (Art. 8).

Article 36 of the Constitution recognizes that women and men enjoy equally the rights, freedoms and duties laid down in the Constitution, “save for matters which are specifically ordained in Islamic Sharia”. It further provides that the government shall encourage and legislate for “the right for women to be free of practices which are contrary to sharia and which are injurious to their personality and dignity”; women have the right to “own, manage, oversee, trade in or pass on property in accordance with the law”. In light of this, women can legally own and control land but there are many cases in which customary rules prevail over statutory law, especially in rural areas where traditional social systems discriminate against women and impede them from owning and controlling land. This constitutional principle for women’s rights needs to be interpreted into practice and mainstreamed into programs within the public sector delivery of services.

There are several legislative instruments that have been adopted to govern specific sectors related to land. Prominent among them are the Agricultural land ownership Law No. 8/1999 and Urban land management law No. 17/2001. There are also other laws on mining, livestock, water and environment that are relevant to land governance.

Apart from the Somaliland land tenure Policy an analysis of legal issues related to land in Somaliland (Final Draft Report April 2016) has been reviewed as it has a number of amendments of the previous land tenure documents. According to this document Article 8 of Law No. 8/1999 provides that if agricultural land is nationalized for public use, the state has to pay compensation to the previous owner within three months. The law does not specify the remedial procedures to be followed in order to ensure fair compensation is received by the previous owners. Urban land may similarly be expropriated for public purpose subject to compensation to owners. Under Art. 1 and 6 of law No. 17, the President of Somaliland has the authority to issue decree transferring land for the public interest or town re-planning after consulting with the Cabinet and the National Urban Land Planning Committee. Public interest means the use of land for the construction of new roads, extension of existing roads, bridges, electrical and communication lines, offices and government buildings and any other reason deemed necessary. The presidential decree will be circulated through official channels. The National Land Planning Committee is responsible for the evaluation of the costs and payment of the compensation for the properties affected by the re-planning, and an owner shall also receive a plot that is equal, in terms of size and location, to the plot that is expropriated.

As mentioned above, under Art. 12 of the Constitution, the state is responsible for land administration, but this part will examine how the administration is delegated to different authorities including Ministries and local authorities. According to Art. 3 of Law No. 08/99, the Minister of Agriculture is responsible for the administration of agricultural land on behalf of the government, and at the same time, the Ministry issues title deeds and makes registration of farms.

On the other hand, Law No. 17/2001 established the National Urban Land Planning committee²¹ which is responsible for urban planning, approval of master plans and extension of towns. The Committee is comprised of six Ministries including Ministers of agriculture and rural development and the Minister of Public

The lack of a comprehensive land policy, the desperate and to some extent inconsistent legal frameworks and weak institutional governance in land administration has shifted public trust from the public institutions to the clan system where communities feel their land is more secure through clan protection. For instance, elders have assumed crucial decision-making powers in land disputes. Sometimes, the police and judicial institutions redirect critical land cases to elders for the later to pass final judgments that are often enforced. However, even the decisions of elders may be rejected by a losing party and this can lead to unresolved clan disputes, especially among pastoral and agro pastoral communities where clashes over scarce resources lead to conflicts that are difficult to prevent or resolve.

3.1.8 Coastal and Marine Resource Policy

In September 1995, Somaliland Law on Fisheries was promulgated to deal with jurisdiction of the Somaliland maritime zone, resources management, licensing and penalties. To strengthen the Law on Fisheries, the Coastal and Marine Resource Policy of Somaliland was approved at the end of 2000. The Policy provides a clear vision on resource development and the conservation of biodiversity. The following are the specific principles and objectives stipulated in the Policy:

- Optimizing the long-term social and economic benefits from the coastal and marine environment for Somaliland and its people;
- Protecting the rich biodiversity of Somaliland's marine and coastal environments for present and future generations;
- Adopting responsible fisheries practices so as to ensure sustainable use of living marine resources;
- Coordinating coastal and marine resource use and planning, at a national level;
- Promoting fair, equitable and transparent governance over marine and coastal resources;
- Meeting international and regional obligations to marine and coastal matters;
- Allocating central budgets for fisheries development.
- Developing partnerships with stakeholders, communities and local authorities to achieve optimal management of resources.

3.1.9 National Climate Change Policy

The overall aim of the Somaliland's National Climate Change Policy (NCCP) is to enhance the resilience and improve adaptive capacity of the country as whole, and in particular, the vulnerable communities and the ecosystems on which they depend, to the adverse effects of climate change, whilst equally, pursuing a path of economic growth that uses natural resources in a sustainable manner. This policy is intended to guide the development policies and operations of those concerned with development matters in Somaliland, including government institutions, non-governmental international and local organisations,

with the intention of enhancing coping and recovery mechanisms of the Somaliland citizens to the risks of climate change.

3.1.10 National Gender Policy

The overall objective of the National Gender Policy is to facilitate the mainstreaming of the needs and concerns of women and men, girls and boys in all areas for sustainable and equitable development and poverty eradication. Policy refers to guiding principles to a course of action arrived at by decisionmakers to address a particular issue or issues. The following are the 9 priority areas, (i) Poverty Reduction and Economic Empowerment (livelihoods), (ii) Education and Training, (iii) Health and Reproductive Health, (iv) Nutrition Security, (v) Water Resources and Supply, (vi) Employment, (vii) Political Participation and Decision-Making; (viii) Democratic Governance and Human Rights and (ix) Sexual and Gender Based Violence (SGBV). The ultimate objective of this sector is to ensure that opportunities for education and training for all citizens, male as well as female, are guaranteed so that they may develop their individual potentials to the optimum and that they may be able to play a more meaningful role as productive and upright citizens.

3.1.11 Land Use Planning Guidelines

The Government of Somaliland recognizes the importance of land use planning. The Ministry of Agriculture (MoA) mentions integrated land use planning as one of the tools to promote sustainable agricultural resource use and management and land use planning is listed as one of the short-term interventions (MoA, 2007). The same Ministry, in its Draft National Agriculture Policy (MoA, 2008), also advocates village land use planning as a tool for implementing policies for better land use and management and a basis for agricultural extension services. The Ministry of Pastoral Development and Environment (MoPD&E) in its Strategic Plan 2008-2010 recognizes that land is a primary natural resource that requires wise usage for sustainable development, and land use planning based on accurate and reliable data. And both MoA and MoPD&E in their Somaliland land tenure policy (2008) give local authorities and district governments the authority to undertake land use planning and enforcement of approved development plans in collaboration with representatives from the respective line ministries.

Presently, due to the socio-political situation of the country, land resources are mostly used and managed by individual land users, without much consideration for the welfare and future of the wider population. However, the current Government has identified Land Use Planning as a tool that could guide the implementation of policies, programs and projects based on a sound technical framework towards sustainable natural resources management. Land Use Planning is a tool that is successfully used by many countries in the world for natural resources management and the improvement of livelihoods.

3.2 Institutional Framework

3.2.1 Ministry of Energy and Mineral Resources

Article 4

1. As obliged by the MoEM Act, the Ministry is the highest institution in the energy sector that lays down the government policy towards energy including electricity.

2. If there is a dispute and conflict in the decisions of the National Commission of Energy, the case will be forwarded to the appropriate competent Court.
3. The Ministry should prepare national energy policy and plan with the help of the National Commission of Energy. The Council of Ministries will approve the energy policy
4. The Ministry will plan and implement the authority and obligations this act gives to the National Commission of Energy after the Council of Ministries approves them and they assume their duties.
5. The Ministry will evaluate issues concerning energy generating, distributing, and supply of energy in Somaliland. The evaluation of the Ministry should help plan the process of operating the system, reliability of the energy, provision of enough energy, plan and predict future energy sources, loads, evaluate conditions and markets of energy supply of the world that can have bearing on Somaliland and anything that concern energy so that the Ministry give Somaliland government and people reliable information about situation in world energy market and the effect they will have on Somaliland
6. The Ministry is responsible to prepare National Development Plan of energy and the policy to implement the strategy. The stakeholders and the public should be consulted when the strategy and plan [of the energy is being prepared] and it should be in accordance with the National Development Plan that will be sent to the government. The Ministry should create and print the list of licensees of electricity. It must evaluate and prepare the projects the government, business-people and donors are investing that concern electric generating, supply and distribution.
7. The Ministry will encourage private investment in the energy sector and will develop sources energy and renewable energy.
8. The Ministry should approve the bylaws that are in accordance with this law that are submitted by the Commission, not contradicting the laws of the country and not giving energy sector work to special group as a monopoly.
9. The Ministry with the help of the Ministry of Foreign Affairs and International Cooperation and in consultation with the National Commission of Energy has the authority to transmit energy between two country and at the regional level. It will also deal with the regional cooperation of the neighbouring states involving research concerning international agreements on energy cooperation.
10. The foreign investment in the energy sector will be subject to the approval of the Ministry of Energy and Minerals while considering conditions of the investment of the Ministry of Investment Development and in consultation with the Commission.

The Ministry will upgrade the development and use modern technology derived from the fossil fuel and renewable energy including fuelwood, coal, solar, wind, ocean, hydropower, bioenergy, and biomass. The Ministry to increase the development of the use of the renewable will embark on the following:

- a) Establish national plan that implements research on renewable energy
- b) To establish reliable regulations of constant production, supply, distribution, marketing of fossil fuel, fuelwood, fuelwood, solar, wind, biomass, geothermal energies.

- c) Develop the technical know-how for installing, repairing, operating renewable energy equipment like wind and solar
- d) Develop international cooperation on the programme concerning use of the source of fossil fuel and renewable energy
- e) Make use opportunities for the development of renewable, clean energy and other methods like carbon credit trading so as to raise the development and use of the source of renewable energy.
- f) If Somaliland is a member or wants to be a member that participates in the regional electricity energy market, the Ministry will ensure that the byelaws of the country are in harmony with those of the East Africa power pool.
- g) If the Ministry becomes aware that the byelaws produced by the Commission contradicts, responsibilities and obligations of Somaliland as stated in the regional agreement or bilateral agreement in which the country is a party, the Ministry will inform the Commission to amend articles in the byelaws that contradicts the agreement to harmonize them conditions agreed with the regional agreement or a bilateral one in which Somaliland is a party.
- h) The Ministry will make sure that it has enough authority to implement this law. To realize that; it has to give training of upgrading the skills of the staff of the Ministry.
- i) The Ministry has to register by reviewing, innovations, initiatives, achievements of the new energy technology that is applicable to Somaliland
- j) The Ministry will take every legal step to ensure that the Commission fulfil its dotes in every place outside Somaliland

3.2.2 Ministry of Environment and Climate Change

The mandate of the Ministry of Environment and Climate Change (MoECC) is to develop the Climate Change sector, protect, conserve and manage the environment through sustainable development aimed at eradication of poverty, improving living standards, and ensuring that a protected and conserved environment is available. The core functions of the climate change environmental safeguards department are to:

- Coordinate with private sector, intergovernmental organization and government agencies, on-governmental organization and community base organization on issues related to climate change and environmental safeguards.
- Provide mechanisms for, and facilitate climate change research and development, training and capacity building for the stakeholders.
- Conduct regular environmental inspections. Monitor and supervise environmental issues.
- Environmental/ensures integration of environmental consideration in plans, program and project of other agencies
- Integrate and review guidelines on environmental management.
- Coordinate environmental impact assessment and environmental audit review.
- Develop a strategy for mainstreaming of climate change policy so as to ensure policy adaptation across all sectors.
- Takes measures to promote research and development of science and technology which may contribute to the protection of the environment and sustainable development.
- Prepare progress reports and information bulletin for information dissemination.

The MoECC established a department of EIA which conducts the review, approval, and monitoring of the compliance with ESMP implementation, and global performance and environmental safeguard standards. The department has 4 technical staff actively operating under this department. The ministry and department are understaffed and has limited capacity to execute its functions effectively and requires capacity enhancement in terms of additional staff and training in environmental and social assessment and management. MoECC has a total of four staff with an environmental background and are responsible for coordinating EIA process. However, considering the developmental projects implementing by the ministry in energy and mining sectors, the number is very limited, thus requiring additional environmental consultants/specialists to be engaged. There is need to increase the capacity of the existing staff in environmental compliance with EIA standards through training.

3.2.3 Somaliland Energy Regulatory Commission

The Energy Commission is required by law to regulate and manage the development and utilization of energy resources in Somaliland as well as to provide the legal, regulatory and supervisory framework for all providers of energy in the country, specifically by granting licenses for the Generation, Distribution, Transmission and sales of electricity. The Commission will create and administer Somaliland energy fund. The fund was created to develop and invest the infrastructure of the energy sector

To get an affordable energy, the Commission will support and encourage to reform the structures and operations of the companies that supply electricity.

Electricity can only be imported from foreign countries after the Commission in consultation with stakeholders ensures that the following conditions are met:

- i) After detailed research is made
 - ii) After research on its impact on the environment is made
 - iii) After its positive and negative impact is studied
 - iv) Ensure it is in line with energy policy
 - v) Ensure it is in line with National Development Plan
 - vi) To ensure that it is line with modern technology of electricity energy
- When it certifies the conditions stated above and consult with stakeholder, the Commission will write its suggestions to the Ministry of Energy and Minerals.
 - The Ministry of Foreign Affairs should ensure the imported energy is in line with agreement of that country and Somaliland.
 - The Ministry of Energy and Minerals should give a written advice to the President of Somaliland.
 - The President should approve that energy be imported into the country by Presidential decree and which is going to be published in the official gazette.

3.2.4 Ministry of Public Works, Land and Housing

Somaliland, Ministry of Public Works, Land and Housing is responsible for public works, land affairs and housing projects. The Ministry is also responsible government land, maintenance of government buildings and also for planning, designing, implementing, monitoring and coordinating development activities.

3.2.5 Local Government and Municipalities

According to Land Management Law No. 17, passed in 2001 and slightly amended in 2008, all land belongs to the state. Land management in Somaliland is divided between the national and the local administrative level. The National Urban Planning Institute (NUPI) under the Ministry of Public Works is assigned to draft urban land use plans. Subsequently, these plans have to be approved by the national government, represented by the National Urban Planning Board (NUPB) and activated by Presidential decree. The municipalities, in collaboration with the Ministry of Public Works Land and Housing, are authorised to allocate, issue and register land and landownership certificates according to the master plan. Concerning land conflict management, Law No. 17 stipulates that a technical committee is to be established that includes national as well as local institutions.

The local government is authorised to allocate, issue and register land and landownership certificates based on the land use plan (town master plan) drawn by the National Urban Planning Institute (NUPI) and approved by the National Urban Planning Board (NUPB). Thereby, however, they have to collaborate with the Ministry of Public Works, Land and Housing, which issues construction permits and heads the NUPI and the NUPB.

According to Law No. 17, “Registration of land is to be based on the availability of the plot tenure certificate or judgment from the court that witnesses its ownership. It must be listed in both the local governments and Ministry of Public Works, Land and Housing registrations”⁵. Generally, there exist two types of land plots: ‘temporary’ structures (e.g. with huts and traditional materials) and permanent structures (with stone-, cement-buildings etc.), both of which must be approved by the municipality authorities. In accordance with the Master Plan, it is also in charge of approving the conversion of ‘temporary’ plots into ‘permanent’ plots⁶. Moreover, it is authorised to allocate land to individuals, national-or international organisations, and to “specific projects that will enhance the national welfare”⁷. However, a person who already owns a plot in the town is not eligible to be allocated another plot by the local government⁸. Land allocations have to be published and opposing claims have to be brought in within 60 days. The Ministry of Public Works, Land and Housing and the NUPI have to record the number of allocated plots. Legally recognized landowners may sell or otherwise transfer their plot⁹.

⁵ Ibid., Article 27

⁶ Ibid., Article 10, 11, 12

⁷ Ibid., Article 16

⁸ Ibid., Article 15

⁹ Ibid., Article 26

3.3 International/Multilateral Agreements

In addition to national environmental legislations, Somaliland is also a party to some regional and international conventions and protocols about the environment which are of relevance to the project. The international agreement to which FGS/Somaliland is a signatory includes the following as shown in table 3-1.

Table 3-1: International Agreements

Convention	Relevance
Convention on Biological Diversity, 1992	The three goals of this convention are the conservation of biodiversity; the sustainable use of the components of biodiversity; and the fair and equitable sharing of the benefits arising from the use of genetic resources. The Convention was ratified by Somalia in 2009.
United Nations Framework Convention on Climate Change (UNFCCC), 1992	This convention takes into account the fact that climate change has transboundary impacts. The basic objective of this convention is to provide for agreed limits on the release of greenhouse gases into the atmosphere to prevent the occurrence of climate change. It also aims to prepare countries to minimize the impact of climate change should it occur. The convention was ratified by Somalia in 2009.
Convention on International Trade Against Endangered Species, 1986.	The convention aims to protect endangered plants and animals. The convention was ratified by Somalia in 1986.
United Nations Convention to Combat Desertification, 2002.	The convention combats desertification in those countries that experience serious droughts and/or desertification. The Convention was ratified by Somalia in 2002
Abolition of Forced Labour Convention, 1957.	Ensure that forced labour is prohibited and that human resource policies and procedures are developed and implemented to ensure this.
The Right to Organize and Collective Bargaining Convention, 1949.	Article 1 Each Member which ratifies this convention shall take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labour as a matter of urgency. Article 2 For the purposes of this convention, the term child shall apply to all persons under the age of 18. The convention was ratified by Somalia in 2014.
Convention concerning Forced or Compulsory Labour.	Article I 1. Each Member of the International Labour Organization, which ratifies this Convention, undertakes to suppress the use of forced or compulsory labour in all its forms within the shortest possible period. Article 5 1. No concession granted to private individuals, companies or associations shall involve any form of forced or compulsory labour for the production or the collection of products which such private individuals, companies or associations utilize or in which they trade. The convention was ratified by Somalia in 1960.
Convention on the Rights of the Child, 1989.	The Convention on the Rights of the child is the most comprehensive compilation of international legal standards for the protection of the human rights of children. It acknowledges children as individuals with rights and responsibilities according to their age and development, as well as members of a family or community. This includes non-discrimination, the best interest of the child, the right to life, survival and development and the right to participation. The convention was ratified by Somalia in 2015.
Minimum Age Convention, 1973 (No. 138)	Ensure that employment policies include prohibitions on the employment of children and that such policies are adhered to.
Worst Forms of Child Labour Convention, 1999 (No. 182)	Ensure that employment policies include prohibitions on the employment of children and that such policies are adhered to. The convention was ratified by Somalia in 2014.
Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87)	Ensure that the Project recognise workers freedom of association and protection of the right to organise. The convention was ratified by Somalia in 2014.

Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	Discrimination in the field of employment and occupation should be expressly forbidden.
International Convention on the Elimination of All Forms of Racial Discrimination: 1969.	All workplace racial discrimination should be expressly forbidden.

3.4 Applicable World Bank Environmental and Social Standards

The ESSs are technical reference documents which form part of the World Bank's 2016 Environmental and Social framework (ESF). The ESF has a set of 10 Environmental and Social Standards (ESSs) guidelines that are designed to ensure that all social and environmental risks and impacts of development project are identified and managed effectively.

The ESSs are designed to be used together with the General EHS Guidelines document, which guides the developer in the management of environmental, health and safety aspects of a project. These guidelines are considered for implementation of the project, and with specific application to the construction of power distribution lines. The ESHS Guidelines for Electric Power Transmission and Distribution (2007) include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas.

The World Bank's Environmental and Social Framework (ESF) requires the Bank and Borrowers to better manage environmental and social risks and impacts of projects and to improve development outcomes. The project is therefore subject to the World Bank ESF requirement. 8 of the 10 Environmental and Social Standards (ESSs) apply to the project. The ESS applicable to the project are:

Table 3-2. Applicable Bank Environmental and Social Standards

ESS	Description and Relevance
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	ESS1 prescribes that the borrower will assess, manage, and monitor the environmental and social risks and impacts of the project throughout the project life cycle so as to meet the requirements of the ESSs in a manner and within a timeframe acceptable to the Bank. In order to meet this requirement, the borrower will: (a) Conduct an environmental and social assessment of the proposed project, including stakeholder engagement; (b) Undertake stakeholder engagement and disclose appropriate information in accordance with ESS10; (c) Develop an ESCP, and implement all measures and actions set out in the legal agreement including the ESCP; and (d) Conduct monitoring and reporting on the environmental and social performance of the project against the ESSs. The Bank has classified the proposed project as "High Risk" project in consideration on the type of project, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts associated with evacuation of high voltage power lines.
ESS2: Labour and Working Conditions	This ESS recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. However, the ESS prescribes that the project proponent should promote sound worker management relationships and enhance the development benefits of the project by treating workers in the project fairly and providing safe healthy working

	conditions. The activities in this project may have high potential occupational health and safety risks.
ESS3: Resource Efficiency and Pollution Prevention and Management	ESS3 recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels. This ESS sets out the requirements to address resource efficiency and pollution prevention and Management throughout the project life cycle consistent with GIIP. The construction, operation and maintenance phase of this project may lead to pollution.
ESS4: Community Health and Safety	ESS4 addresses the health, safety, and security risks and impacts on project-affected communities and the corresponding responsibility of Borrowers to avoid or minimize such risks and impacts, with particular attention to people who, because of their circumstances, may be vulnerable. The project is expected to result in health and safety impacts to the community in the project area, such as impacts associated to exposure to dust, noise and vibration, electric magnetic field, an increase in traffic, risk of children climbing towers as well as transmissible diseases or violent behaviors related to labor influx.
ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	The overall objectives of the World Bank's ESS 5 are to avoid land acquisition and involuntary resettlement where feasible, or to minimize resettlement while exploring all viable alternatives. Where it is not possible to avoid resettlement, activities will be conceived and executed as sustainable development programs, providing sufficient investment to enable the persons displaced by the project to share in the project benefits. The project activities will lead to potential land acquisition due to the acquisition of land for the transmission network.
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources,	ESS6 recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. ESS6 recognizes the importance of maintaining core ecological functions of habitats, including forests, and the biodiversity they support. This ESS also addresses sustainable management of primary production and harvesting of living natural resources. ESS6 recognizes the need to consider the livelihood of project-affected parties, including Indigenous Peoples, whose access to, or use of, biodiversity or living natural resources may be affected by a project. The project is not likely to impact biodiversity or living natural resources.
ESS8: Cultural Heritage	This ESS recognizes that cultural heritage, in its many manifestations, is important as a sourced of valuable scientific and historical information, as an economic and social asset for development, and as an integral part of peoples' cultural identity and practice. The objective of this ESS is to protect cultural heritage from the adverse risks and impacts of project activities and to promote meaningful consultations with stakeholders regarding cultural heritage. A Chance Find Procedure is recommended for this project.
ESS10: Stakeholder Engagement and Information Disclosure	ESS 10 applies as it addresses the importance of open and transparent stakeholder engagement, which is essential in improving the environmental and social sustainability of the project. Stakeholder engagement must be a socially inclusive process conducted throughout the project life cycle. Where properly designed and implemented, it supports the development of strong, constructive responsive relationships that are important for the successful management of a project's environmental and social risks. Construction activities will impact the social and economic life of people and their environment. An overall Stakeholder Engagement Plan (SEP) has been developed for the project. Contractors shall be required to develop site specific SEP as part of the Construction Environmental and Social Management Plan (E-ESMP)

3.5 World Bank Group General Environmental, Health and Safety Guidelines

These are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). These General EHS Guidelines are used in addition to the local guidelines in order to provide mitigation measures for the various environmental and social impacts that will be identified in this report. The main EHS guidelines that will be used alongside local policies include:

World Bank Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution

The EHS Guidelines for Electric Power Transmission and Distribution (2007) include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas. The following measures shall be adopted in the design to minimise avifauna and bat collision and electrocution in line with the EHS Guidelines for Electric Power Transmission and Distribution (2007).

Table 3-3: Avifauna and Bat Collision and Electrocution Mitigation Measures

Guidelines	Mitigation
Construction site waste generation	The ESIA has identified types of wastes likely to be generated during construction phase and included preparation of waste management plan as part of contractor's E-SMP.
Terrestrial Habitat Alteration	The ESIA has identified sensitive terrestrial habitats that are within the AoI. Based on the analysis, the sensitive terrestrial habitats are out of the AoI within a radius of 10-50km from the transmission line route. Mitigation measures to protect terrestrial habitats and minimise their alteration irrespective of conservation status has been included in the ESIA.
Construction of Right-of-Way	40m wide ROW provided
Avian and Bat Collisions and Electrocution	The route selection has avoided areas known to have avifauna and bats of conservation significance including IBA sites or migratory corridors. The design has incorporated elements that minimise bird and avian collisions e.g. maintaining a wide conductor to conductor phase (energised conductors) spacing (4m), insulation (disc type porcelain insulators) of exposed parts, installation of perch guards, fitting cables with line marking devices

EMF Exposure Guidelines

Electric and Magnetic Fields Electric and magnetic fields (EMF) are invisible lines of force emitted by and surrounding any electrical device (e.g. power lines and electrical equipment). Electric fields are produced by voltage and increase in strength as the voltage increases. Electric field strength is measured in volts per meter (V/m). Magnetic fields result from the flow of electric current and increase in strength as the current increases. Magnetic fields are measured in units of gauss (G) or tesla (T), where 1T equals 10,000G.

Electric fields are shielded by materials that conduct electricity, and other materials, such as trees and building materials. Magnetic fields pass through most materials and are

difficult to shield. Both electric and magnetic fields decrease rapidly with distance. Power frequency EMF typically has a frequency in the range of 50 – 60 Hertz (Hz) and is considered Extremely Low Frequency (ELF). Although there is public and scientific concern over the potential health effects associated with exposure to EMF (not only high voltage power lines and substations, but also from everyday household uses of electricity), there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment. However, while the evidence of adverse health risks is weak, it is still sufficient to warrant limited concern. Recommendations applicable to the management of EMF exposures as per EHS Guidelines for Electric Power Transmission and Distribution (2007) which will be adopted in the design and implementation as per the reference levels developed and recommended by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and which have been adopted as mitigation measures include:

Table 3-4: Minimising EMF Exposure

Construction Phase and Exposure Minimisation	
Considering siting new facilities to avoid or minimize exposure to the public	Transmission line sited away from public with the villages where the line is traversing being between 28m-1055m from the transmission line.
Installation of transmission lines or other high voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g. schools or offices), should be avoided	Transmission line site to not pass over any structures intended for high frequency operation and height of the towers at 40m high.
Shielding with specific metal alloys	Design includes shielding materials that are made of metal alloys (Aluminum Alloy) with disc type porcelain insulators
Increasing height of transmission towers	Height of towers is 40m as per international best practise for EHV transmission lines
Modifications to size, spacing, and configuration of conductors	Spacing of conductors is 4m as per international best practise for EHV transmission lines
Operation Phase and Exposure Minimisation	
Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure	Preparation and implementation of an EMF safety program including the following components: Identification of potential exposure levels in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities. This is included in ESMP and shall be a requirement in C-ESMP. Workers' exposure during commissioning, operation, and maintenance to include limiting exposure through rotation, increasing the distance between the source and the worker, when feasible, or the use of shielding materials. This is included in ESMP and shall be a requirement in C-ESMP.

4 ENVIRONMENTAL AND SOCIAL BASELINE

This chapter provides a description of the baseline conditions in the Somaliland as the projects runs for a stretch of 271.6 Km and includes the Area of Influence (AoI) as defined in section 1.8.1 with land take away of about 1086.4 Ha. The baseline characteristics of the biophysical and socio-economic conditions are used as the basis of prediction of possible project effects and to monitor changes during construction and operation.

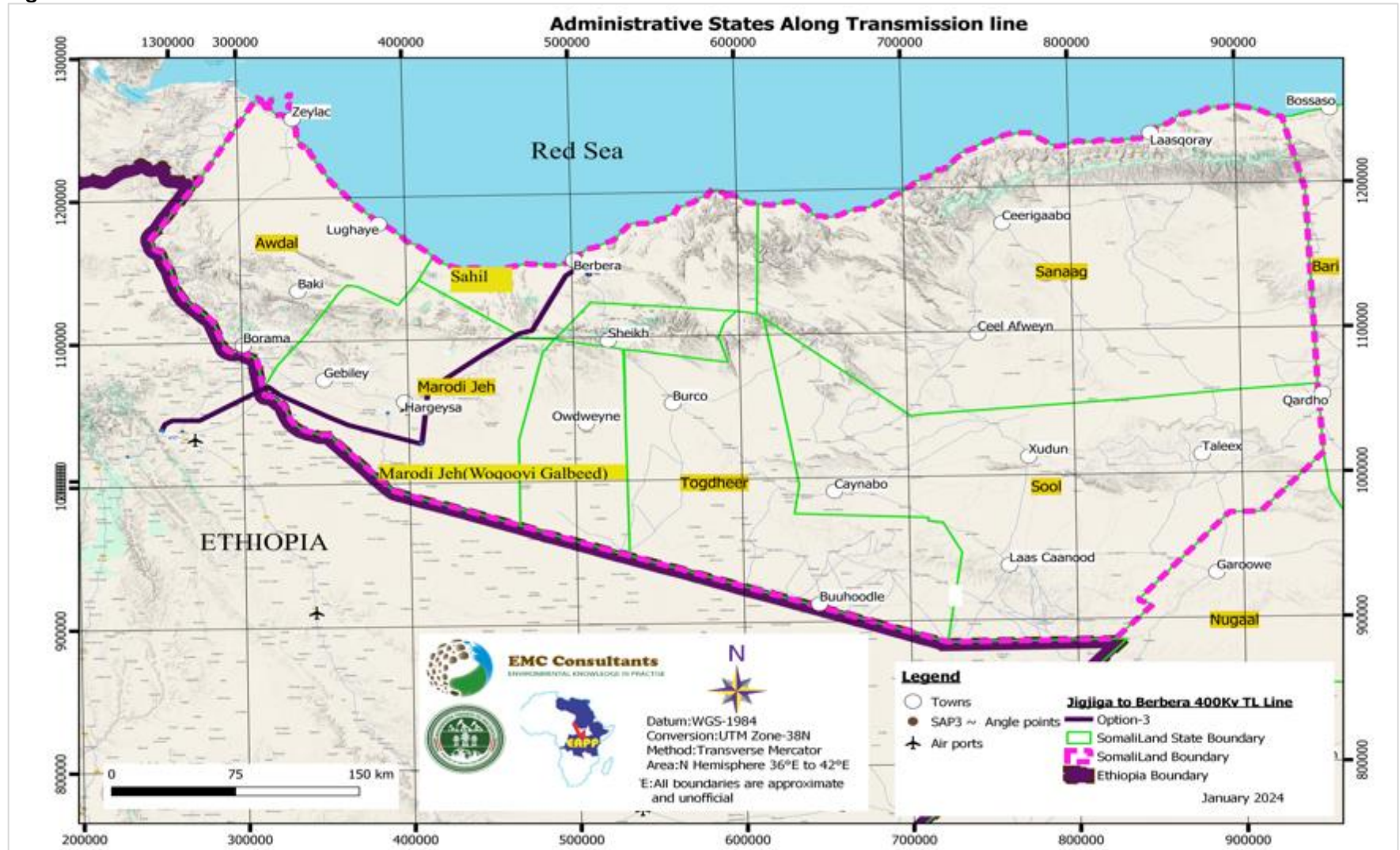
4.1 Bio-Physical Environment

4.1.1 Location and Size of Somaliland

The Democratic Republic of Somaliland has a total area of 137,600km², with a coastline of about 850km. It situated in the Horn of Africa. Its boundaries are defined by the Gulf of Aden in the north, the Federal Republic of Ethiopia in the south-west, and the Republic of Djibouti in the north-west. It lies between Latitudes 8⁰ and 11⁰ 27' North and Longitudes 42⁰35' and 49⁰ East. It has mountain ranges rising up to six and seven thousand feet in the center and in the east of the country respectively¹⁰.

¹⁰ Ministry of Planning and National Development (2014): Somaliland in Figures Report

Figure 4-I: Transmission Line Route



Source: EMC Consultants 2024.

4.1.2 Administrative and Political Units

The administrative structure of the state consists of three branches: the judiciary, legislative (the House of Elders and the House of Representatives), and the executive (the President and his chosen Council of Ministers). The country has six main regions namely Marodi-jeh, Awdal, Sahil, Togdheer, Sanaag and Sool regions, with 86 sub-divided districts, where 23 of them are electoral districts. Each region has a governor and district councils. The district councilors are elected, whereas the governors of the regions are appointed by the President. The transmission line route traverses two regions namely Marodi-jeh and Sahil described in summary below.

4.1.2.1 Marodi-Jeh Region

Marodi-jeh is an administrative region in western Somaliland. It is the most populous region of the country. It is bordered by Awdal to the west, Sahil to the north, Togdheer to the east and Ethiopia to the south. Marodi-jeh was created by splitting the previously existing region (gobolka) Woqooyi Galbeed into two, and other part is Sahil in accordance with the Law 23/2007 approved by the parliament. The capital city of Somaliland known Hargeisa is under Marodi-jeh region. According to Somaliland local and regional governance law (Lr-22/2007), Marodi-jeh region has 19 districts with different grades. Out of the 19 districts in this region, the transmission line route traverses two districts (Gabiley and Hargeisa) and 22 villages, 5 in Gabiley and 17 in Hargeisa as shown in table 4-1.

4.1.2.2 Sahil Region

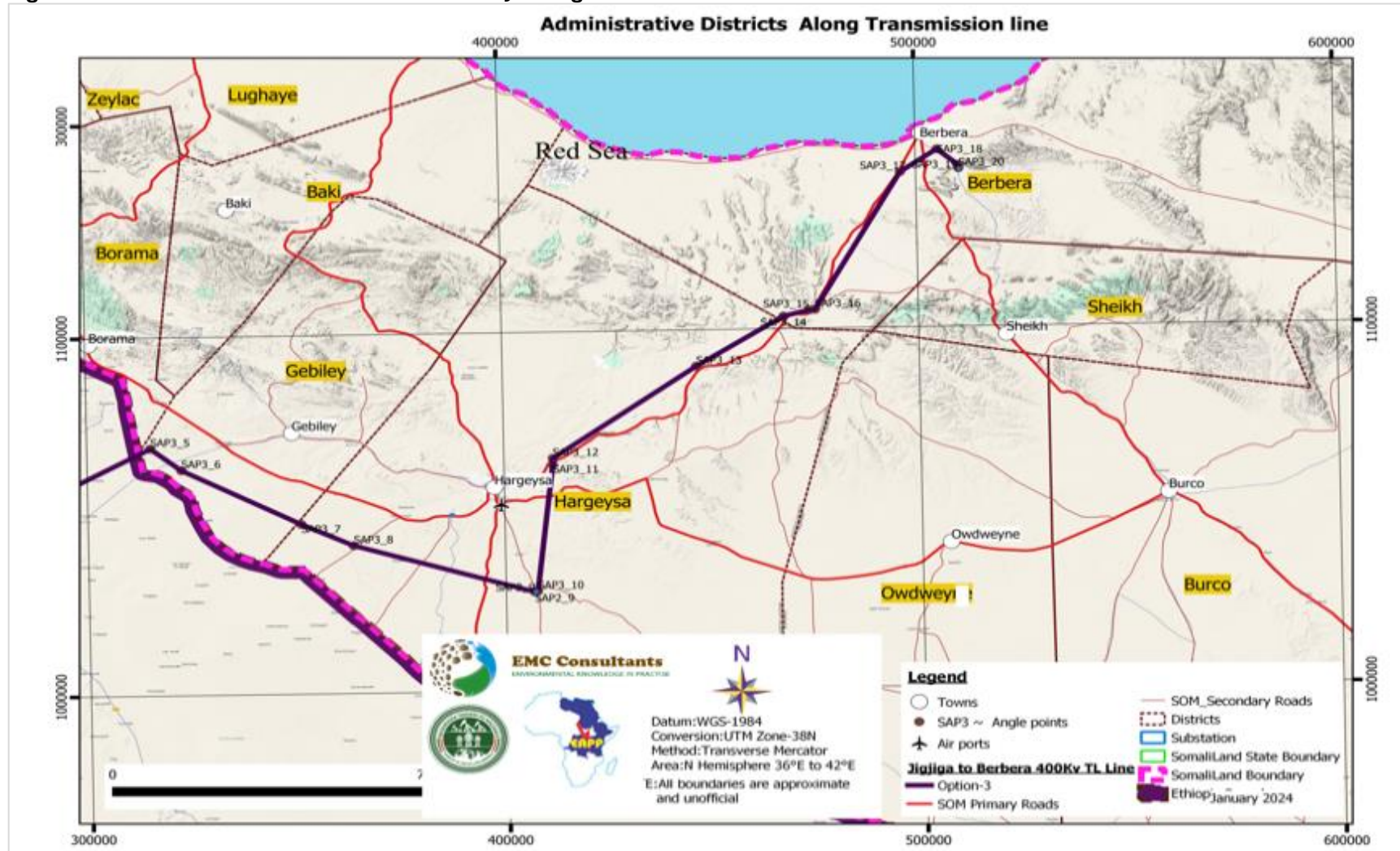
Sahil is an administrative region in northern Somaliland with the port city of Berbera as its capital. It was separated from Woqooyi Galbeed and became a province in 1991. In 1998, the Sheikh District of Togdheer was incorporated into Sahil region. The region has a long coastline facing the Gulf of Aden to the north. Sahil borders Adwal to the northwest, Marodi-Jeh to the southwest, Togdheer to the south and Sanaag to the east. In this region, the line passes through Berbera district and 4 villages as shown in table 4-1.

Table 4-1: Administrative and Political Units

REGION	DISTRICT	AFFECTED VILLAGES
MAROODIJEH	Gabiley	Godka Carrada
		Dhagaxyo Cad1
		Laaya
		Tinad
	Hargeisa	Da'arta
		Sheekh Muhamed Yarre
		Lafta Farawayne
		Aw-Barre
		Sheikh Mooldhe
		Carra Madow
		Shirwareen
		Ina Cunaaye
		Jibaaqe
		Galoole

SAHIL		Sharmaarke
		Maadhyaal
		Markazka-Burcada Yar
		Aw-Barkhadle
	Berbera	Dacar Budhuq
		Lafaruug
		Laas Geel
		Xabaalo Tumaalood
		Baxarasaafka

Figure 4-2: Affected Districts in Sahil and Marodi Jeh-Regions

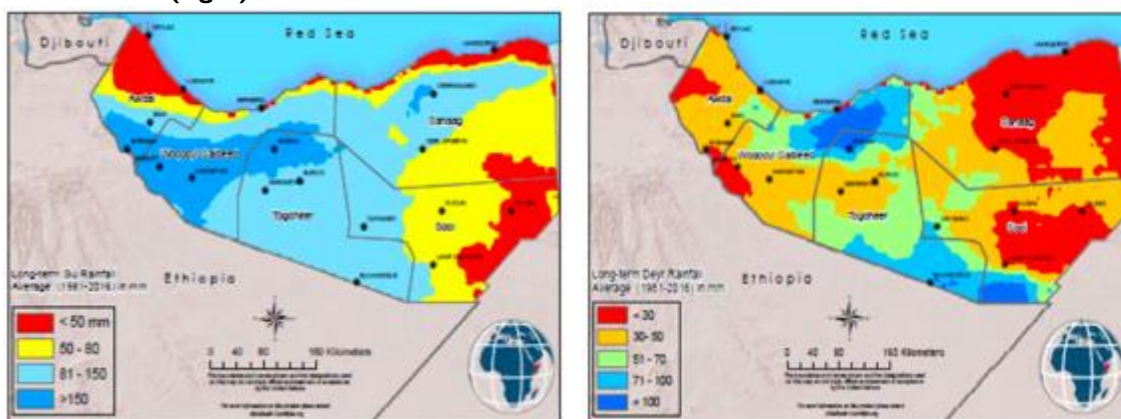


Source: EMC Consultants 2024.

4.1.3 Climatic Condition

Somaliland has a bimodal rainfall distribution (*Gu* and *Deyr*). The first main rainy season (*Gu*) occurs between April and June, when around 60 percent of rain falls, and the second rainy season (*Deyr*) from August to November. The months of highest rainfall within these seasons are generally from April–June and October–November. The two dry seasons in the country are *Jilaal* and *Hagga*, which occur between December and March and July and August, respectively. Rainfall is low and erratic. The amount of rainfall received annually reduces further to the north except for areas around Sheikh, Hargeisa and Borama that receive between 500 mm and 600 mm per year. The area around Ceeregaabo receives up to 400 mm annually. The northern coastline is characterized by low rains of less than 100 mm per year. The rest of Somaliland receives an annual rainfall of 200 to 300mm.

Figure 4-3: Rainfall Distribution: Gu Season from 1981 to 2016 (left); and Deyr Season from 1981 to 2016 (right).

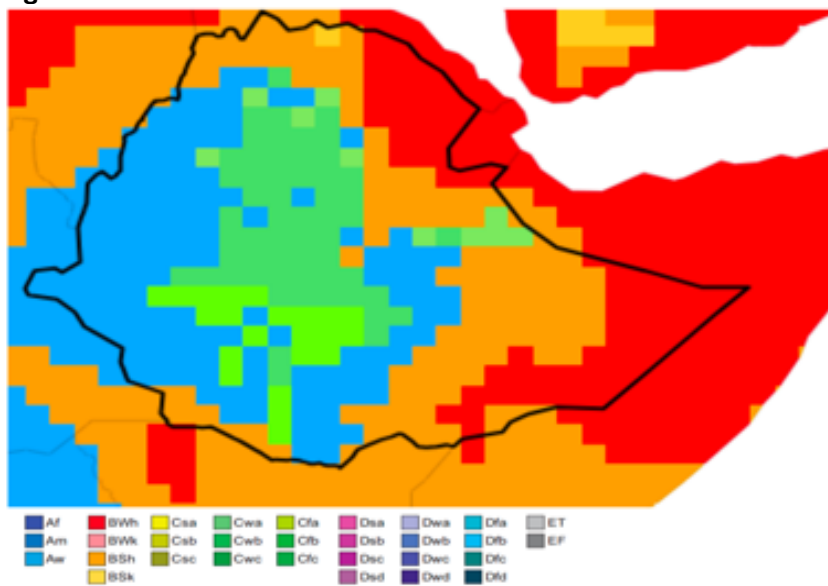


In the higher altitudes of the mountains and plateau areas temperatures vary considerably with the seasons, with a mean annual temperature of 20-24°C, while the coastal region has mean annual temperatures of 28-32°C. The hottest weather is experienced between June and September and temperatures get cooler in December, January, and February. The highest long-term mean maximum value that has been recorded is 42°C in June and July at Berbera. The lowest can reaches 5-10 in Ceeregaabo, Hargeisa and Borama.

4.1.3.1 Climate Variability

The climate classification classes based on Köppen-Geiger climate classification system for Somaliland are given in Figure 4-4. In Somaliland, there are two major classes of climate based on Köppen-Geiger climate classification system (Figure 4-4). These are hot desert climate and cold semi-arid climate.

Figure 4-4. Climate Classification Classes Somaliland



(Sources : (<https://climateknowledgeportal.worldbank.org/country/>).

4.1.3.1.1 Mean Daily Maximum Temperature: the basics

Weather conditions have significant impacts on the different sectors of economy. Electricity market is one of the sector sensitive to weather since power demand is linked to several weather variables, mainly daily air temperature. Climate change affects weather conditions (induce an increase in mean daily maximum temperature), which in turn affects the consumption of electricity at household level and electricity infrastructure. Increase in the mean daily maximum temperature induces frequent heat waves that could adversely affect different components of electricity infrastructure. Besides, it increases demands for electricity consumption. Studies elsewhere has shown that weather conditions affect electric demand.

Air is considered the most important variable affecting energy demand, namely, cooling and heating demands. Electricity load demand increases during hot days leading to an increase in energy generation and transmission losses. The study area of the current assignment is stretch over a large area with different topography, elevation and weather/temperature conditions. Air temperature is known to affect electricity infrastructure, but the assessments of the historical trends and future projects of mean daily maximum temperature of the project area is of a paramount importance to:

- Understand the extent of mean daily maximum temperature and the implications of its increase in the context of heat waves.
- Assess the adverse impacts of increased mean daily maximum temperature (Tmax) and
- The future tends of mean daily maximum temperature to suggest adaptation options for the Ethiopia –Somaliland power interconnections.

Near Air Surface Temperature

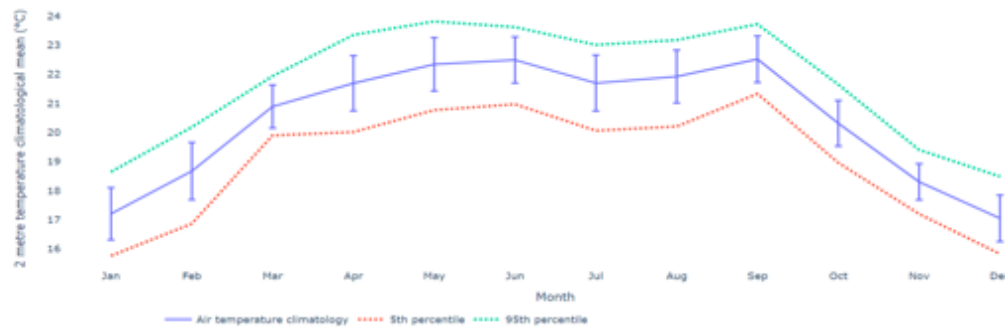
Near surface air temperature (TAS) is temperature measures at 2m above the ground. It is an important variable for several applications such as climate and environmental change (Huang et al., 2019), terrestrial hydrology and phenology (Ren et al., 2019) and electrical infrastructure (Burillo, 2018). It affects natural systems and human lives such as health, energy demand and etc. Near surface air temperature reflects the energy and water cycles of the ground and the bottom layers of the atmosphere.

With regard to global warming over the last decades, information on the values of near surface air temperature is for climate change assessment. Its values are usually obtained from observations of ground-based weather stations. But the latter is spatially scattered and covers limited area of influence. This presents challenges to get reasonable datasets to accurately measure near surface air temperature. The advent of remote sensing and Reanalysis improved our understanding of near surface temperature and other essential variables of climate. European ReAnalysis (ERA) of the European Centre for Medium Range Weather Forecasts (ECMWF) has evolved over years. Currently, ERA5 is mostly widely used for assessment of essential climate variables such as temperature and precipitation. For the current assignment, datasets from Copernicus <https://cds.climate.copernicus.eu/> and <https://ds.nccs.nasa.gov/thredds/catalog/AMES/NEX/GDDP-CMIP6/catalog.html> were used.

4.1.3.1.2 Historic Climate Trends

The historical air temperature at 2m of the Hargeisa-Berbera was computed from ERA5 data set and given in Figure 4-5. The highest mean air temperature was recorded as 22.55 ± 0.8315 for September. The mean value of air temperature for June is also high, i.e., 22.50 ± 0.7959 . The lowest mean air temperature for this block of the project was recorded for December and January, i.e., 17.05 ± 0.8006 and 17.20 ± 0.8972 , respectively. There are 4 cycles of increases and decreases in air temperature across the 12 months. The first increases mark months from January-June and then a decrease in July. A short period on increase in air temperature from July-September is followed by a long period of decreases from September-December (Figure 4-5).

Figure 4-5. Historical Air Temperature at 2m of Hargeisa-Berbera Block of the Project From 1950-2023.

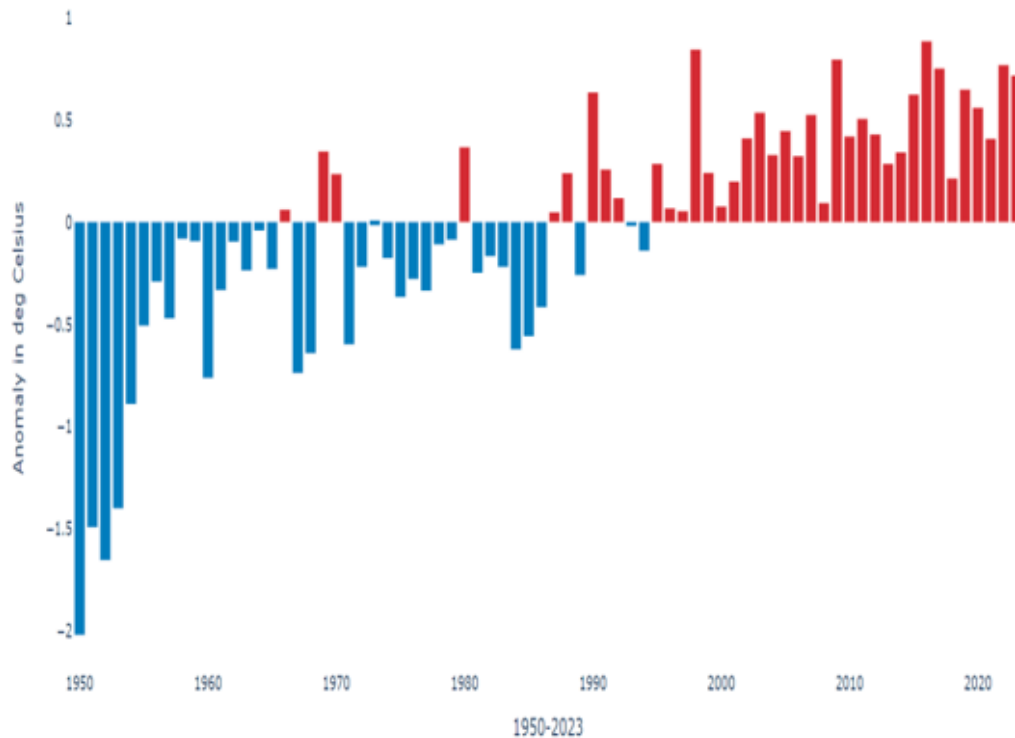


Source: Climate Risk and Adaptation Assessment study of Ethiopia-Somaliland transmission line interconnections: Jigjiga-Hargeisa and Hargeisa-Berbera, 2024.

Temperature Anomalies

Historical mean air temperature anomalies of the Hargeisa-Berbera block is given in Figure 4-6. There were decreases in air temperature from 1950-1965 (16 consecutive years). The highest decrease was recorded in 1950, which is -2.02°C compared to the long-term average value. The air temperature has increased to $+0.06^{\circ}\text{C}$ in 1966 to be followed by two years of decreases (1969 – 1970). A period from 1987-1994 is marked with more increases in mean air temperature than decreases. There were marked and consecutive increases in mean air temperature from 1995-2023, i.e., 29 years of increase in mean surface temperature compared to the long-term average (Figure 4-6). The highest historical increase in mean air temperature was recorded in 2023, i.e., $+0.93^{\circ}\text{C}$ compared to the average.

Figure 4-6. Historical Air Temperature at 2m Anomalies of Hargeisa–Berbera Block of the Project.



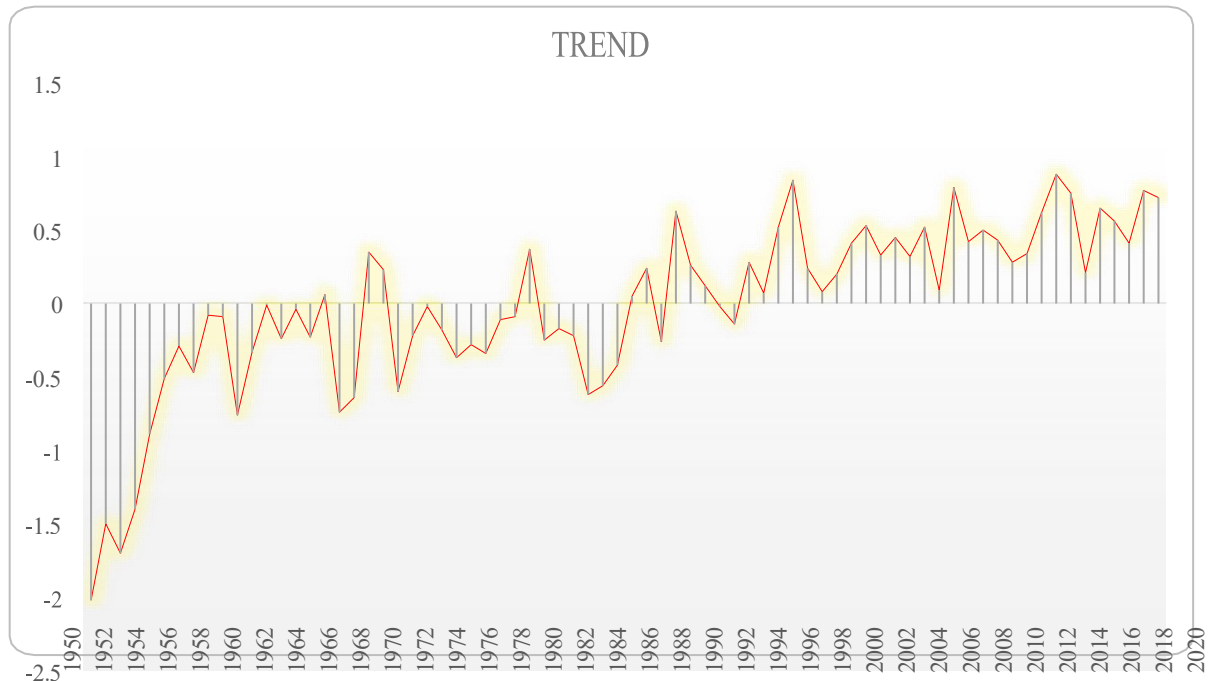
Source: Climate Risk and Adaptation Assessment study of Ethiopia-Somaliland transmission line interconnections: Jigjiga-Hargeisa and Hargeisa-Berbera, 2024.

Trend in Air Temperature

The historical trend in air temperature is broadly classified into two major categories. The first category ranges from 1950 –1986. This period is mainly characterized by a decreasing trend of air temperature. But there are 4 scattered events of increases in air temperature. During this period, the highest increase in temperature was recorded in 1980, which is $+0.36^{\circ}\text{C}$. On the other hand, 1987-2023 is dominated with increasing trend of air

temperature with only 3 scattered events of decreases (Figure 4-7). Generally, the overall trend in air temperature since 1987 shows increasing events.

Figure 4-7. Historical Trend in Surface Air Temperature of Hargeisa-Berbera Block of the Project.

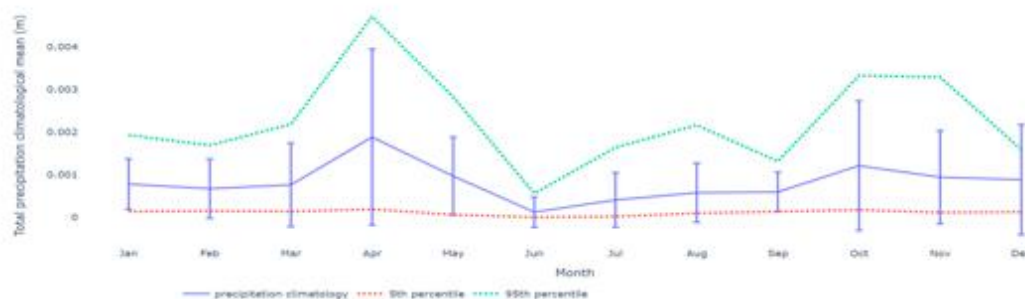


Source: Climate Risk and Adaptation Assessment study of Ethiopia-Somaliland transmission line interconnections: Jigjiga-Hargeisa and Hargeisa-Berbera, 2024.

Precipitation

The total precipitation of this block is punctuated with increases and decreases throughout the months from 1940-2023 (Figure 4-8). The highest increase in total precipitation was recorded in April and the lowest in June. There are cycles of increases and decreases in total precipitation.

Figure 4-8. Historical Precipitation of Hargeisa –Berbera Block of the Project

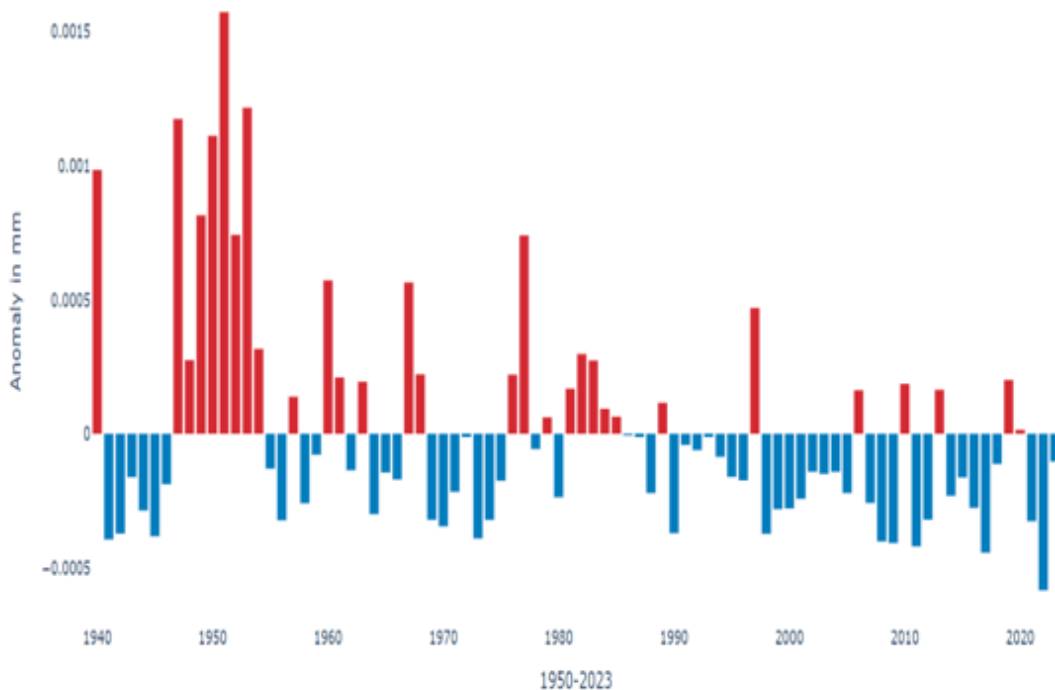


Source: Climate Risk and Adaptation Assessment study of Ethiopia-Somaliland transmission line interconnections: Jigjiga-Hargeisa and Hargeisa-Berbera, 2024.

Precipitation Anomalies

The historical precipitation anomalies of the Hargeisa–Berbera block of the project is given in Figure 4-9. An increase in mean precipitation in 1940, which was +98.22 mm compared to the average, was followed by decreases for 6 consecutive years. The highest decreases in mean precipitation compared to the average was in 1941, which is -39.3 mm. Eight years (1947-1954) of increases in mean precipitation was recorded following the 6 years decreases. The highest increase in precipitation compared to the average was 157 mm in 1951. The period from 1955-2023 was dominated by decreases in precipitation although it is dotted with increases, which are either 1 or 2 consecutive years (Figure 4-9). An exception a period from 181-1985, which showed increases in precipitation. The highest increase during this period was +29.7mm. The highest decrease for period from 1955-2023 was recorded in 2022, which is -58.2 mm.

Figure 4-9. Historical Precipitation Anomalies of Hargeisa-Berbera Block of the Project

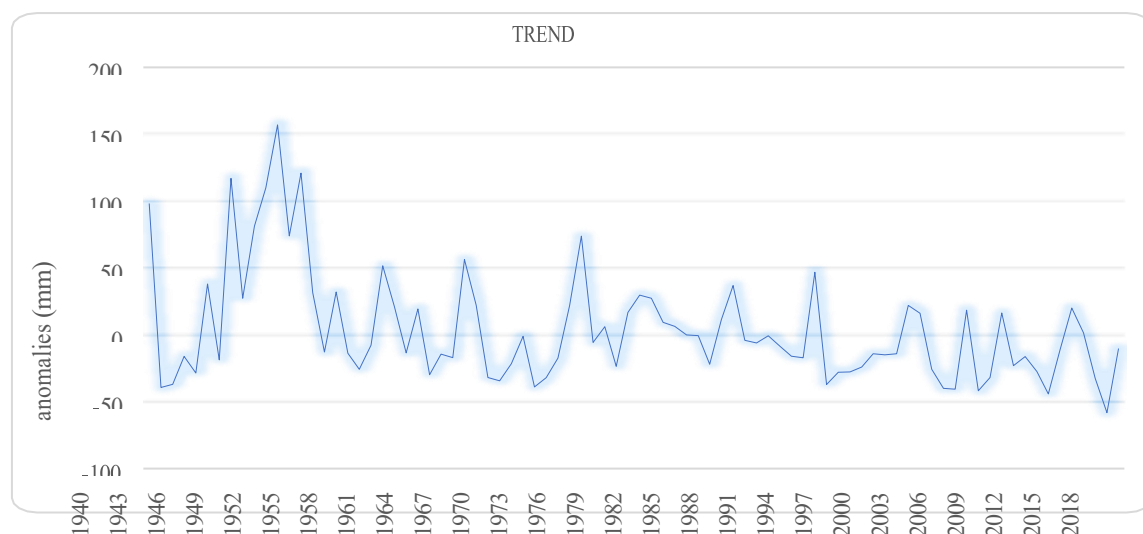


Source: Climate Risk and Adaptation Assessment study of Ethiopia-Somaliland transmission line interconnections: Jigjiga-Hargeisa and Hargeisa-Berbera, 2024.

Trend in Precipitation

The historical trend in the precipitation of the Hargeisa-Berbera block of the project is given in Figure 4-10. The general trend in precipitation is characterized as cycles of increases and decreases compared to the average. But their magnitude is different, i.e., decreases range from -0.1 mm to -58.2 mm. Similarly, increases during the entire period ranges from +6.1 mm to +157 mm. However, historical data set shows an overall decreasing trend in the precipitation for the Hargeisa-Berbera transmission line section.

Figure 4-10. Historical Trend in the Precipitation of Hargeisa-Berbera Block of the Project



Source: Climate Risk and Adaptation Assessment study of Ethiopia-Somaliland transmission line interconnections: Jigjiga-Hargeisa and Hargeisa-Berbera, 2024.

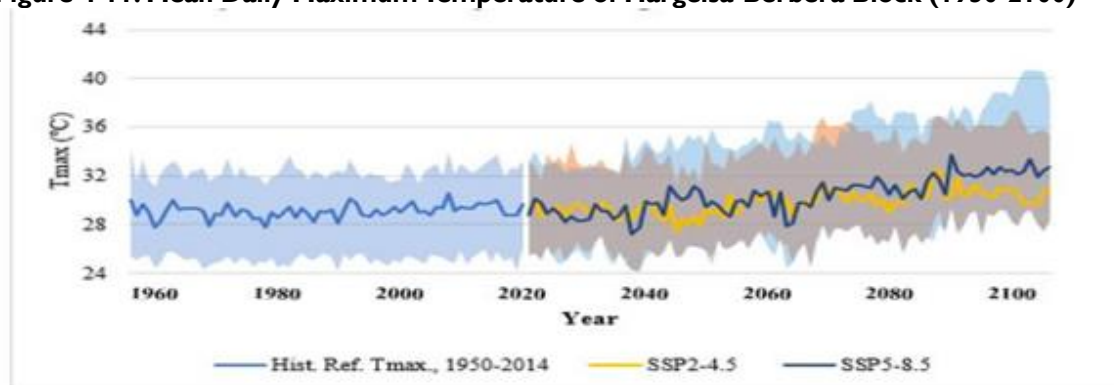
4.1.3.1.3 Future Climate Change Projections

Scenarios and Future Horizons

Mean daily maximum temperature

Projection of mean daily maximum temperature for Hargeisa-Berbera bloc under 2 scenarios (SSP2 4.5 and SSP5 8.5) is given in Figure 4-11. The values of Tmax remains more or less comparable to the historical values until the first half of the century but there is a tendency to increase at around 2050. This is followed by a short period of stabilization and a decrease at early 2060s to only begin increasing until the turn of the century (Figure 4-11). From early 2090s–2100, the values of the mean daily maximum temperature remain above 32°C compared to 28°C of the historical values. Generally, the mean daily maximum temperature increases for most part of the second half of the century under both SSP2 4.5 and SSP5 8.5.

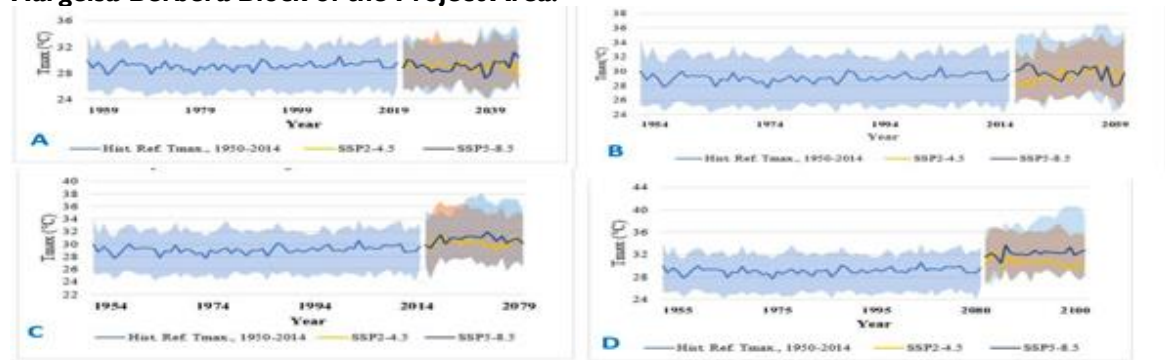
Figure 4-11. Mean Daily Maximum Temperature of Hargeisa-Berbera Block (1950-2100)



Source: Climate Risk and Adaptation Assessment study of Ethiopia-Somaliland transmission line interconnections: Jigjiga-Hargeisa and Hargeisa-Berbera, 2024.

Time series projections of the mean daily maximum temperature for Hargeisa-Berbera block of the project under SSP2 4.5 and SSP5 8.5 are given in Figure 4-12. In 2040, the projected Tmax will remain similar to the historical values for 2020s and early 2030 (Figure 28 A). It even falls below the historical values in mid-2030 under SSP5 8.5. Although the values of projected Tmax decreases at the end of 2030s under SSP2 4.5 but it increases under SSP5 8.5 (Figure 4-12A) in 2060, Tmax falls during early 2040s and then shows an increasing trend towards the late 2050s under SSP5 8.5 (Figure 4-12 B). But it starts at lower values compared to the historical values during the early 2040s but steadily increases from 2050 to the end of the century. In 2060, the mean daily maximum temperature shows a pronounced difference compared to the historical values under SSP5 8.5 (Figure 4-12 C). It is remarkably lower for SSP2 4.5 although it increases at late 2050s. Tmax is clearly above 32 °C for most of the time from 2080-2100 under SSP5 8.5 (Figure 4-12 D). It is higher during early 2080s and tends to decrease at the end of the century under SSP2 4.5. The general trend is an increase in mean daily maximum temperature in the future horizons.

Figure 4-12. Time Series Future Projections of Mean Daily Maximum Temperature (Tmax) for Hargeisa-Berbera Block of the Project Area.



Shaded areas denote 10th and 90th percentiles.

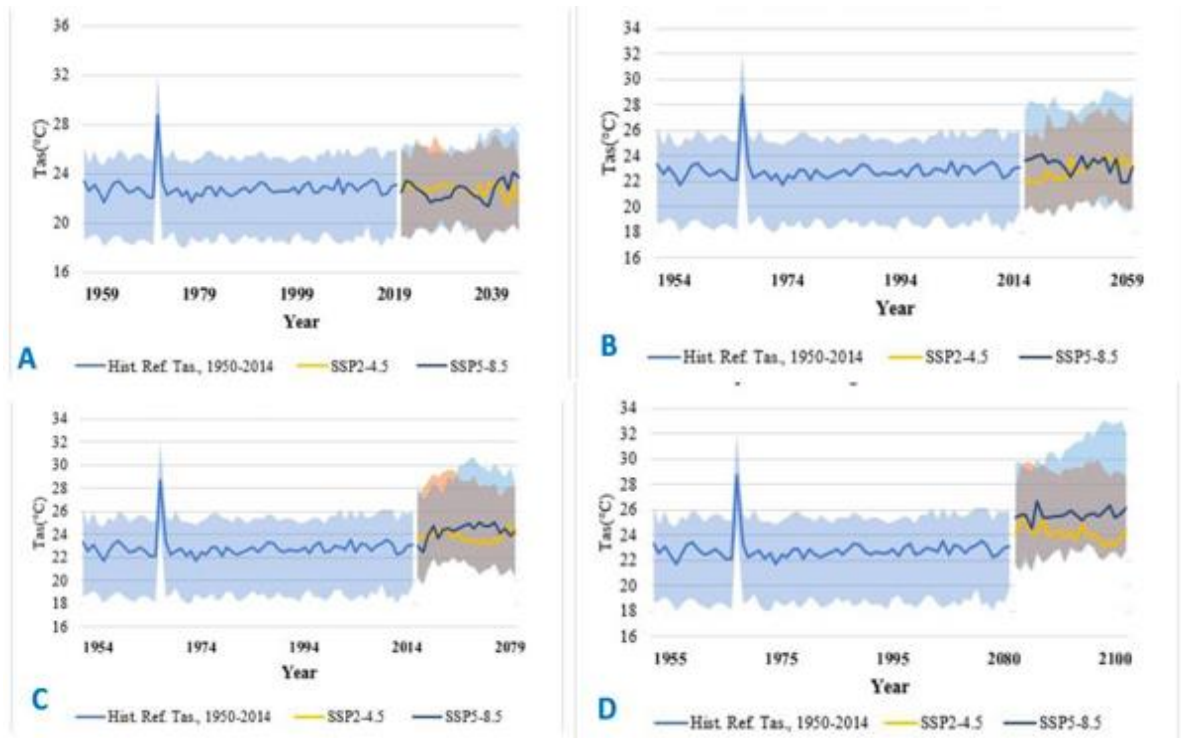
Source: Climate Risk and Adaptation Assessment study of Ethiopia-Somaliland transmission line interconnections: Jigjiga-Hargeisa and Hargeisa-Berbera, 2024.

Near Surface Air Temperature (Tas)

Time series trends of the near surface air temperature (Tas) have been projected into future horizons under SSP2 4.5 and SSP5 8.5 (Figure 4-13). Noteworthy is one event of a surge in the historical near surface air temperature to above 28°C. In all cases, with this exception, the values of historical Tas remained below 24°C (Figure 4-13). The near surface temperature is higher during the early 2020s and mid-2030s under SSP2 4.5, it will be much lower than its values under SSP5 8.5 at the end of 2030s (Figure 4-13). On the other hand, Tas is lower than the historical values for most of this future horizon under SSP5 8.5 except a sharp increase at the end of 2030s (Figure 4-13). In 2060, Tas is higher than the historical values at the beginning and then sharply pick up getting closer to 24 °C under SSP5 8.5 (Figure 4-13). The values of Tas are low during early 2040s and gradually climb for the rest of the years under SSP2 4.5 in 2080, Tas surpasses the 24 °C mark under SSP5 8.5 but it is higher than the historical values and becomes above 24 °C at the end of 2070s (Figure 4-13). In the period from 2080–2100, the near surface temperature of the

Hargeisa–Berbera is above the 24°C mark but it also attains values above 26 °C under SSPs 8.5 (Figure 4-13). There are 4 events when Tas is above 24°C under SSP2 4.5 but it is always lower than the values under SSP5 8.5. The near surface air temperature shows increasing trends in all future horizons for Hargeisa-Berbera block of the project.

Figure 4-13. Time Series Future Projections of Near Surface Air Temperature (Tas) for Hargeisa -Berbera Block of the Project Area.



Shaded areas denote 10th and 90th percentiles.

Source: Climate Risk and Adaptation Assessment study of Ethiopia-Somaliland transmission line interconnections: Jigjiga-Hargeisa and Hargeisa-Berbera, 2024.

4.1.4 Air Quality

The air quality along the proposed transmission line route corridor is generally good due to its routing in predominantly rural areas. Absence of major industries along the transmission route and specifically the AoI, relatively low commercial, and industrial sites, as well as low population density and limited traffic along the transmission line corridor, it is reasonable to assume that the ambient air quality is good, apart from elevated dust levels close to the existing access road during the dry season caused by passing traffic. This is likely to be the case even during construction adjacent to the access road since traffic volumes will not be high enough to result in significant air quality degradation. The distance between the urban towns and the villages where the transmission line is located is 5 km for Gebiley, for 9km Hargeisa and 6km for Berbera an indication that the transmission line is in predominantly rural areas.

4.1.5 Ambient Noise

In terms of human settlement, the baseline environment along the transmission line corridor is mostly rural with sparse settlement patterns. Hence, existing noise levels in the vicinity of the transmission line reflect rural acoustical environment and are generally characterized by sounds of nature and minimal road traffic. However, there are no vulnerable targets (school, clinic, worship place, local administration offices, etc.) likely to be exposed to noise and vibration from the project during construction and operation. The few schools' religious places and health facilities found in the villages are all at least 1km away from the transmission line route thereby minimising construction and operation phase impacts.

4.1.6 Topography

Somaliland topography consists of three main landforms:

- Piedmonts and the coastal plain (Guban) southward from the Red Sea with elevations ranging from seas level to 600m.
- Hills and dissected mountains (Ogo) of rugged topography rising to more than 1,500m.
- The plateau (Haud) with large areas of gently undulating plains.

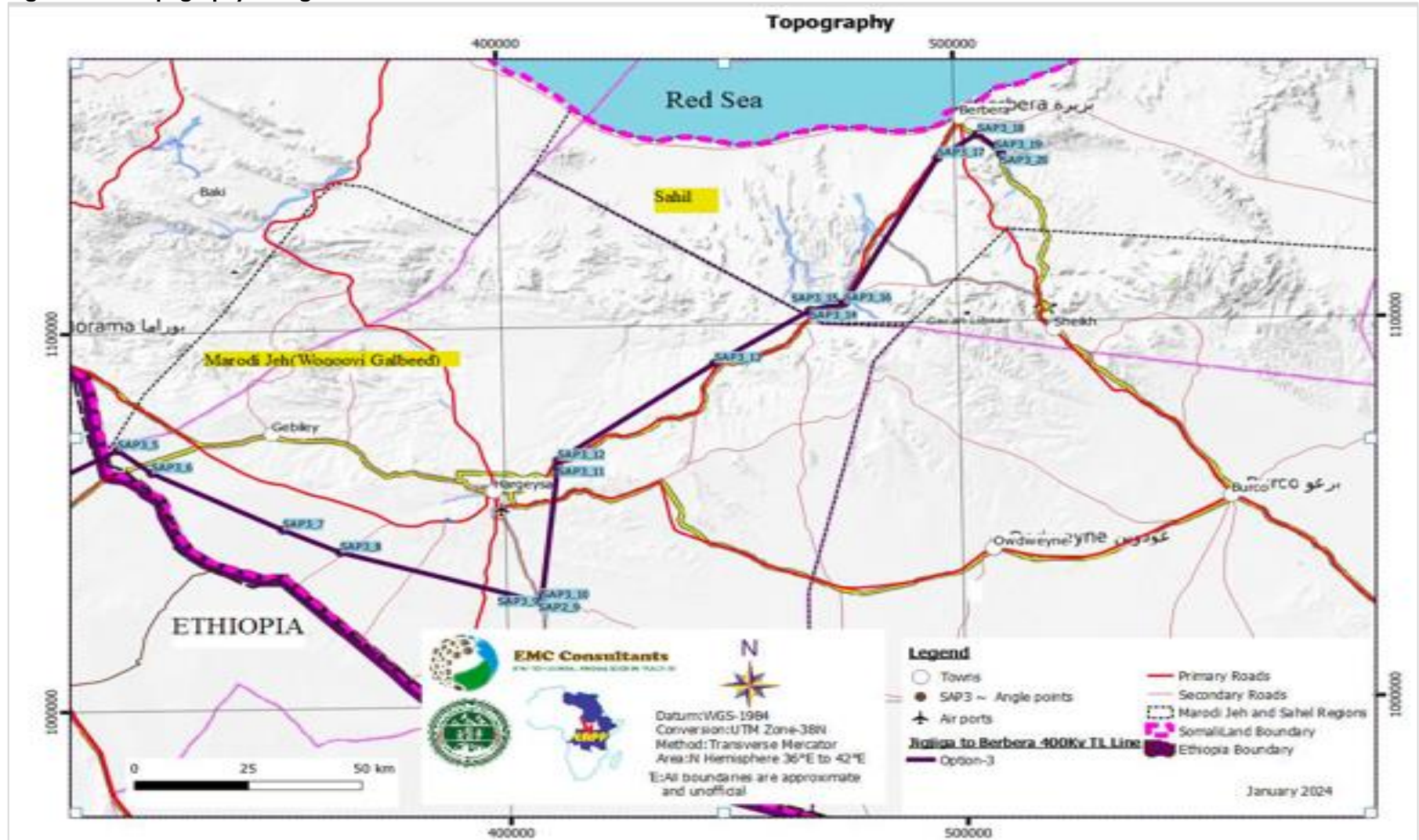
The elevation profile of the line from Wajaale to Berbera is generally sloping downwards from an altitude of about 1742m asl at SAP3-2 to 212m asl at SAP3-20 at Berbera. From SAP 3-2 to SAP3-3 the line rise up slope of 0.6% to an altitude of about 1766m asl at SAP3-3 which is the highest point the line passes through. From SAP 3-3 the line transects through a consistently downward sloping terrain until SAP3-15 at about 728 m asl then rises slightly to 721 m asl at SAP3-16. From SAP3-16 the line continues to transect a down sloping terrain until it gets to SAP3-18 which is the lowest altitude the line transects at an altitude of about 107m asl in Berbera area. From this point the line goes upslope of about 1.6% to through SAP3-19 then terminate at SAP3-20 which is at about 212 m asl. Major topographic features and slope categories along the transmission line route corridor are presented in Figure 4.14.

Figure 4-14: Elavation Profile Along Transmission Line Route



Source: EMC Consultants 2024.

Figure 4-15: Topography Along Transmission Line Route



Source: EMC Consultants 2024.

Figure 4-16: Topographical Features Along Transmission Line Route



Source: EMC Consultants 2024.

4.1.7 Soils

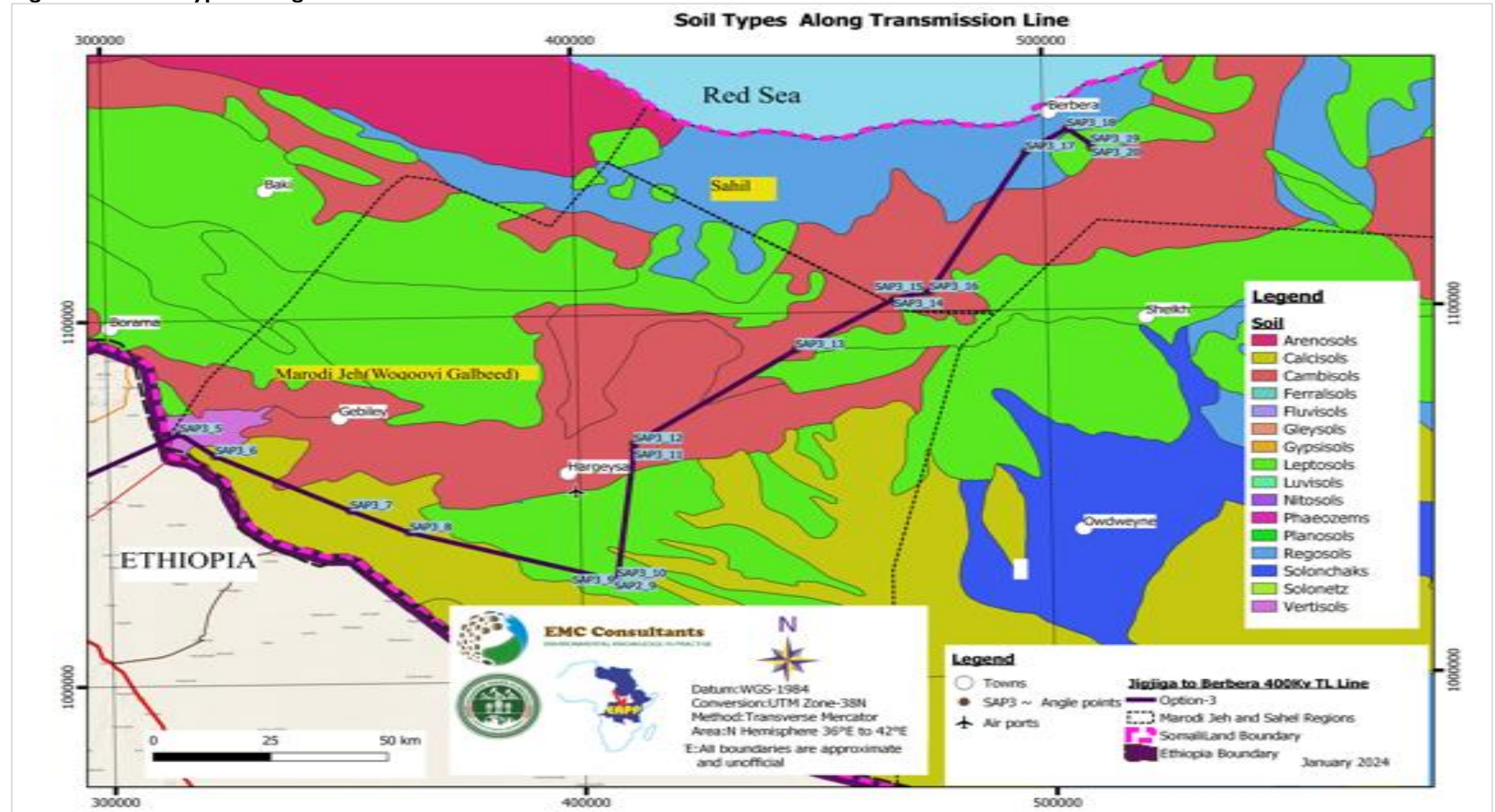
The soil types in Somaliland have a one-to-one relationship with the parent rock types, geomorphology and climate elements. The soils along the coast are haplic arenosols and sandy in texture. The central, predominantly basement and mountainous areas are covered by eutric leptosols of loamy texture. Petric calcisols and calcaric cambisols are dominant over the Mesozoic sedimentary terrains of the southeast. Along the project transmission route, the dominant soil types are Leptosols, Vertisols, Cambisols and Regosols. Table 4-2 below presents the different types of soils by distances in km from the point where the transmission line starts in Wajaale to Berbera (271.6km) and shows the changes in soil types across the distances covered by the transmission line.

Table 4-2. Soil Types

Kms Covered	Distances (km)	Soil types(legends)
47.3	0 to 47.3km	Yesomma Sandstones
32	47.3km to 79.3 km	Sands:silts and gravels: alluvial
9	79.3km to 88.3km	Auradu Limestone: shelf limestones
28	88.3km to 116.3km	Sands:silts and gravels: alluvial
3.4	116.3km to 119.7km	Auradu Limestone: shelf limestones
3.6	119.7km to 123.3km	Sands:silts and gravels: alluvial
7.6	123.3km to 130.9km	Auradu Limestone: shelf limestones
1.5	130.9km to 132.4km	Sands:silts and gravels: alluvial
1.9	132.4km to 134.3km	Auradu Limestone: shelf limestones
1.9	134.3km to 136.2km	Auradu Limestone: shelf limestones
3	136.2km to 139.2km	Sands:silts and gravels: alluvial
19	139.2km to 158.2km	Yesomma Sandstones
1.8	158.2km to 160km	Yonger Granites
10.4	160km to 170.4km	Qabri Bahar (Qabri Baxar)
4.3	170.4km to 174.7km	Sands:silts and gravels: alluvial
3.3	174.7km to 178km	Qabri Bahar (Qabri Baxar)
10.7	178km to 188.7km	Yonger Granites
12.8	188.7km to 201.5km	Qabri Bahar (Qabri Baxar)
1.5	201.5km to 203km	Sands:silts and gravels: alluvial
3.3	203km to 206.3km	Yonger Granites

2.6	206.3km to 208.9km	Basalt lava flows
6.8	208.9km to 215.7km	metagabbros and related rocks
9.6	215.7km to 225.3km	Qabri Bahar (Qabri Baxar)
3.4	225.3km to 228.7km	Sands:silts and gravels: alluvial
4.9	228.7km to 233.6km	Qabri Bahar (Qabri Baxar)
38	233.6km to 271.6km	Sands:silts and gravels: alluvial

Figure 4-17: Soil Types Along Transmission Line Route



Source: EMC Consultants 2024.

4.1.8 Geology

Somaliland has a complex geology and structural setting that make it rich in mineral resources. The country is almost all rocks of the three major rock categories. The geology of the surveyed part of Somaliland is dominantly covered by eolian and marine sediments. This unit covers areas along the coast and is dissected by radiating wadis. However, quaternary undifferentiated proluvial sediments are more abundant in the southeastern part of country, as shown in Figure 4-18. Mesozoic sediments, which are composed of sandstone and shale layers, are also exposed.

Figure 4-18: Mesozoic Sedimentary Rocks (left) and the Crystalline Basement Rocks right.



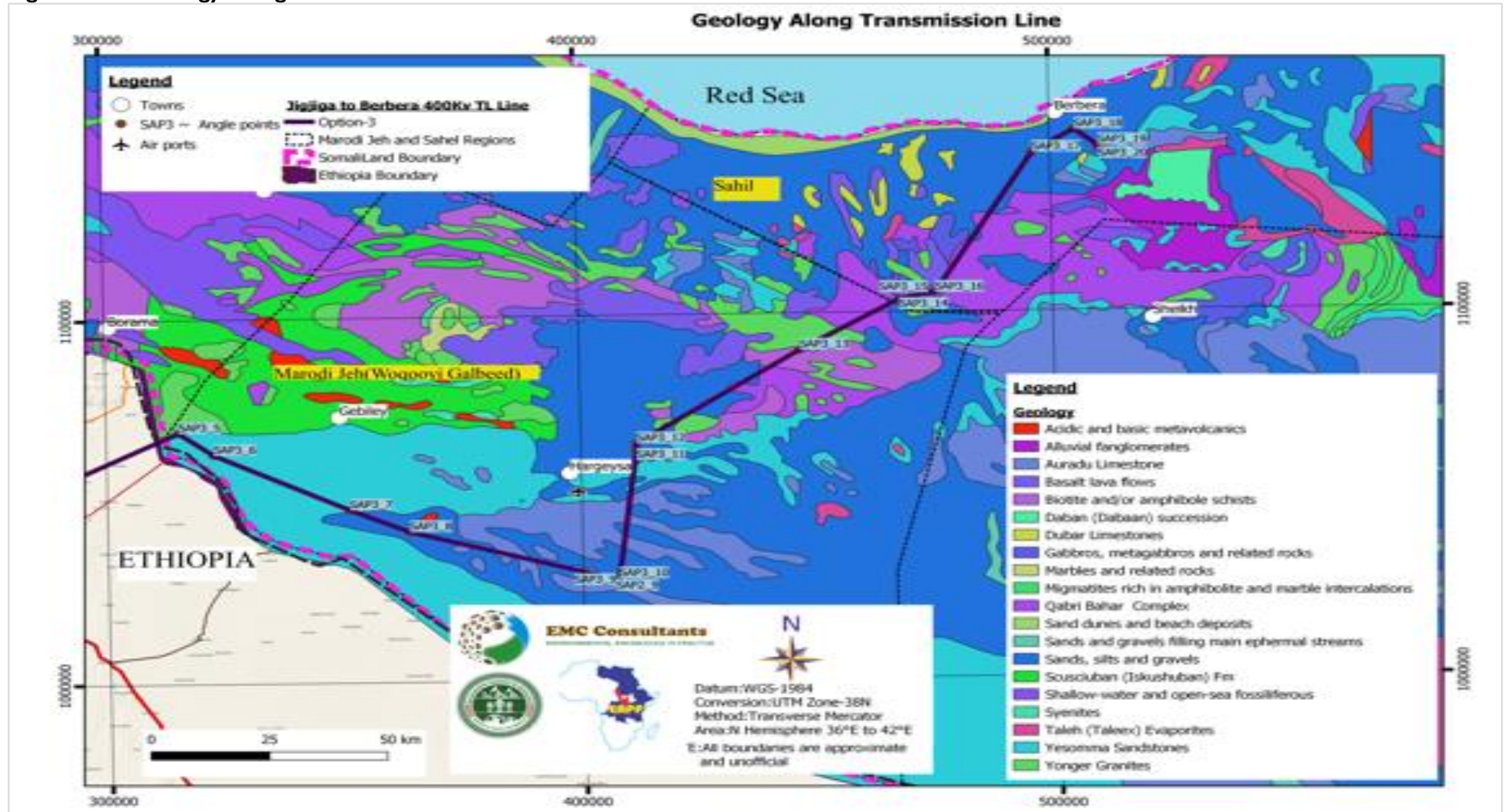
Source: EMC Consultants 2024.

Areas between Hargeisa and Berbera, except for the southern and northern ends, are predominantly covered by crystalline basement rocks. The northwest-southeast trending faults dissect the area and control its hydrological characteristics. Areas around Hargeisa and the Gebiley-Hargeisa stretch are covered by limestone, shale, claystone, and anhydrite rocks (Table 4-3). Along the project route the dominant geology is sandstones, limestones, sand, silts, gravels, and biotite and/or amphibole schists. Gebiley, Hargeisa and Berbera lie within a tectonically active region characterized by the East African Rift system. Though not extensively studied or mapped as those in other regions, the broader tectonic setting of the East African Rift suggests that the three regions experience tectonic activity associated with faulting and rifting.

Table 4-3. Lithological Covers of Western Somaliland

Geology	Area in Ha	Percent
Eolian and marine sediments	1007052	24.4
Quaternary undifferentiated, proluvial sediments	1379658	33.4
Sandstone, shale	743795	18.0
Limestone, Shale, claystone, anhydrite	375196	9.1
Lower member. Basalts	281603	6.8
Crystalline Basement Rocks	347509	8.4

Figure 4-19: Gelology Along Transmission Line Route



Source: EMC Consultants 2024.

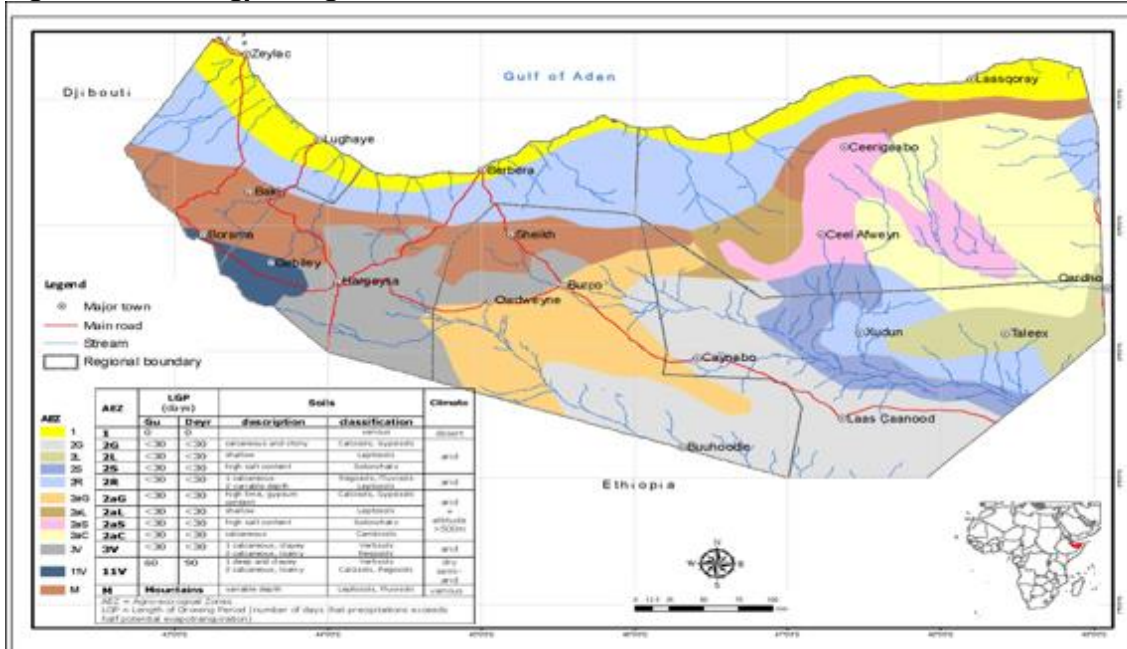
4.1.9 Agro-Ecological Zones

In broad terms Somaliland can be divided into 10 agro-ecological zones. Of, these 8 constitute arid or desert zones with significant limitations that make them unsuitable for agriculture. The total arable land area is estimated at around 350,000 ha. This is concentrated largely on the northwestern plateau (Southern Awdal, Gebiley and Marodije) and contains the main rain fed agricultural zones. This is further divided into two main sub-zones:

- The high potential rain-fed farming land, which covers the land on the plateau along the main road Hargeisa-Borama, and the area surrounding Borama town and Qulijeed village. The size of the cultivated farm ranges between 1.5-5 hectares for bigger farmers and between 0.5-1.5 ha for small farmers, and
- The land which covers the northwest of Borama and the south and the east of Hargeisa, which has a small proportion of the agro-pastoral population. Cultivated areas range between 0.6-1.5 hectares, and from 0.4-0.6 hectares.

The coastal plain has little agricultural potential and is sparsely populated. The eastern plateau (Togdheer) has very limited rain-fed and irrigated agricultural potential. The arid hilly terrain of the Far East (Sool) has practically no agricultural potential. There is limited irrigated agricultural potential along seasonal streams with associated shallow aquifers. However, the eastern highlands of Sanaag around Erigabo which benefits from greater precipitation during the rainy season do have the potential for both subsistence and commercial farming. Along the transmission line, the agro-ecological zones are semi-arid at the starting point of the transmission line in Gebiley, into Hargeisa, and then desert in Berbera as shown in figure 4-20.

Figure 4-20: Ecology Along Transmission Line Route



Source: EMC Consultants 2024.

4.1.10 Water Resources and Drainage Networks

The surface waters of Somaliland belong to three major river basins:

- Gulf of Aden basin
- Dharoor basin
- Nugaal basin

The surface drainage closely follows the general geomorphology. Much of the area drains in a southeasterly direction towards the Indian Ocean; the extreme north discharges its runoff into the Gulf of Aden. The drainage network, which is influenced by local topography, rainfall, and geology, is dense to very dense in the northern mountains. It is very thin or virtually non-existent in large parts of the central basin. Runoff in Somaliland basins generally takes place in seasonal streams (toggas) and in addition to infiltration, it replenishes stream bed and flood plain aquifers. Runoff only occurs after heavy rainfalls in the form of spate flows, which may last from a few hours to a several days. In sandy fans and in valley bottoms in the gently rolling topography large quantities of water are infiltrated into the aquifers. Evaporation and overland flows are also high in these plains.

There is only one perennial river along the transmission line route (Togga Baba). The smaller rivers and drainages have surface water only after periods of heavy rainfall. There are, however, many small streams called toggas (*wadis*) originating from the plateaus and mountains in the north that have perennial flows in some stretches and at other stretches have a complex surface-water groundwater interaction (sub-surface flow) where there is groundwater recharge. After intense rainfall, most of these small streams can carry high floods and debris. Even some river training and control structures can be destroyed as happened, for instance, on several occasions in Togga Hargeysa. The surface runoff lasts from a few hours to a few days. The subsurface flow of toggas is often tapped by many shallow wells, being an important source of water for people and livestock in the region. Dams, ponds and dug outs (*Wars*) are commonly used in the valleys along the transmission line by local communities to collect storm water from small catchments. The Wars are unlined with surface areas of hundreds to thousands of m² and a depth of 2m to 3m. Berkads are major water storage infrastructure in Marodi-Jeh and Sahil regions. They vary in their capacity but are normally less than 300m³. The main problems with berkads are related to sanitary and hygienic conditions. Along the project transmission route, the rivers crossed by the project include 1 main river Togga Baba and 5 small rivers namely Togga Maroodijeex, Togga Kodayare, Togga Dacarbudhug Caloola, Togga, Xyod-Balae Abdaal and Togga Cabaadweyne. As shown in figure 4-21, some angle points cross the toggas and the design is aimed at ensuring that the towers are not located at the riverbeds and instead will be re-routed. A Water Resource Use Assessment Study has been undertaken as part of this ESIA study and recommends potential sources of water for use during the construction phase (Annex H).

Figure 4-21: Togga Baba River and Togga Maroodijeex



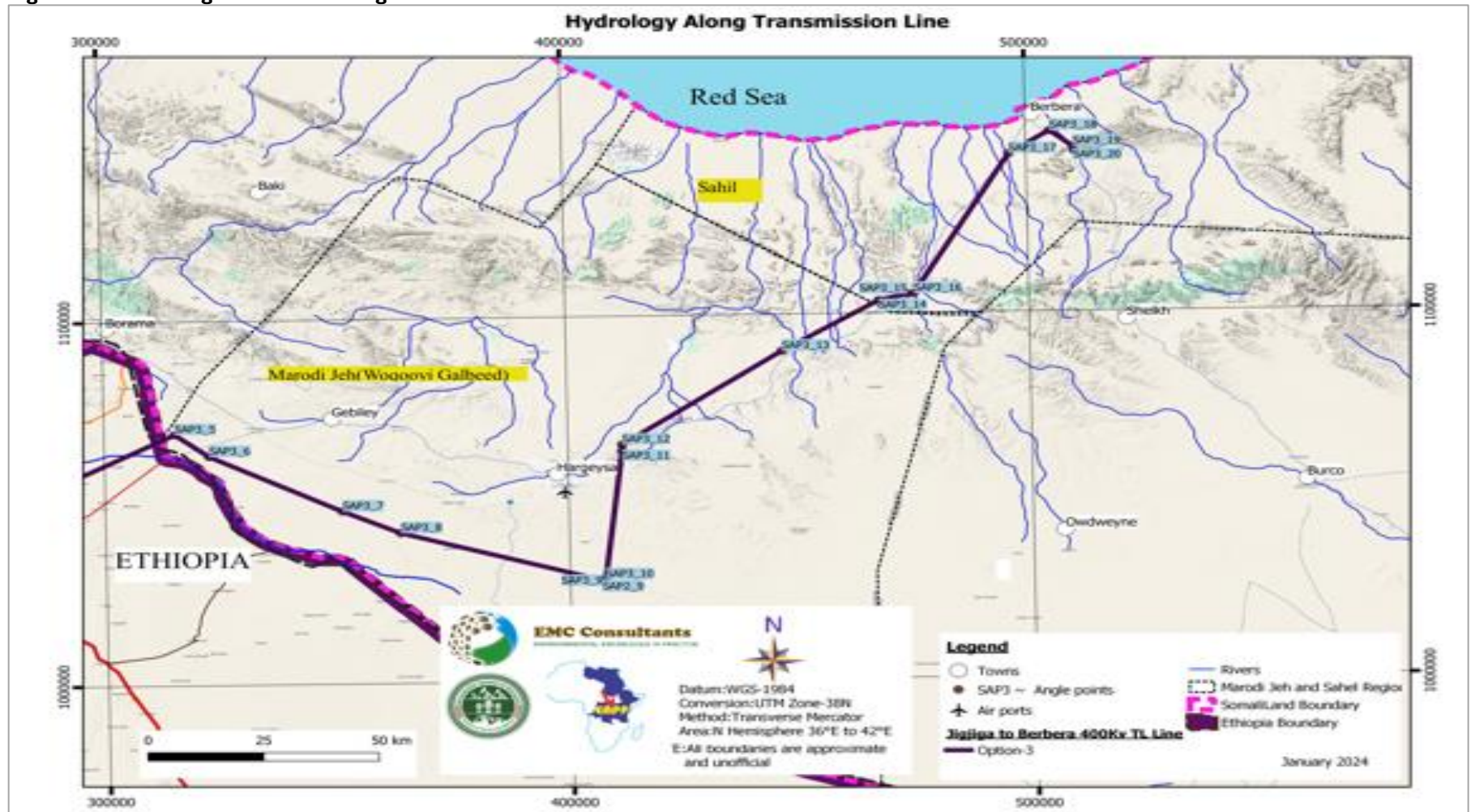
Source: EMC Consultants 2024.

Figure 4-22. Berkad in Lafta Farawayne Village and Seasonal Dry River in Lafa-ruug Village



Source: EMC Consultants 2024.

Figure 4-23. Drainage Network Along Transmission Line Route



Source: EMC Consultants 2024.

Figure 4-24. Water Bodies Crossed by Angle Lines Along Transmission Line Route



Source: EMC Consultants 2024.

4.2 Biological Environment

4.2.1 Flora

The vegetation in Somaliland is predominantly dry deciduous bushland and thicket dominated by species of Acacia thorn trees, commiphora, aloes, baobab, and candelabra trees are native to the semi-arid regions, with semi-desert grasslands and deciduous shrub land in the western parts neighboring Ethiopia. Trees that provide frankincense and myrrh are native to the region as well. Mangrove trees are found in the western part of Somaliland namely from Zeila to Lowyacada along the Red Sea coast. Kapok, and papaya grow along the rivers. Coconut, dune palm, pine, juniper, cactus, and flowering trees such as the flamboyant were imported and have become widespread in populated areas. The route of the transmission line passes through three main ecological zones. According to the vegetation map of Somaliland, the most cited reference is Hemming's (1966) ecological classification. Following are the three vegetation zones and a description of the dominant species that are found in each zone:

***Vachellia etbaica* open woodland.** *V. etbaica* is found mainly on the southern fringes of the Golis range. It is a strip that widens out in the west as one approach the Ethio-Somaliland Border and beyond. *V. etbaica* is also found on the north-facing slope of the main escarpment at somewhat lower altitudes.

Golis mountain: Golis Mountain range is an extension of the Ethiopian highlands that run parallel (east-west) with the Gulf of Aden. The central Golis Range, particularly the section between Hargeisa and Berbera is the lowest part in terms of elevation. For example, elevation of *Dhubato* Pass, just to the south of Dacar-budhuq is only 1200 metres above sea level (masl). Other important species in the area include *Balanites glabra*, *Vachellia tortilis* and *Delonix elata*. *Aloe megalacantha* is also widely conspicuous in this zone, particularly areas to the south and southwest of Hargeisa. It is important to note that one of the villages whereby the transmission line passes is called *Dacarta* (literally meaning aloe). *A. etbaica* is an important colonizer and can be seen encroaching on the traditional grassy plains (*buns*) e.g. Wajaale and Faraweyne.

Sub-coastal and coastal zones: The vegetation of the coastal plain can be categorised into two main classes. Adjacent to the coast, there is a littoral zone where halophytic flora is common on vegetated beach dunes. Moving further inland, this quickly transits to an extensive vegetation type dominated by scattered, dwarf, and woody plants. This characterises across most of the sandy coastal plain as far south as Xabaalo-Tumaalo village, the nearest village to Berbera (circa 30 km south of Berbera). Dominant species in this vegetation type include *Vachellia edgeworthii* and stunted *Vachellia tortilis*. Some of the other most conspicuous species include *Balanites rotundifolia* var. *Orbicularis*, and the well-branched evergreen 'tooth-brush tree' (*Salvadora persica*). The vegetation found most commonly along seasonal water courses includes *Zizyphus hamur*, *Tamarix aphylla* and *Leptadenia pyrotechnica*.

4.2.2 Flora Assessment

4.2.2.1 Land Cover Types Along Transmission Route

The natural environment along the transmission line route AoI is primarily a mix of largely natural, natural and modified habitats (land use) as shown in figure 4-25 and tables 4.4 and 4.5 as classified by ESS6. Based on the World Bank Environmental and Social Standard 6 (ESS6) classification, habitats can be categorized as:

- **Natural Habitat:** Areas composed of viable native species and functioning ecological processes with minimal human alteration.
- **Largely Natural Habitat:** Areas that retain most natural characteristics but may have been slightly modified or influenced by human activities.
- **Modified Habitat:** Areas substantially changed by human activity, often dominated by cultivated or constructed systems.

4.2.2.2 Quantification of Habitat Extents in the Project AoI

The extent of the various mapped habitat types and their habitat status (i.e. modified/natural) in the Project AoI (40m ROW and 1km buffer) are quantified in tables 4-4 and 4-5. The land cover along the proposed transmission line corridor spans a range of habitat types, reflecting varying degrees of ecological integrity. Analysis of satellite-derived land cover data integrated into GIS reveals that the corridor is predominantly composed of largely natural and natural habitats, with only a small proportion falling under the modified category.

Largely Natural Habitats (73.6%)

These areas exhibit minimal human disturbance and retain much of their original ecological character. They dominate the corridor and include:

- **Sparse Shrubs and Sparse Herbaceous Vegetation-** The most extensive land cover type, characterized by open arid or semi-arid landscapes supporting scattered shrubs and herbaceous species. These areas are ecologically important for supporting drought-adapted flora and fauna.
- **Parklike Patches of Sparse Herbaceous Vegetation (20–10% cover)-**Scattered grassland with occasional woody elements, representing transitional zones between shrublands and open grassland.
- **Bare Soil and Unconsolidated Materials:** Includes areas of exposed soils, sand, or gravel, often associated with seasonal watercourses or degraded patches.
- **Loose and Shifting Sands:** Sandy areas with minimal vegetation, likely to be mobile under wind action and potentially sensitive to disturbance.

Natural Habitats (17.3%)

These habitats are relatively intact ecosystems with native vegetation and minimal modification, supporting native biodiversity. Key types include:

- **Shrubland with Herbaceous Layer:** Dense shrub communities with a mix of grasses and forbs, indicative of stable dryland ecosystems.
- **Shrubland with Herbaceous (20–10% cover):** Slightly more open than the main shrublands, these areas still maintain high ecological value.

- Broadleaved Deciduous Woodland with Herbaceous Layer and Sparse Shrubs: Pockets of woodland provide critical habitat for woodland-adapted species.
- Closed to Very Open Herbaceous Vegetation with Trees and Shrubs: A mosaic of herbaceous cover interspersed with woody plants.
- Continuous Closed to Very Open Herbaceous Vegetation: Dense grasslands with varying canopy openness.
- Bare Rock(s): Extremely limited, representing exposed rocky outcrops.

Modified Habitats (4.7%)

These are areas subject to significant human influence, mostly through agricultural use:

- Permanently Cropped Area with Surface Irrigated Herbaceous Crops: Indicative of intensively cultivated fields, likely used for seasonal or commercial food production.
- Permanently Cropped Area with Small-Sized Fields of Irrigated Herbaceous Crops: Reflects fragmented subsistence farming with irrigation, common in peri-urban or settlement-adjacent zones.

Table 4-4. Habitat Description Along Area of Influence- 40m RoW

Habitat Description (40m RoW)	Area (ha)	ESS6 Category
Sparse shrubs and sparse herbaceous	87,015.2	Largely Natural
Shrubland with herbaceous	11,394.7	Natural
Permanently cropped area with surface irrigated herbaceous crop (s)	2460.4	Modified
Permanently cropped area with small sized F=field(s) of surface irrigated Herbaceous crop (s)	3,444.5	Modified
Parklike patches of sparse ((20-10)-4%) herbaceous vegetation	363.3	Largely Natural
Bare soil and/or other unconsolidated material(s)	2,459.5	Largely Natural
Broadleaved deciduous (40-(20-10) %) woodland with herbaceous layer and sparse shrubs	20.3	Natural
Closed to very open herbaceous vegetation with trees and shrubs	141.2	Natural
Continuous closed to very open herbaceous vegetation	15.0	Natural
Loose and shifting sands	93.4	Largely Natural
(40 - (20-10) %) shrubland with herbaceous	4874.1	Natural
Bare rocks	0.1	Natural

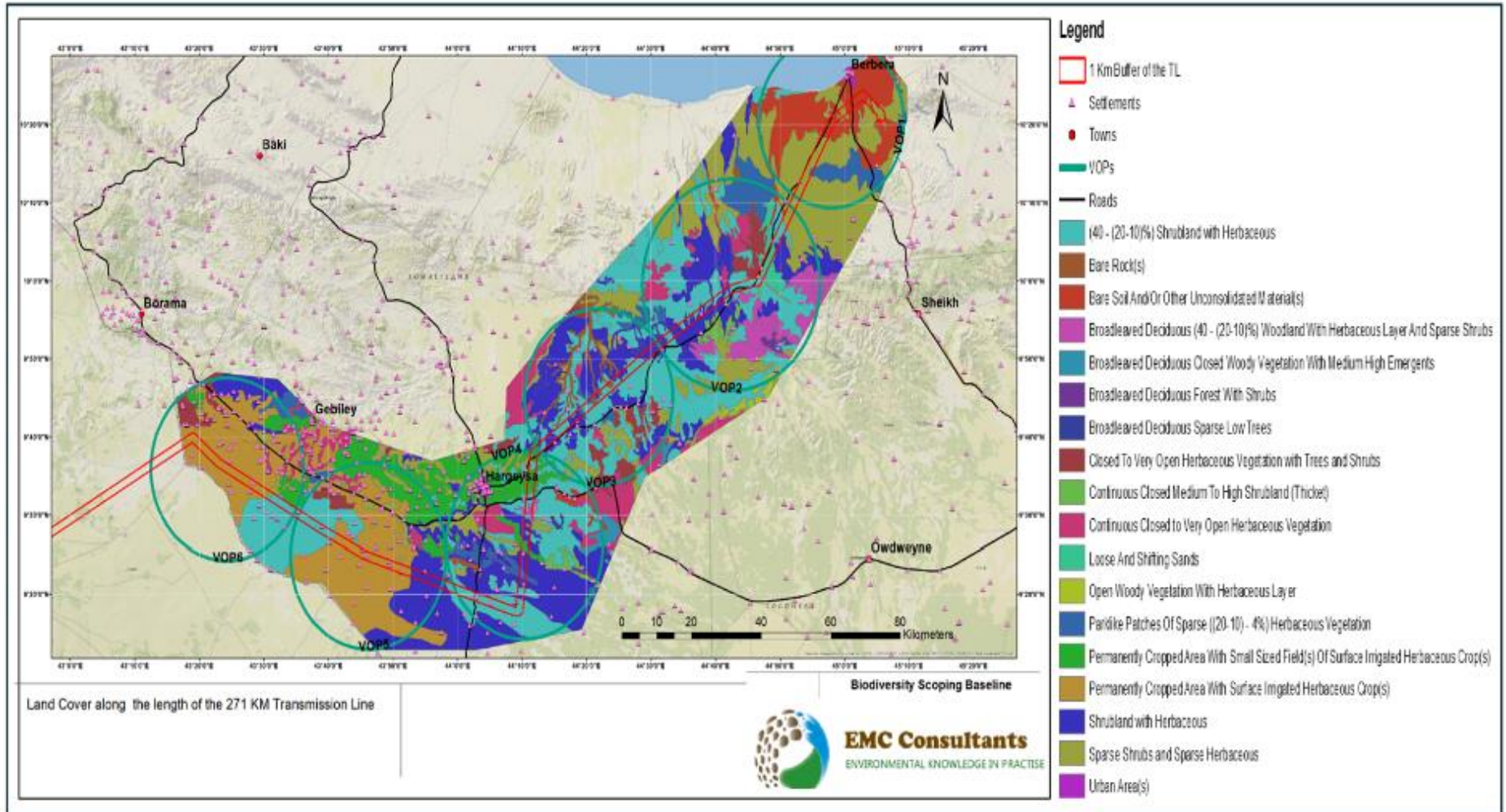
Table 4-5. Habitat Description Along Transmission Line Route 1km Buffer

Habitat Description (1 km buffer)	Area (ha)	ESS6 Category
Sparse shrubs and sparse herbaceous	4,350,761.574	Largely Natural
Shrubland with herbaceous	569,733.190	Natural
Permanently cropped area with surface irrigated herbaceous crop (s)	123,021.783	Modified
Permanently cropped area with small sized F=field(s) of surface irrigated Herbaceous crop (s)	172,224.596	Modified
Parklike patches of sparse ((20-10)-4%) herbaceous vegetation	18,165.664	Largely Natural
Bare soil and/or other unconsolidated material(s)	122,974.671	Largely Natural

Broadleaved deciduous (40-(20-10) %) woodland with herbaceous layer and sparse shrubs	1,015.760	Natural
Closed to very open herbaceous vegetation with trees and shrubs	7,060.040	Natural
Continuous closed to very open herbaceous vegetation	751.860	Natural
Loose and shifting sands	4,670.669	Largely Natural
(40 - (20-10) %) shrubland with herbaceous	243,707.153	Natural
Bare rock (s)	4.221	Natural

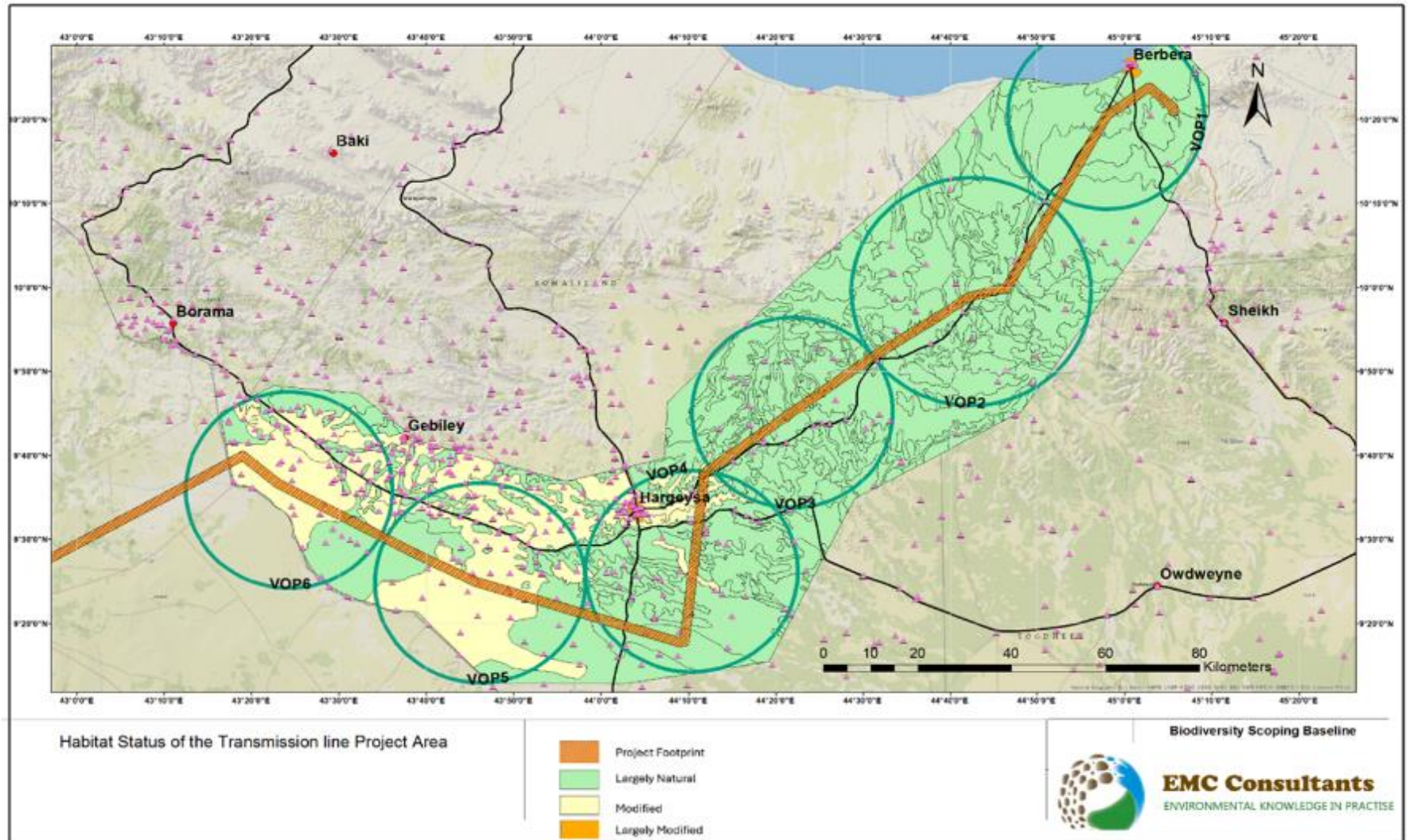
Figure 4-26 shows the proposed transmission line (brown)/1km-and the 6 Vantage Observation Points (VOP). The VOPs were selected based on the land cover types, ensuring representation across the major ecosystems along the transmission line corridor. These land cover types served as a basis for identifying and stratifying the key habitat types, in line with ESS6 requirements. The habitat types and land cover data are therefore complementary, supporting a systematic assessment of biodiversity values within the project AoI. Figure 4-27 shows the field survey areas selected for the flora survey.

Figure 4-25. Land Cover Types Along Transmission Route Aol



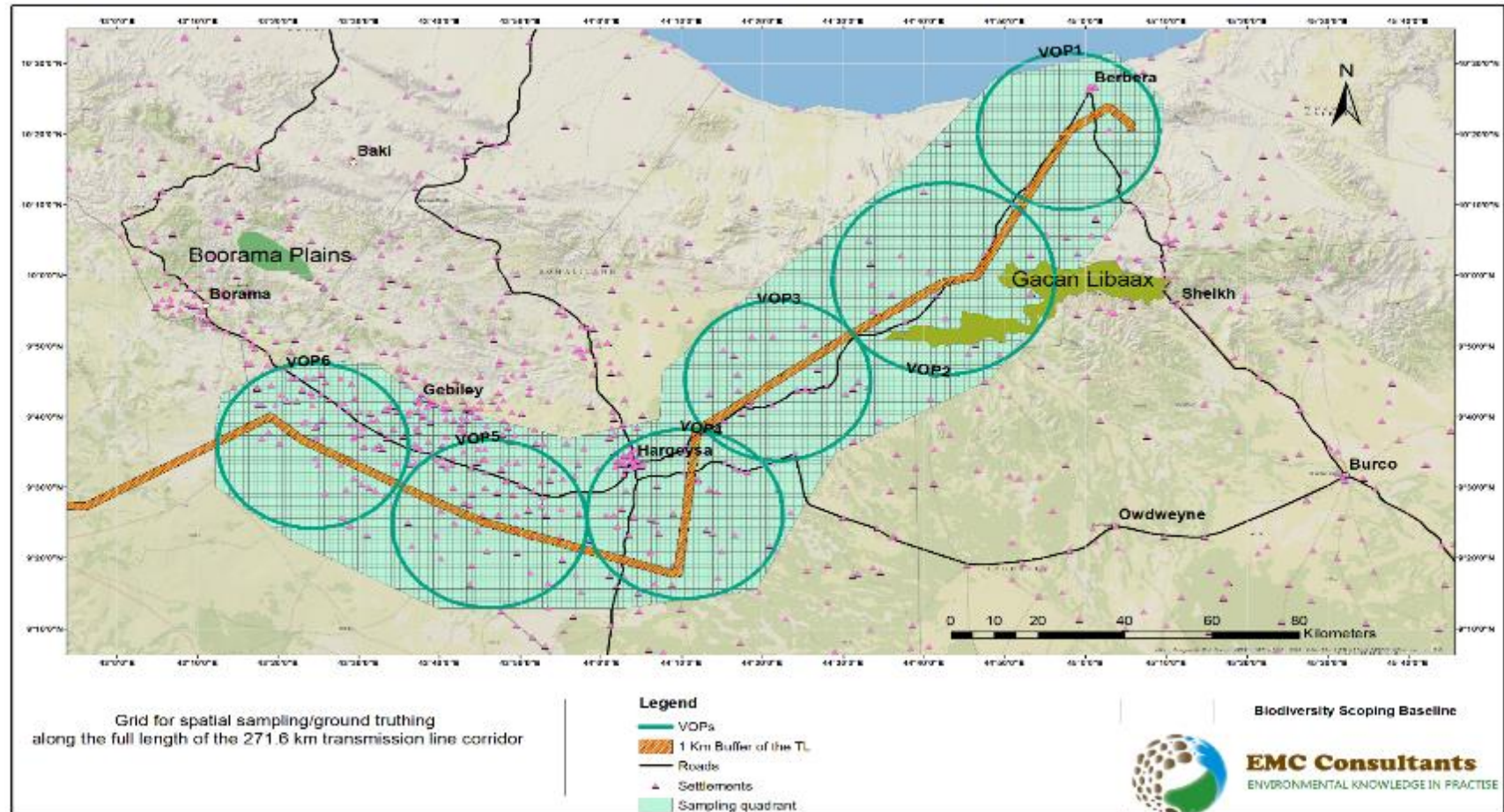
Source: EMC Consultants, 2024.

Figure 4-26. Habitat Status of Vegetation/Faunal Habitats Represented in Transmission Line Route Aol



Source: EMC Consultants 2024.

Figure 4-27. Flora Field Survey Areas Along Transmission Line Route



Source: EMC Consultants 2024.

4.2.2.3 Berbera Section Flora Survey (VOP 1)

Berbera was selected to represent coastal habitats, which support coastal vegetation. The floral species observed along the transmission line route are shown in tables 4-6 to 4-10.

Table 4-6. Species in Berbera Section

Common Name	Scientific Name	IUCN Status	Sighted
<i>Umbrella Thorn Acacia</i>	<i>Acacia tortilis</i>	Least Concern	Yes
<i>African Commiphora</i>	<i>Commiphora africana</i>	Least Concern	Yes
<i>Frankincense</i>	<i>Boswellia papyrifera</i>	Endangered	No
<i>Desert Date</i>	<i>Balanites aegyptiaca</i>	Least Concern	Yes
<i>Tamarisk</i>	<i>Tamarix spp.</i>	Not Evaluated	No

Source: IBAT

4.2.2.4 Mandera and Wajaale Section Flora Survey (VOP 2)

Locations near Mandera and Wajaale are predominantly arid and semi-arid regions with sparse vegetation. The dominant plant species are drought-resistant trees and shrubs, many of which are adapted to conserve water and withstand the dry conditions, observed species are shown in table 4-7 below.

Table 4-7. Species in Mandera-Wajaale Section

Common Name	Scientific Name	IUCN Status	Sighted
<i>Acacia tortilis</i>	<i>Vachellia tortilis</i>	Least Concern	Yes
<i>Acacia nilotica</i>	<i>Vachellia nilotica</i>	Least Concern	Yes
<i>Acacia laeta</i>	<i>Acacia laeta</i>	Not Evaluated	Yes
<i>Commiphora africana</i>	<i>Commiphora africana</i>	Not Evaluated	Yes
<i>Commiphora wightii</i>	<i>Commiphora wightii</i>	Not Evaluated	Yes
<i>Balanites aegyptiaca</i>	<i>Balanites aegyptiaca</i>	Not Evaluated	No
<i>Tamarindus indica</i>	<i>Tamarindus indica</i>	Least Concern	No
<i>Boswellia papyrifera</i>	<i>Boswellia papyrifera</i>	Not Evaluated	No
<i>Cissus quadrangularis</i>	<i>Cissus quadrangularis</i>	Not Evaluated	No
<i>Zygophyllum simplex</i>	<i>Zygophyllum simplex</i>	Not Evaluated	Yes
<i>Zygophyllum album</i>	<i>Zygophyllum album</i>	Not Evaluated	Yes
<i>Pennisetum mezianum</i>	<i>Pennisetum mezianum</i>	Not Evaluated	Yes
<i>Cenchrus ciliaris</i>	<i>Cenchrus ciliaris</i>	Not Evaluated	Yes

Source: IBAT

4.2.2.5 Awbarkadle and Toon Section Flora Survey (VOP 3 and 4)

Awbarkadle and Toon were chosen for their proximity to grasslands and savannas, habitats where species like raptors are commonly found. These areas are characterized by a mix of woody shrubs, trees, and grasses. These habitats are ideal for supporting raptors and other wildlife species.

Table 4-8. Species in Awbarkadle and Toon

Common Name	Scientific Name	IUCN Status	Sighted
Acacia tortilis	<i>Vachellia tortilis</i>	Least Concern	Yes
Acacia senegal	<i>Vachellia senegal</i>	Least Concern	Yes
Acacia nilotica	<i>Vachellia nilotica</i>	Least Concern	Yes
Commiphora africana	<i>Commiphora africana</i>	Not Evaluated	Yes
Commiphora wightii	<i>Commiphora wightii</i>	Not Evaluated	Yes
Balanites aegyptiaca	<i>Balanites aegyptiaca</i>	Not Evaluated	No
Tamarindus indica	<i>Tamarindus indica</i>	Least Concern	No
Ficus sycomorus	<i>Ficus sycomorus</i>	Least Concern	No
Cissus quadrangularis	<i>Cissus quadrangularis</i>	Not Evaluated	No
Zygophyllum simplex	<i>Zygophyllum simplex</i>	Not Evaluated	Yes
Zygophyllum album	<i>Zygophyllum album</i>	Not Evaluated	Yes
Pennisetum mezianum	<i>Pennisetum mezianum</i>	Not Evaluated	Yes
Cenchrus ciliaris	<i>Cenchrus ciliaris</i>	Not Evaluated	Yes
Cymbopogon proximus	<i>Cymbopogon proximus</i>	Not Evaluated	No
Themeda triandra	<i>Themeda triandra</i>	Not Evaluated	No
Eragrostis tenuifolia	<i>Eragrostis tenuifolia</i>	Not Evaluated	No

Source: IBAT

As indicated in Table 4-9 below, there are 3 species of flora categorized as EN which are likely to be present along the transmission line route and within the area of influence(AoI).

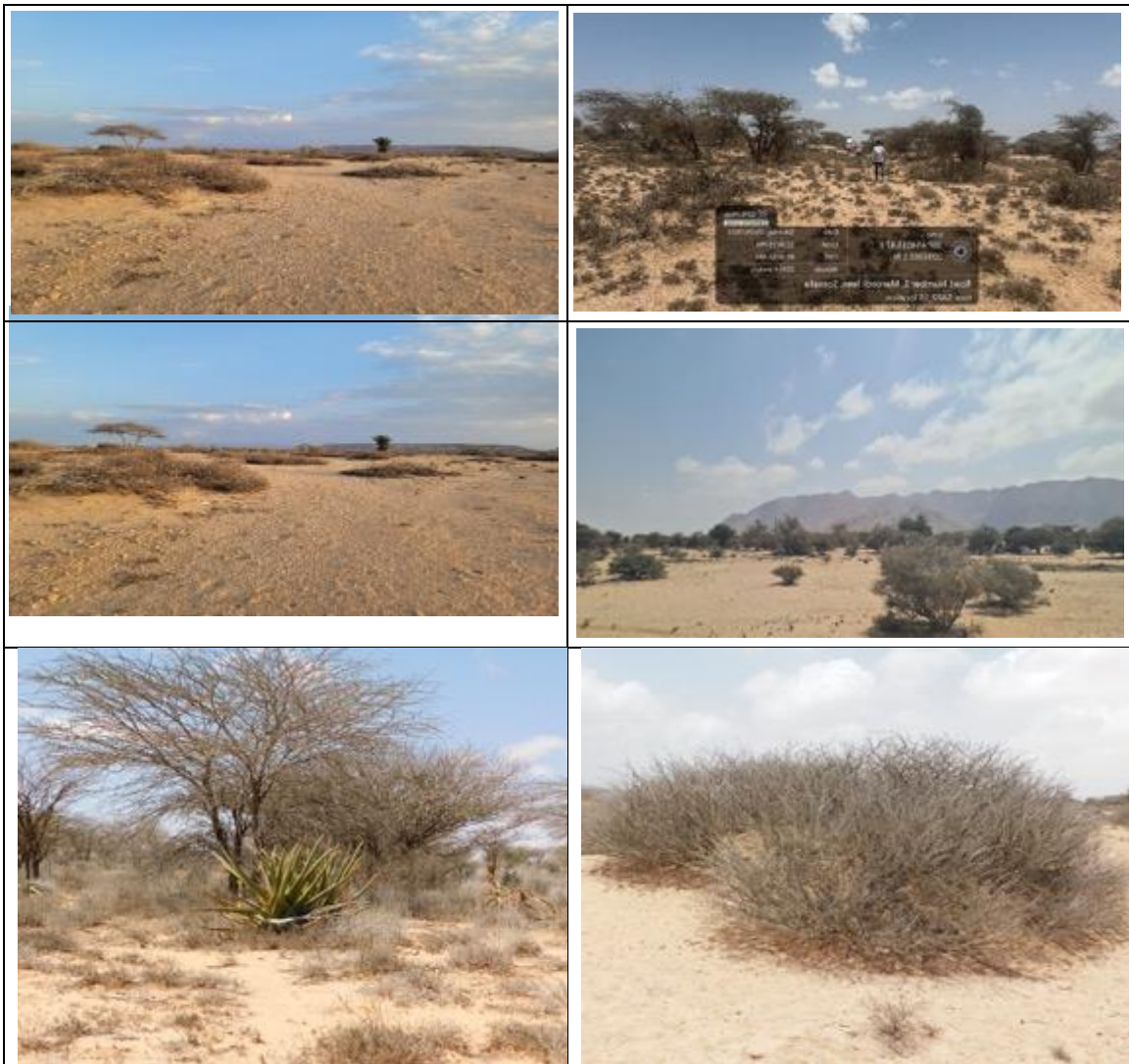
Table 4-9. Initial Screening of Flora Critical Habitat Qualifying Species Confirmed or Likely to Occur in Transmission Line Route AoI Red List Threatened Species I I

Species Name	Common Name	IUCN Category	Population Trend	Biome	Sighted
<i>Vigna monantha</i>	MAGNOLIOPSIDA	EN	Decreasing	Terrestrial	No
<i>Aloe hildebrandtii</i>	LILIOPSIDA	EN	Unknown	Terrestrial	No
<i>Aloe grisea</i>	LILIOPSIDA	EN	Decreasing	Terrestrial	No

Source: IBAT

¹¹ IUCN Red List of Threatened Species (IUCN RL or Red List): international standard for assessing threat status for species. The Red List is compiled by IUCN's global network of experts, specialist groups and partners. For further information, please see the IUCN Red List of Threatened Species website. Red List categories are: Critically Endangered (CR): Highest risk of extinction. A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild. Endangered (EN): Very high risk of extinction. A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild. Vulnerable (VU): Risk of extinction. A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild. Near Threatened (NT): A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered, or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future. Least Concern (LC): A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened. Widespread and abundant taxa are included in this category.

Figure 4-28: Vegetation Along Transmission Line Route



Source: EMC Consultants 2024.

4.2.3 Fauna

The abundance and distribution of mammals in Somaliland, particularly the larger individuals, has been heavily impacted by hunting, beginning from the colonial days. In more recent decades, insecurity, disease, droughts, and the proliferation of guns have presented an on-going threat. Some of the iconic species that have been extirpated from the country during the early part of the twentieth century include the savannah elephant (*Loxodonta Africana*), lion (*Panthera leo*), Swayne's Hartebeest (*Alcelaphus buselaphus Swaynei*), Reticulated giraffe (*Giraffa camelopardalis*), Beisa Oryx (*Oryx beisa*) and Black Rhinoceros (*Rhinoceros bicornis*). The status of the Somali Wild Ass (*Equus africanus somaliensis*) and some others are unknown. A recent unpublished list of mammals in Somaliland contains one hundred and six (106) terrestrial mammals. (Mazuch, 2020). The mammalian species identified in secondary literature as likely to be present along transmission line route AoI are listed here below. During the biodiversity scoping field survey, species observed are shown in table 4-10.

Table 4-10. Initial Screening of Fauna CH Qualifying Species Confirmed or Likely to Occur in Transmission Line Route Aol.

#	Species	Common Name	Conservation Status	Sighted
1	<i>Vulpes rueppellii</i>	Rüppell's Fox	Least Concern	No
2	<i>Crocuta crocuta</i>	Hyaena hyaena	Near Threatened	No
3	<i>Hyaena hyaena</i>	Stripped hyaena	Near Threatened	No
4	<i>Genetta genetta</i>	Common genet	Least Concern	No
5	<i>Herpestes sanguineus</i>	Common slender mongoose	Least Concern	No
6	<i>Orycteropus afer</i>	Aardvark	Least Concern	No
7	<i>Procavia capensis</i>	Rock Hyrax	Least Concern	No
8	<i>Phacochoerus aethiopicus</i>	Warthog	Least Concern	No
9	<i>Papio hamadryas</i>	Hamadryas Baboon	Least Concern	No
10	<i>Lepus habessinicus</i>	Abyssinian Hare	Least Concern	Yes (6 no)
11	<i>Arvicanthus somalicus</i>	Somalian grass rat	Least Concern	Yes (2 no)
12	<i>Hystrix cristata</i>	Crested porcupine	Least Concern	No
13	<i>Litocranius sclateri</i>	Geranug	Least Concern	No
14	<i>Gazella pelzelni</i>	Pelzeln's Gazelle	Endangered	No
15	<i>Madoqua saltiana</i>	Salt's Dik-dik	Least Concern	No
16	<i>Gazella spekei</i>	Speke's gazelle	Endangered	No
17	<i>Diceros bicornis</i>	Black Rhino	Critically Endangered	No
18	<i>Diceros bicornis ssp. michaeli</i>	Eastern Black Rhino	Critically Endangered	No
19	<i>Oryx beisa</i>	Beisa Oryx	Endangered	No
20	<i>Oryx beisa ssp. beisa</i>	Beisa Oryx	Endangered	No
21	<i>Diceros bicornis</i>	Black Rhino	Critically Endangered	No

Source: IBAT

There are approximately 40 species of bats in Somaliland. While majority are in the LC of the IUCN Red List of threatened species, many are in either Data Deficient (DD) or Near Threatened categories. Some of these species are likely to be found within the vicinity of the proposed transmission line based on literature review and are summarized in the table 4-11.

Table 4-11. Bat Species Likely to be present along Transmission Line Route

Species	IUCN Red list & CMS Status	Ecological Trait that may influence vulnerability to the project	Other remarks
Macinnes's mouse tailed bat, <i>Rhinopoma macinnesi</i>	Vulnerable (VU)	Prefers desertic and semi desertic habitats	Poorly understood hence and rare, especially in Somaliland where most biodiversity remains unstudied
Blasiuss horseshoe bat, <i>Rhinolophus blassi</i>	Near Threatened	Cave dependent. Like other Rhinolophid	

		species this species is likely to be affected by artificial light	
African Long-fingered bat, <i>Miniopterus africanus</i>	Data deficient	Cave dependednt and migratory bat. Easily attracted to insects swaming artificial(flood/security) light	Some populations undergo torpor in certain months
Samburu Pipistrelle bat, <i>Neoromicia helios</i>	Data deficient	Low flying little bat with body mass below 6 grams,	There is little information on natural history of this species
Hamilton's tomb bat, <i>Taphozous hamiltoni</i>	Data Deficient	Medium size, high flying bat	Its distribution into the Somaliland is debated
African Straw-colored fruit bat, <i>Eidolon helvum</i>	Near Threatened	Migratory and high flying at levels of conductors	The range of this species is under debate

Source: IBAT

During the field survey, no observations were recorded on the presence of bats within the AoI due to the survey being carried out during the day due to security concerns associated with undertaking the survey after dark.

4.2.4 Avifauna

Important Bird Areas¹²

Somaliland is a part of Somaliland-Masai steppe geographic region of plant endemism (savannas and shrub lands) and has 24 important bird areas. There are 2 IBA¹³'s located approximately 10km and more than 50km away from the transmission line route. These 2 sites, Boorama Plains (50km) and Gacan Libaax (10km) (figure 4-29) are habitats of a number of avifauna species that are categorised as CR and EN. 5 species are classified as CR and 10 species classified as EN.

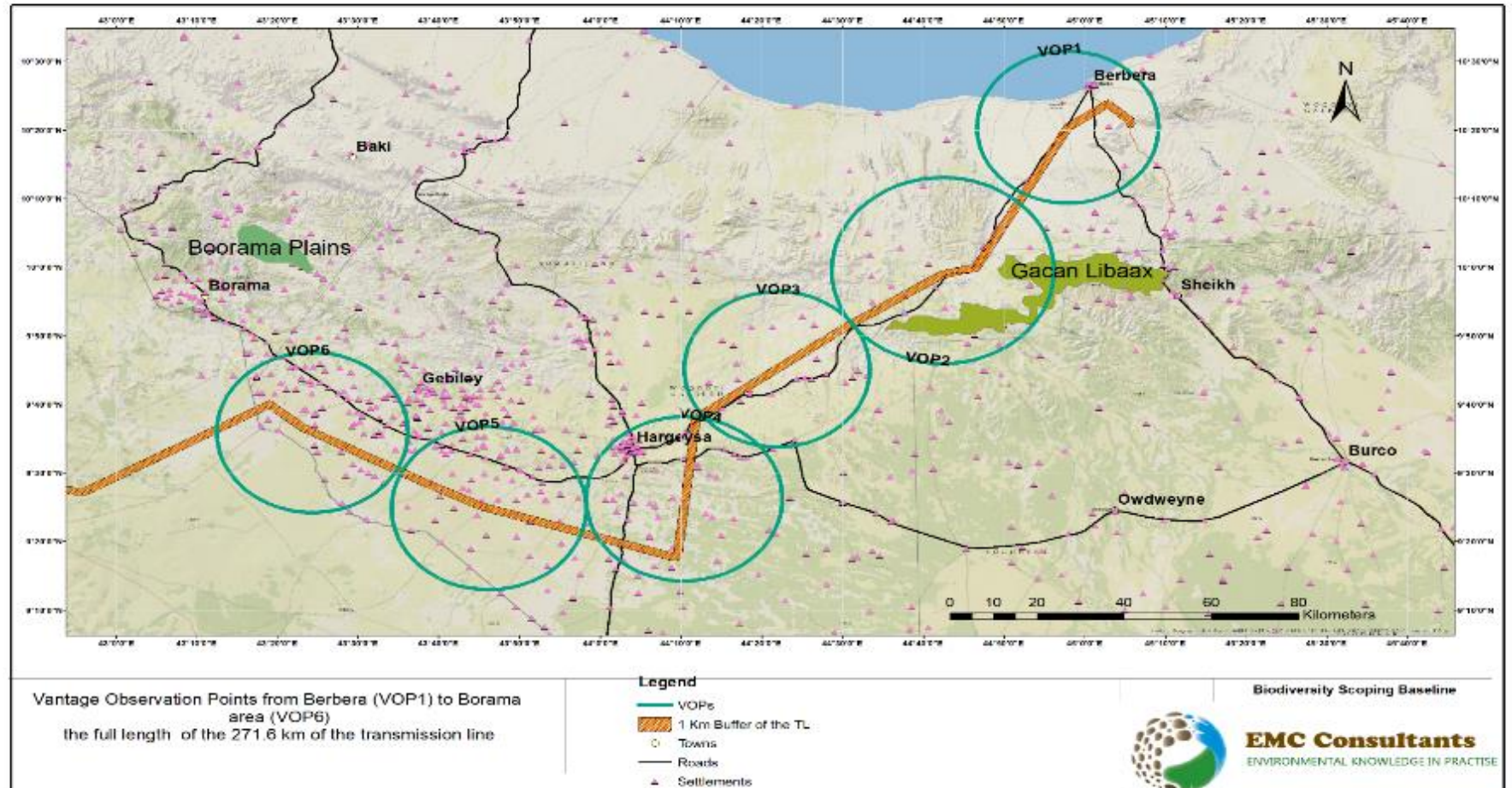
A desktop survey, followed by field survey screening for Critical Habitat (CH) was undertaken during the ESIA study (See annex K Biodiversity Scoping Report). The biodiversity scoping study involved assessment of critical habitats and avifauna diversity within the 1-10km corridor along the transmission line. Evaluation of likely impacts on avifauna along the 10km buffer zone due to laying of proposed transmission line was also carried out to develop/list the possible mitigation measures for the same.

The literature review assessment of avi fauna showed 5 species of birds in the CR category and 10 species classified as EN. The avifauna likely to be present along the transmission line route based on literature review and observations are shown tables 4-12-4-17. A biodiversity scoping survey was undertaken along the transmission line route with focus

¹² Important Bird and Biodiversity Areas (IBAs) are priority sites for bird conservation because they regularly hold significant populations of one or more globally or regionally threatened, endemic or congregatory bird species, or highly representative bird assemblages.

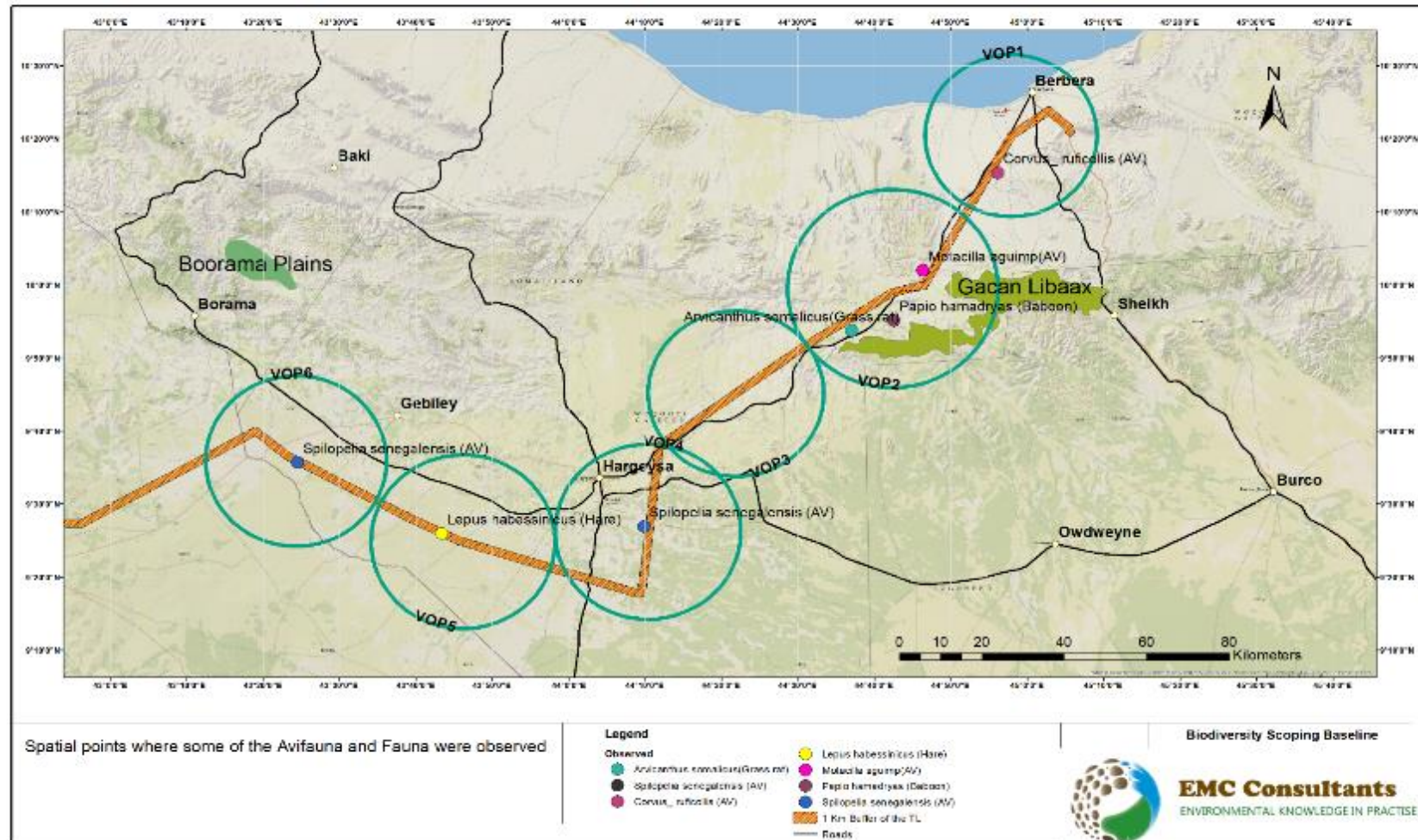
on the 6 Vantage Observation Points (VOPs) as outlined in figure 4-29 below. The VOPs were classified into 6 sections representing different habitat types as shown in tables 4-12 to 4-17.

Figure 4-29. Avi Fauna Vantage Observation Points Along Transmission Line Route



Source: EMC Consultants 2024.

Figure 4-30. Sighting Locations for Flora and Fauna Along Transmission Line Route



Source: EMC Consultants 2024.

Table 4-12. Berbera Section (VOP 1)

Common Name	Scientific Name	Migratory Behaviour	IUCN Status	Flight Height	Circadian Behaviour	Sighted
Brown-necked Raven	(<i>Corvus ruficollis</i>)	Sedentary/non migratory	Least Concern	Below power line height (7–35m)	Diurnal	Yes (20)
Lesser Kestrel	(<i>Falco naumanni</i>)	Full Migrant	Least Concern	Below power line height (7–35m)	Diurnal	No
Osprey	(<i>Pandion haliaetus</i>)	Largely Migratory	Least Concern	Below power line height (7–35m)	Diurnal	No
Western Reef Heron	(<i>Egretta gularis</i>)	Partially Migratory	Least Concern	Below power line height (7–35m)	Diurnal	No

Table 4-13. Mandera and Wajaale-Arid with Seasonal Wetland Habitat (VOP2)

Common Name	Scientific Name	Migratory Behaviour	IUCN Status	Flight Height	Circadian Behaviour	Sighted
Marsh Harrier	(<i>Circus aeruginosus</i>)	Full Migrant	Least Concern	Below power line height (7–35m)	Diurnal	No
Grey Heron	(<i>Ardea cinerea</i>)	Partial Migrant	Least Concern	Below power line height (7–35m)	Diurnal	No
White-headed Vulture	(<i>Trigonoceps occipitalis</i>)	Sedentary/non migratory	Critically Endangered (CR)	Below power line height (7–35m)	Diurnal	No
African Fish Eagle	(<i>Haliaeetus vocifer</i>)	Sedentary/non migratory	Least Concern	Below power line height (7–35m)	Diurnal	No
Common Kestrel	(<i>Falco tinnunculus</i>)	Partial Migrant	Least Concern	Below power line height (7–35m)	Diurnal	No

Table 4-14. Awbarkadle-Grassland/Savanna Habitat (VOP3)

Common Name	Scientific Name	Migratory Behaviour	IUCN Status	Flight Height	Circadian Behaviour	Sighted
Secretary bird	<i>Sagittarius serpentarius</i>	Sedentary/non migratory	Vulnerable	Above power line height (7–35m)	Diurnal	No
Lesser Kestrel	<i>Falco naumanni</i>	Full Migrant	Least Concern	Below power line height (7–35m)	Diurnal	No
Black-chested Snake Eagle	<i>Circus pectoralis</i>	Partially Migrant	Least Concern	Below power line height (7–35m)	Diurnal	No
Tawny Eagle	<i>Aquila rapax</i>)	Partial Migrant	Least Concern	Above power line height (7–35m)	Diurnal	No
Bateleur	<i>Terathopius ecaudatus</i>	Sedentary/non migratory	Least Concern	Above power line height (7–35m)	Diurnal	No

Table 4-15. Toon-Grassland/Savanna Habitat (VOP4)

Common Name	Scientific Name	Migratory Behaviour	IUCN Status	Flight Height	Circadian Behaviour	Observed
Steppe Eagle	(<i>Aquila nipalensis</i>)	Full Migrant	Least Concern	Above power line height (7–35m)	Diurnal	No
Booted Eagle	<i>Aquila pennata</i>)/Hieraetus pennatus.	Full migrant	Least Concern	Above power line height (7–35m)	Diurnal	No
Brown Snake Eagle	(<i>Circaetus cinereus</i>)	Sedentary/non migratory	Least Concern	Below power line height (7–35m)	Diurnal	No
African Hawk-Eagle	(<i>Aquila spilogaster</i>)	Sedentary/non migratory	Least Concern	Above power line height (7–35m)	Diurnal	No
Rüppell's Vulture	(<i>Gyps rueppelli</i>)	Sedentary/non migratory	Endangered	Below power line height (7–35m)	Diurnal	No

Table 4-16. Sheik Moldhe-Urban Habitat (VOP5)

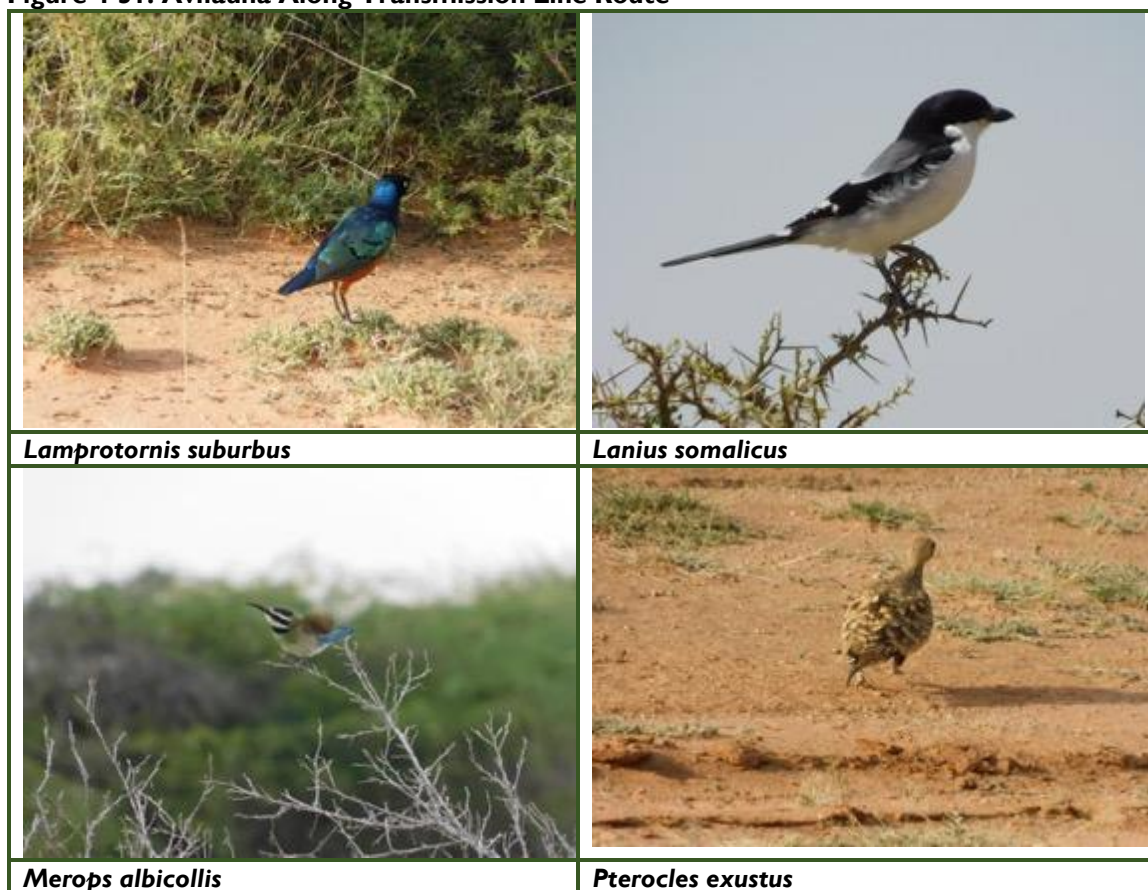
Common Name	Scientific Name	Migratory Behaviour	IUCN Status	Circadian Behaviour	Sighted
House Sparrow	(<i>Passer domesticus</i>)	Sedentary/non migratory	Least Concern	Diurnal	Yes
Laughing Dove	(<i>Spilopelia senegalensis</i>)	Partially Migratory	Least Concern	Diurnal	No
Black-winged Stilt	(<i>Himantopus himantopus</i>)	Fully Migratory	Least Concern	Diurnal	No
Pied Crow	(<i>Corvus albus</i>)	Sedentary/non migratory	Least Concern	Diurnal	Yes
African Pied Wagtail	(<i>Motacilla aguimp</i>)	Sedentary/non migratory	Least Concern	Diurnal	Yes

Table 4-17. Toon-Arid Grassland Habitat (VOP6)

Common Name	Scientific Name	Migratory Behaviour	IUCN Status	Flight Height	Circadian Behaviour	Sighted
African Fish Eagle	(<i>Haliaeetus vocifer</i>)	Sedentary/non migratory	Least Concern	Below power line height (7–35m)	Diurnal	No
White-backed Vulture	(<i>Gyps africanus</i>)	Sedentary/non migratory	Near Threatened	Below power line height (7–35m)	Diurnal	No
Eurasian Hobby	(<i>Falco subbuteo</i>)	Full migrant	Least Concern	Below power line height (7–35m)	Diurnal	No
Northern Raven	(<i>Corvus corax</i>)	Sedentary/non migratory	Least Concern	Below power line height (7–35m)	Diurnal	No

Gabar Goshawk	(Micronisus gabar)	Sedentary/non migratory	Least Concern	Below power line height (7–35m)	Diurnal	No

Figure 4-31. Avifauna Along Transmission Line Route



Source : EMC Consultants 2024.

4.2.5 Wetlands

Wetlands are characterized by distinct soil types, and unique plant and wildlife communities. Wetlands enhance both water quality and supply by retaining and removing sediment. They provide flood storage, ground water recharge and discharge, shoreline anchoring, and unique habitat for plants and wildlife. There are no wetlands traversed by the transmission line.

4.2.6 Key Biodiversity Area

There are 2 Key Biodiversity Areas¹⁴ (KBA) which are 10km and more than 50kms away from the transmission line as shown in table 4-18. These 2 KBAs are not in the direct AoI

¹⁴ Key Biodiversity Areas (KBAs): Key Biodiversity Areas (KBA) are 'sites contributing significantly to the global persistence of biodiversity', in terrestrial, freshwater and marine ecosystems. Sites qualify as global KBAs if they meet one or more of 11 criteria, clustered into five categories: threatened biodiversity; geographically restricted biodiversity; ecological integrity; biological processes; and, irreplaceability. KBAs comprise an "umbrella" set of internationally recognized priority sites for biodiversity that include Important Bird and Biodiversity Areas (IBAs); and Alliance for Zero Extinction (AZE) sites. For further information please see the Key Biodiversity Areas website.

and only one KBA (Gacan Libaax) overlaps with the transmission line outside of the 10km buffer.

Table 4-18: Key Biodiverse Area

Area name	Distance	IBA	AZE
Boorama Plains	More than 10km from transmission line	Yes	No
Gacan Libaax	10 km from transmission line	Yes	No

Source: IBAT

4.2.6.1 Summary of IUCN Red List of Threatened Species Likely Along Transmission Line Route Aol

A total of 25 species of flora and fauna are identified as likely to be found within the 2 KBA/IBA sites. Table 4.19 below shows the species within the project AoI and indicates that 25 species qualify as threatened species (EN/CR) with 3 qualifying as restricted range species.

Table 4-19: Initial Screening of CH Qualifying Species Likely to Occur in Transmission Line Route Aol. IUCN Red List Threatened Species¹⁵

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
<i>Diceros bicornis</i>	Black Rhino	MAMMALIA	CR	Increasing	Terrestrial
<i>Diceros bicornis ssp. michaeli</i>	Eastern Black Rhino	MAMMALIA	CR	Increasing	Terrestrial
<i>Aloe jucunda</i>	Gaan libah aloe	LILIOPSIDA	CR	Decreasing	Terrestrial
<i>Necrosyrtes monachus</i>	Hooded Vulture	AVES	CR	Decreasing	Terrestrial
<i>Gyps africanus</i>	White-backed Vulture	AVES	CR	Decreasing	Terrestrial, Freshwater
<i>Gyps rueppelli</i>	Rüppell's Vulture	AVES	CR	Decreasing	Terrestrial
<i>Trigonoceps occipitalis</i>	White-headed Vulture	AVES	CR	Decreasing	Terrestrial
<i>Heteromiraфра archeri</i>	Liben Lark	AVES	CR	Decreasing	Terrestrial
<i>Chelonia mydas</i>	Green Turtle	REPTILIA	EN	Decreasing	Terrestrial, Marine

¹⁵ IUCN Red List of Threatened Species (IUCN RL or Red List): international standard for assessing threat status for species. The Red List is compiled by IUCN's global network of experts, specialist groups and partners. For further information, please see the IUCN Red List of Threatened Species website. Red List categories are: Critically Endangered (CR): Highest risk of extinction. A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild. Endangered (EN): Very high risk of extinction. A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild. Vulnerable (VU): Risk of extinction. A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild. Near Threatened (NT): A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered, or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future. Least Concern (LC): A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened. Widespread and abundant taxa are included in this category.

<i>Oryx beisa</i>	Beisa Oryx	MAMMALIA	EN	Decreasing	Terrestrial
<i>Oryx beisa ssp. beisa</i>	Beisa Oryx	MAMMALIA	EN	Decreasing	Terrestrial
<i>Vigna monantha</i>	Montahtha Vigna	MAGNOLIOP SIDA	EN	Decreasing	Terrestrial
<i>Aloe hildebrandtii</i>	Hildebrandt's Aloe	LILIOPSIDA	EN	Unknown	Terrestrial
<i>Aloe grisea</i>	Somali maculate species	LILIOPSIDA	EN	Decreasing	Terrestrial
<i>Oxyura maccoa</i>	Maccoa Duck	AVES	EN	Decreasing	Terrestrial, Freshwater
<i>Neophron percnopterus</i>	Egyptian Vulture	AVES	EN	Decreasing	Terrestrial, Freshwater
<i>Torgos tracheliotos</i>	Lappet-faced Vulture	AVES	EN	Decreasing	Terrestrial
<i>Terathopus ecaudatus</i>	Bateleur	AVES	EN	Decreasing	Terrestrial
<i>Aquila nipalensis</i>	Steppe Eagle	AVES	EN	Decreasing	Terrestrial
<i>Polemaetus bellicosus</i>	Martial Eagle	AVES	EN	Decreasing	Terrestrial, Freshwater
<i>Sagittarius serpentarius</i>	Secretarybird	AVES	EN	Decreasing	Terrestrial
<i>Falco cherrug</i>	Saker Falcon	AVES	EN	Decreasing	Terrestrial, Marine, Freshwater
<i>Geronticus eremita</i>	Northern Bald Ibis	AVES	EN	Stable	Terrestrial
<i>Mirafra sharpii</i>	Sharpe's Lark	AVES	EN	Decreasing	Terrestrial

Source IBAT.

4.2.6.2 Restricted Range Species

Table 4.20 below shows the restricted range species within the project AoI and indicates that qualify as threatened species (EN/CR) under IUCN distribution along the AoI i.e. (*Heteromirafra archeri*, *Geronticus eremita*, *Mirafra sharpie*).

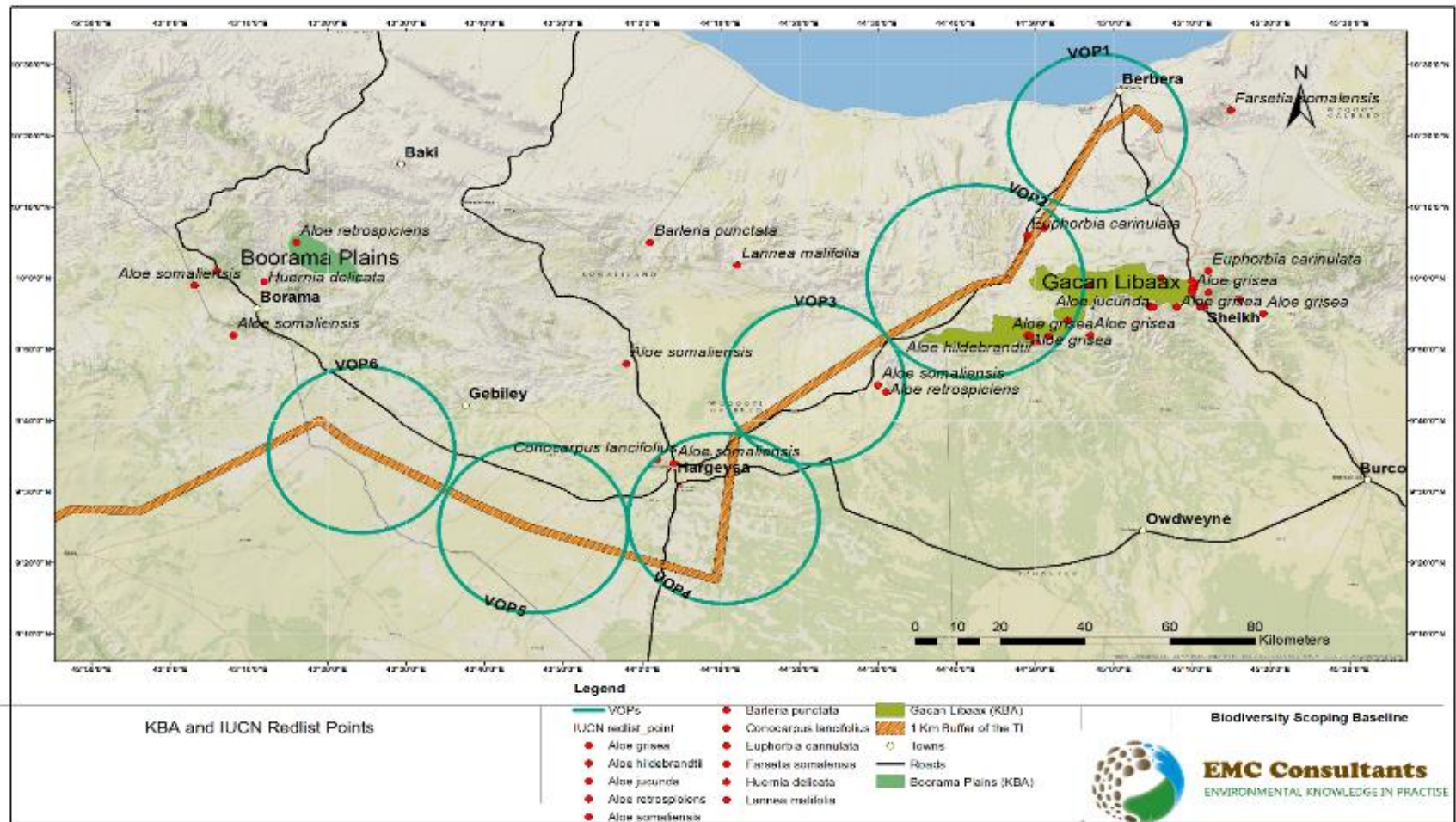
Table 4-20: Initial Screening of Restricted Range CH Qualifying Species Likely to Occur in Transmission Line Route AoI.

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
<i>Heteromirafra archeri</i>	Liben Lark	AVES	CR	Decreasing	Terrestrial
<i>Geronticus eremita</i>	Northern Bald Ibis	AVES	EN	Stable	Terrestrial
<i>Mirafra sharpii</i>	Sharpe's Lark	AVES	EN	Decreasing	Terrestrial
<i>Rhynchostruthus louisae</i>	Somali Grosbeak	AVES	NT OR LR/NT	Decreasing	Terrestrial
<i>Uromastyx macfadyeni</i>	Macfadyen's Mastigure	REPTILIA	LC OR LR/LC	Unknown	Terrestrial
<i>Xenagama batillifera</i>	Vaillant's Strange Agama	REPTILIA	LC OR LR/LC	Unknown	Terrestrial
<i>Hemidactylus ophiolepis</i>	Snakescale Leaf-toed Gecko	REPTILIA	LC OR LR/LC	Unknown	Terrestrial
<i>Acanthocercus phillipsii</i>	Philipps' Ridgeback Agama	REPTILIA	LC OR LR/LC	Unknown	Terrestrial
<i>Pseudoboodon gascae</i>	Gasca's Ethiopian Snake	REPTILIA	LC OR LR/LC	Unknown	Terrestrial
<i>Larus leucophthalmus</i>	White-eyed Gull	AVES	LC OR LR/LC	Stable	Terrestrial, Marine

<i>Phaethon aethereus</i>	Red-billed Tropicbird	AVES	LC OR LR/LC	Decreasing	Terrestrial, Marine
<i>Oceanites oceanicus</i>	Wilson's Storm-petrel	AVES	LC OR LR/LC	Stable	Terrestrial, Marine
<i>Fregetta tropica</i>	Black-bellied Storm-petrel	AVES	LC OR LR/LC	Decreasing	Terrestrial, Marine
<i>Turdus ludoviciae</i>	Somali Thrush	AVES	LC OR LR/LC	Stable	Terrestrial
<i>Agama lanzai</i>		REPTILIA	LC OR LR/LC	Unknown	Terrestrial
<i>Telescopus pulcher</i>	Beautiful Cat Snake	REPTILIA	DD	Unknown	Terrestrial
<i>Hemidactylus laevis</i>	Common Leaf-toed Gecko	REPTILIA	DD	Unknown	Terrestrial
<i>Hemidactylus ophiolepidoides</i>	Lanza's Leaf-toed Gecko	REPTILIA	DD	Unknown	Terrestrial
<i>Epacrophis reticulatus</i>	Reticulate Blind Snake	REPTILIA	DD	Unknown	Terrestrial
<i>Columba oliviae</i>	Somali Pigeon	AVES	DD	Stable	Terrestrial

Source IBAT.

Figure 4-32. KBA Sites and Transmission Line Proximity



Source: EMC Consultants 2024.

4.2.7 Protected Areas

A National Conservation Strategy used to exist but is now extremely low on the territories' agenda. Somaliland is part of Conservation International's Horn of Africa Hotspot which has over 60 endemic general and over 2,750 endemic species. Somaliland is a part of Somaliland-Masai steppe geographic region of plant endemism (savannas and shrub lands) and has 24 important bird areas. Generally, fauna has been depleted due to hunting and culling to protect livestock. The transmission line does not transverse any established protected area and is not within close proximity to any such ecosystem. The following protected area is found more than 50km away from the transmission line route and does not overlap partially or entirely with the transmission line route. (Table 4-21).

Table 4-21. Protected Areas

Area name	Distance	IUCN Category	Status	Designation
Ga'an Libah	>50 km	Not Reported	Designated	National Park

Source: IBAT

4.3 Socio Economic Baseline

4.3.1 Population Distribution

4.3.1.1 Hargeisa City

Hargeisa city is the capital and largest city of Republic of Somaliland. It is also the regional capital of the Marodi-Jeh of Somaliland. Hargeisa was founded as a watering and trading stop between the coast and the interior by the Isaaq Sultanate. Hargeisa is situated in a valley in the Galgodon (Ogo) highlands, and sits at an elevation of 1,334m (4,377 ft). Home to rock art from the Neolithic period, the city is also a commercial hub for precious stone-cutting, construction, retail services and trading, among other activities¹⁶. According to World Population Review (2024), the population Hargeisa is estimated 1.1 million.

4.3.1.2 Gebiley District

Gebiley is a district in the Marodi-Jeh region of Somaliland, with its capital in Gebiley. The majority of the people in the district have been settled there for the last 300 years. There are more major and minor towns in Gabiley district than anywhere else in Somaliland. In accordance to Lr. 23/2019, the district is graded under A category due to number of population and economic activities in the district. Most of the community in Gebiley and surrounding villages are farmers. It has been estimated that the broader Gebiley District has a total population of 320,430. It has been considered to be the fastest growing population district in Somaliland due to its fertile land.

4.3.1.3 Berbera District

Sahil is the smallest region in Somaliland and has five districts, namely: Berbera, Sheikh, Mandera, Bulahar and Hagal Districts. Berbera and Sheikh are most populated districts, with almost half of the region's population. Berbera is the capital of the region and main port of Somaliland. The city is strategically located on the Gulf of Aden, and one of the most important entry points for goods for local use as well as those transiting to Ethiopia

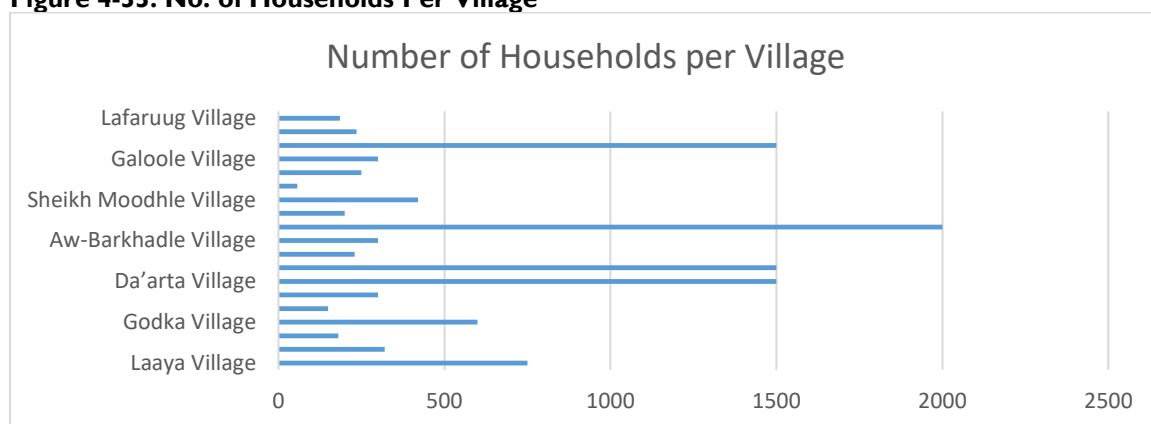
¹⁶ Encyclopædia Britannica, The New Encyclopædia Britannica, (Encyclopædia Britannica: 2002), p.835. Retrieved from <https://en.wikipedia.org/wiki/Hargeisa>

and federal member states of Somalia. According to Berbera District Development Framework report, the estimated population of Berbera district for 2018 is 166,622. Most of the employment comes from port related activities¹⁷.

4.3.1.3.1 Household Size and Composition

The overwhelming majority (91.2%) are male household heads and the remaining 8.8% of the households are headed by females, categorized as single, widowed, or divorced. The average family size is 6.2 persons per household but the average figures for family size vary from as low as 5.4 in Laayo villages to as high as 7.6 in Da'arta village. Along the transmission line, the estimated household population per affected village and based on the socio-economic survey range between 50 to 2,000 households as shown in figure 4-32 below.

Figure 4-33: No. of Households Per Village

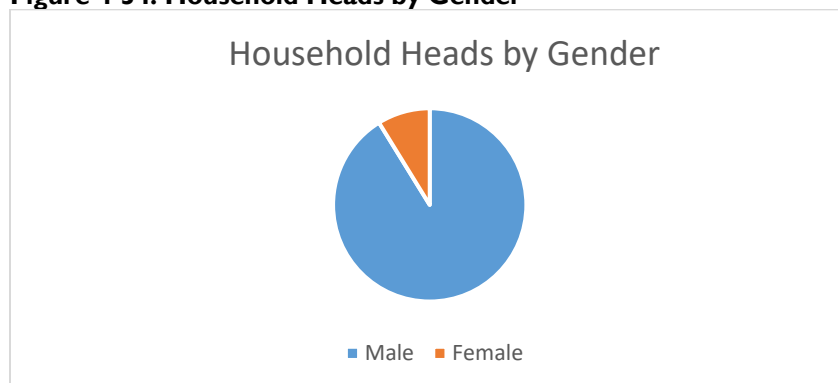


Source: EMC Consultants, 2024.

4.3.1.3.2 Gender

Gender and age of household heads and household members are important variables in that they inform on the general social set-up of a given society. The gender profile of the surveyed household members demonstrates that there are slightly more male than female population and it is about 91.2% and 8.8% respectively.

Figure 4-34: Household Heads by Gender



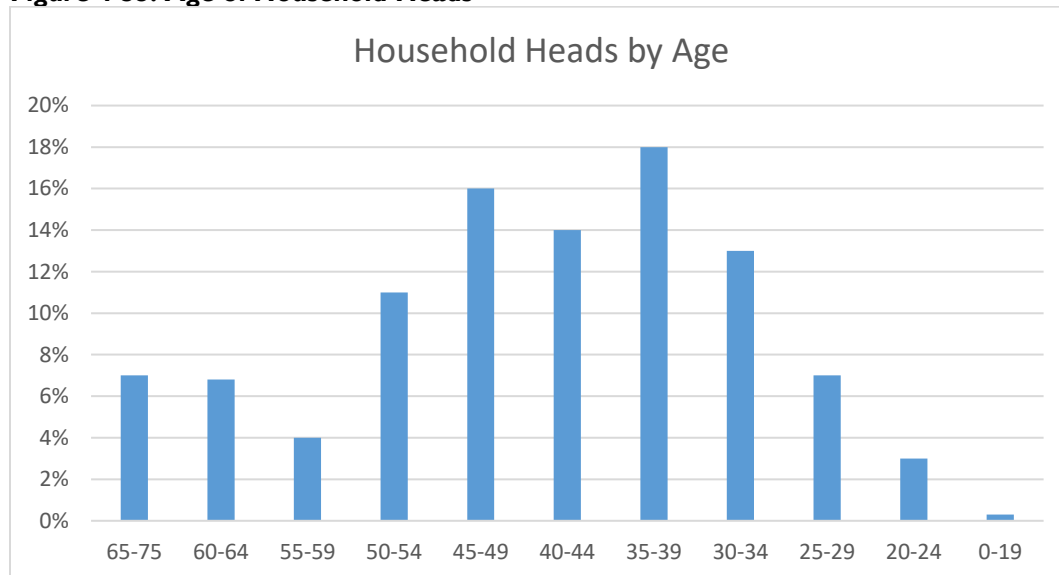
Source: EMC Consultants, 2024.

¹⁷ Berbera District Development Framework Report (2018)

4.3.1.3.3 Age Structure

The age structure of the surveyed household members is dominated by youthful population. According to the survey result, about 3.3% of the household head are below 25 years old and senior household population 60 years and older constituted only 13.8% of the surveyed household population. The average age of household heads between 40-59 years of age is 45%, while household heads below 35 years of age was 23%.

Figure 4-35: Age of Household Heads

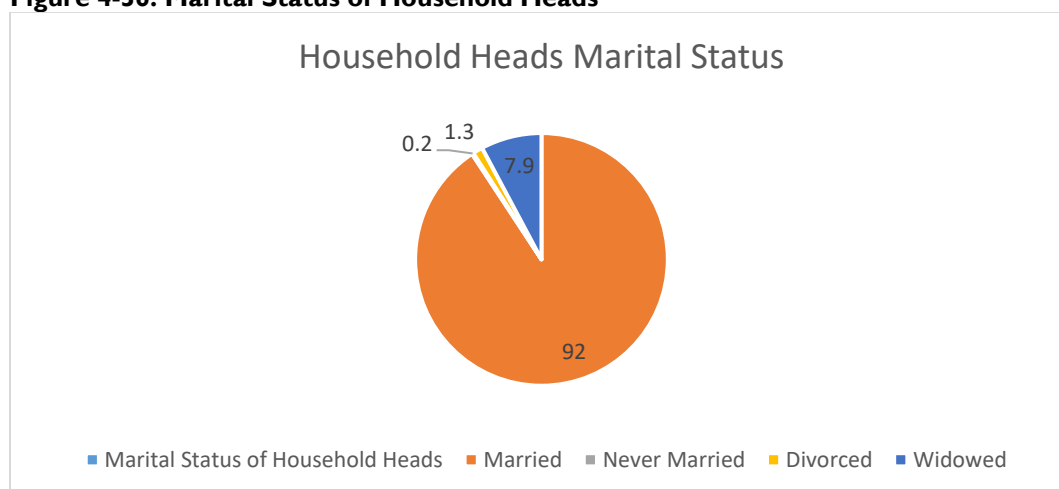


Source: EMC Consultants, 2024.

4.3.1.3.4 Marital Status

Majority (92%) of the household heads are married and the remaining are widows (7.9%), divorced (1.3%) and never married (0.2%). One important point to note is that widowers and divorced household heads are disproportionately higher in villages Berbera and Hargeisa as compared to vaillages in Gabiley district (Figure 4-35).

Figure 4-36: Marital Status of Household Heads



Source: EMC Consultants, 2024.

4.3.2 Land Tenure

The Constitution of Somaliland contains provisions related to land as a national property and establishes the state responsibility for the land and natural resources. Article 12 says, “The land is a public property commonly owned by the nation, and the state is responsible for it¹²”, and shall take all possible steps to explore and exploit the natural resources which are available in the nation’s land or sea. The protection and the best means of the exploitation of these natural resources shall be determined by law. Article 31 of the Constitution recognizes that every person has the right to own private property, if it is acquired lawfully, and that such property may not be expropriated except for reasons of public interests in the exchange of proper compensation. The private property ownership includes land in which Art. 2 (1) of Law No. 8/1999, and 19 (a) of Law No. 17 established private ownership of land with the title deed. Land tenure is closely tied to clans and Somali cultures and traditions. Since the state is weak, mistrusted and based on the clan system, it is the lineage and not the constitution that guarantees landownership rights in Somaliland.

The laws of Somaliland do not formally recognize communal land rights, but “Deegaan” implies informal recognition of clan habited areas that can be alternative to the communal land. All Somaliland people are composed of clans and sub-clans, and each is concentrated into a specific area called Deegaan. In the case of Somaliland, where the majority of the land is communal, recognizing communal land title seems the most suitable option, allowing the community to undertake its own land management, including the allocation of rights to land within its boundaries. These laws of Somaliland do not necessarily reflect the customary system. This means that they are developed regardless their consistency with the customary rules laid down by the society and existed for long time. This contributes to the existence of parallel legal regimes which potentially complicate initiatives for better land tenure. There are common types of Islamic land tenure which are also accepted either in statutory or customary law. These are:

- Mulk or milk: freehold; this is also accepted under customary law but also under the statutory laws on agricultural land ownership and urban land.
- Miri: state owned land; this can be the public land stipulated in Law No. 17
- Waqf: similar to a trust, used to create charitable endowments in perpetuity (e.g. hospitals/schools); this kind of law is also given in Law No. 17, and
- Mewat¹⁸: “dead land”, individuals have a right to reclaim the mewat land that he turns into life, provided that there have been no previous reclaims. This practice is also recognized under Law No. 08/1999.

Along the transmission route, the land tenure in all the villages affected is freehold with all the households owning the land under customary law. However, there are some sections of agricultural land close to wajaale which is owned by the government.

¹⁸ Mawat (dead lands) belonging to the state and requiring state permission for cultivation and grazing rights.

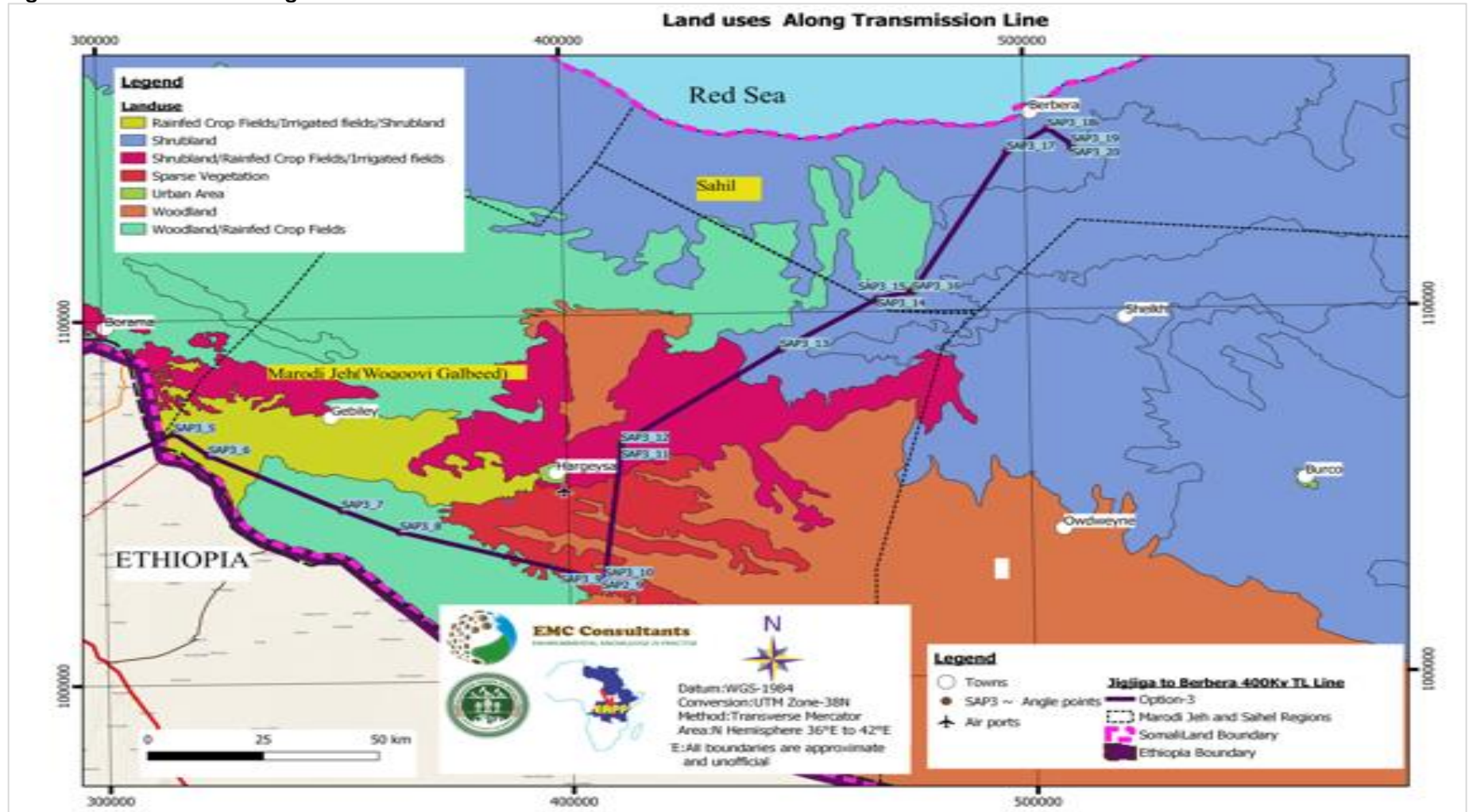
4.3.3 Land Use

In Somaliland, the vegetation type is dominated by relatively dense stands of low thorn trees, thorn bush woods, thorn shrubs, and various species of succulent herbaceous vegetation with sparse undergrowth of rain green herbs and grasses: the thorn bush-succulent savanna, thorn tree-short grass savanna, or acacia-short grass savanna. The woody vegetation (trees) is concentrated in the hilly and mountainous area but also in the valleys. In the drier area, the open semi-desert with its widespread small xerophyte shrub vegetation and poorly developed herbaceous layer predominates. In the arid area, the trees are generally low growing, using the rainwater that percolates through the subsoil. Land use is mainly shrubland, sparse vegetation and farmland.

Table 4-22: Land Use Along Transmission Line Route

Km	Distances(km)	Land use/Land cover
25	0 to 25km	Agropastoral (high density of fields): sorghum, maize, shoats, cattle
58.24	25km to 83.4km	Agropastoral (medium density of fields)/wood collection: sorghum.
0.739	83.4km to 83.98km	Pastoralism (low density): shoats, camels, cattle
3.5	87.45km to 87.45km	Agropastoral (medium density of fields)/wood collection: sorghum
3.7	87.45km to 91.18km	Pastoralism (low density): shoats, camels, cattle.
1.05	91.18km to 92.23km	Agropastoral (medium density of fields)/wood collection: sorghum
14.5	92.23km to 106.73km	Pastoralism (low density): shoats, camels, cattle
1.58	106.73km to 108.31km	Pastoralism (high density)/wood collection and irrigated fields:fodder, sorghum
2.613	108.31km to 110.92km	Pastoralism (low density): shoats, camels, cattle.
3.25	110.92km to 114.17km	Pastoralism (high density)/wood collection and irrigated fields:fodder, sorghum.
4.77	114.17km to 118.94km	Pastoralism (low density): shoats, camels, cattle
2.57	118.94km to 121.51km	Pastoralism (high density)/wood collection and irrigated fields:fodder, sorghum, camels, shoats
11.84	121.51km to 133.35km	Pastoralism (low density): shoats, camels, cattle
41	133.35km to 174.35km	Agropastoral (medium density of fields) with irrigated fields around togas: vegetable
74.68	174.35km to 249.03km	Pastoralism (low density) with scattered irrigated fields around togas: shoats, camels.
22.06	249.03km to 271.6km	Pastoralism (low density) in coastal plains: shoats, camels.

Figure 4-37: Land Uses Along Transmission Route



Source: EMC Consultants, 2024.

4.3.4 Employment and Livelihood Systems

The anchor of the Somaliland economy used to be livestock and livestock-related activities, but over the years this has shifted, at least in terms of market value, to the service industry. This is a common trajectory of economies in Sub-Saharan Africa—skipping growth in industrialization and instead focusing on services. In the services subsector, the dominant players are retail trade, telecoms, tourism, and financial services. Remittances play a catalytic role in the economy and are supported by the large diaspora population. Remittances and the export of livestock ensure a steady supply of much-needed foreign currency to finance the persistent account deficit. The economy is growing as an important logistics hub for the Horn of Africa, riding on the Berbera Corridor and the peace dividend¹⁹. Somaliland economy has been considerably increasing despite having a lot of challenges. The Somaliland economy has been growing at the rate of 3.5%. Somaliland's GDP in current prices, estimated by the expenditure approach, was 3,348 million USD in 2021, while GDP per capita amounted to 775 USD, compared to 697 USD in 2020²⁰. Livestock is currently the leading economic sector in all of Somaliland. Livestock production accounts for 60-65% of the gross domestic product (GDP). Farming contributes between 8% and 15% of the GDP, as livestock production and exports are the backbone of the economy and the largest foreign exchange earner for the country.

Along the transmission line route, the main economic activities are agro-pastoralism which is practised mainly by households between Wajaale and Hargeisa. Crops cultivated include maize, sorghum, millet, onions, and livestock including goats and sheep with few households keeping camels. Villages close to Berbera are mainly pastoralists keeping camels, sheep, and goats that vary in composition depending on wealth and market demand. In these villages very little crop farming is undertaken and is rainfed with crops grown including sorghum, maize, millet etc. Their main income is generated from the sale of live animals and animal products such as meat, milk, skin, hides, and to a lesser extent charcoal burning.

4.3.4.1.1 Employment

According to Somaliland's National Development programme (2018), total employment (comprising self and paid employment) is estimated at 38.5 percent for urban areas and 59.3 percent for rural and nomadic areas. Unemployment among the youth, estimated at 75 percent is higher than the average. In terms of occupation, majority of the household heads (95%) are primarily farmers (livestock and crops). The occupation for households in villages close to Berbera include the construction, fishing, and manpower related activities.

4.3.4.1.2 Occupational Status of Household Heads and Population

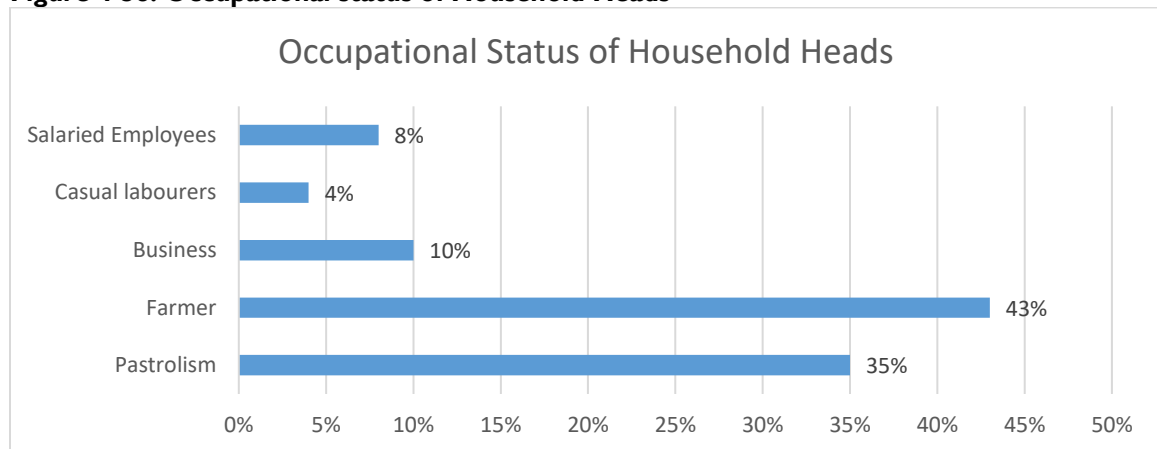
The primary occupation for 78% of the surveyed household heads is agropastoral and pastoralism. Casual labour, salaried employment and business are also other forms of primary occupation reported at 4.0%, 8.0% and 10% by the household heads respectively. The percentage of household members engaged in business activities, crop farming, livestock sale, firewood and charcoal sale, salaried employment, casual labour and

¹⁹ National Development Plan 3 of Republic of Somaliland (2023-2027)

²⁰ Central Statistical Department (CSD)-2021: National Growth Domestic Product (GDP) report

unemployed as primary occupation constituted 10%, 43%, 15% 3%, 8%, and 3% and 2% respectively.

Figure 4-38: Occupational status of Household Heads



Source: EMC Consultants, 2024.

Based on the household survey result, sorghum is the main crop that are grown by vast majority (71.4%) of farmland owing HHs, followed by maize (28.6%). Other crops such as vegetables and are also grown by households. The sample survey also revealed that 63% of the households reported to be engaged in crop production both for market and household consumption. Majority of the households, 60.9% depend on rain for crop production with very little dependence on irrigation and use farm inputs for crop production. Challenges and constraints associated with crop production include insufficient and uneven distribution of rainfall (61.8%), increased price of farm inputs (60.0%), crop diseases and pests (52.2%), lack of improved seed, fertilizer, and agrochemical (45.1%), loss of soil fertility (45.8%) and weak agricultural extension service (40.3%). Regarding external support related to crop production, less than ten percent (8.9%) of the surveyed households owning farmlands confirmed that they received professional support or advice/consult from their district level Agriculture Office.

Figure 4-39: Crops Grown and Uncultivated Farmland

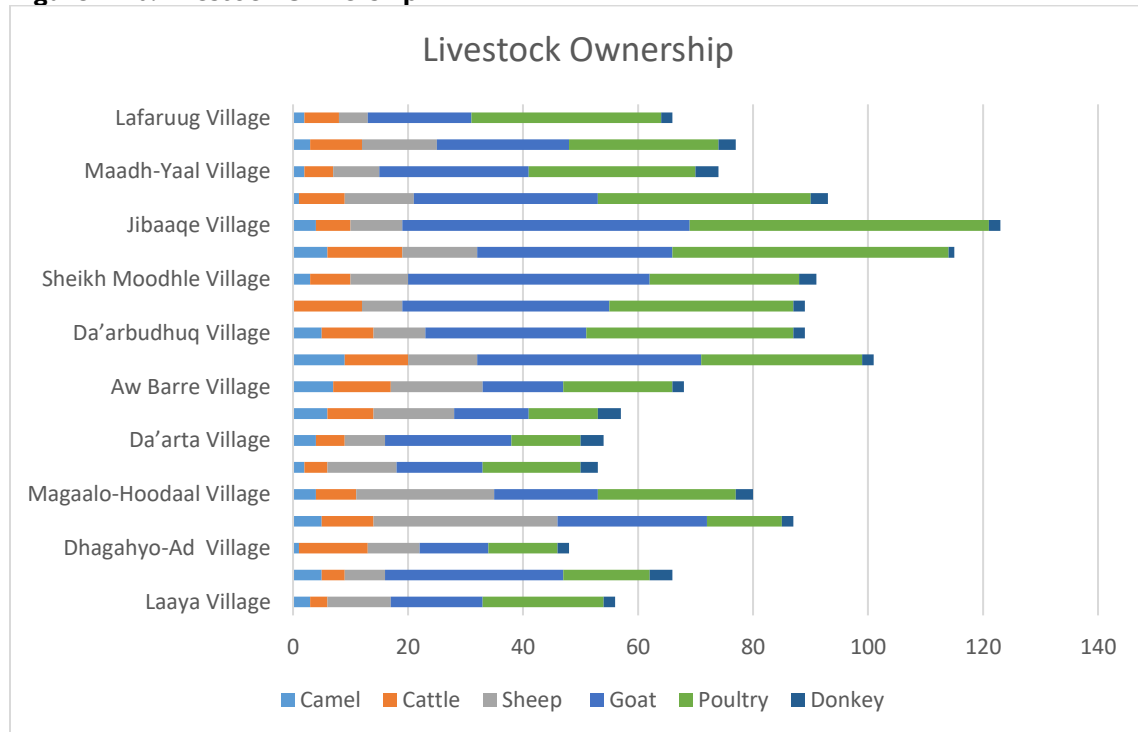


Source: EMC Consultants, 2024.

4.3.4.1.3 Livestock Ownership

In the villages located in Hargeisa and Berbera districts, all (100%) of the households had livestock as they are primarily pastoralists while in the villages located in Gabiley district there are households that reported to not owning many livestock. This is mainly due to the fact that the sample households selected from these villages are agro pastoralists. Livestock types owned by the surveyed households include camels, cattle, sheep, goats, poultry, and donkeys. In Hargeisa and Berbera districts average livestock ownership per HH in the affected villages is 15 compared to 8 in the villages in Hargeisa district.

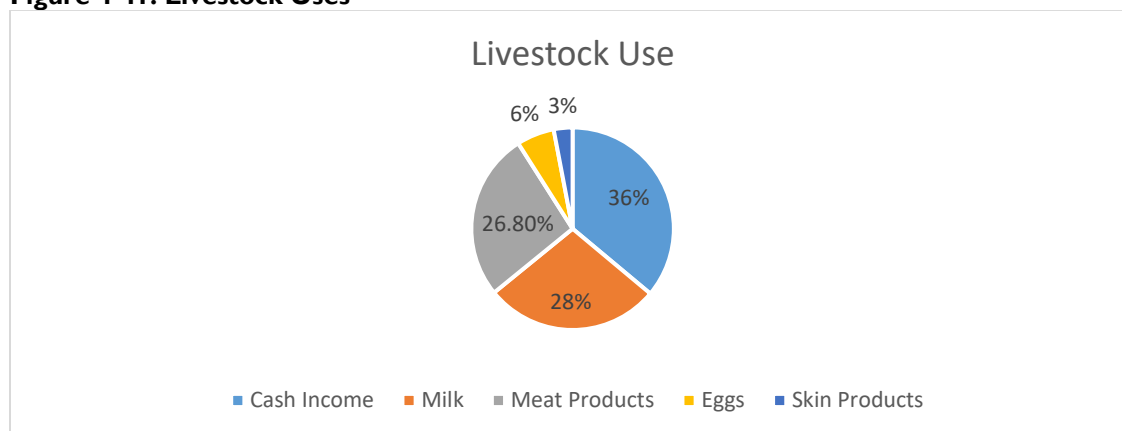
Figure 4-40: Livestock Ownership



Source: EMC Consultants, 2024.

Livestock is mainly reared for household cash income (36%) in majority of the villages followed by 28.2% for milk and 31.8% for meat products respectively. Livestock is also used for traction power for farming activities among only 5.5% of the survey households. Skins and hide as well as social status were reflected as other important reasons for households rearing livestock. The main source of livestock feed is communal grazing especially in villages located in Sahil and Berbera districts where the households are predominantly pastoralists while in Hargeisa, households along the transmission line used a mix of communal grazing and crop residue as a primary livestock feed source. In certain instances, HH, used wetland and swamp as sources of livestock feed by survey households owing livestock. Traditional wells are the primary source of water for livestock as reported by 43.2% of livestock owners, followed by seasonal streams (22.8%) and *Berkad* (24%). Other water sources such as pond, spring and swampy areas are also among reported sources of water for livestock.

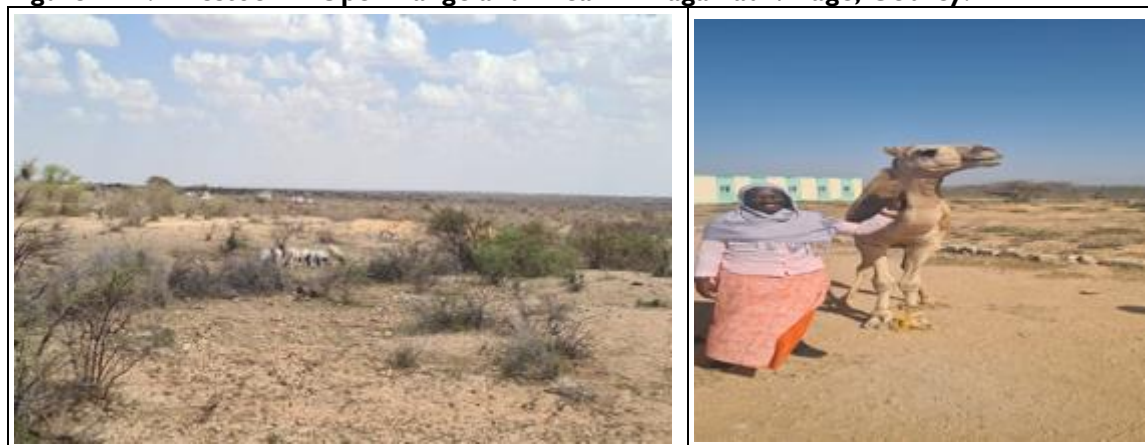
Figure 4-41: Livestock Uses



Source: EMC Consultants, 2024.

Livestock plays a critical role in local household economy but was reported to have been facing certain challenges and constraints. Shortage of livestock feed is the main constraints for livestock production. The second important constraints that affecting livestock resource is shortage of water as reported by 90.6% of the households. Other stated constraints include livestock diseases and lack of market.

Figure 4-42: Livestock in Open Rangeland Area in Dhagah'ad Village, Gebiley.



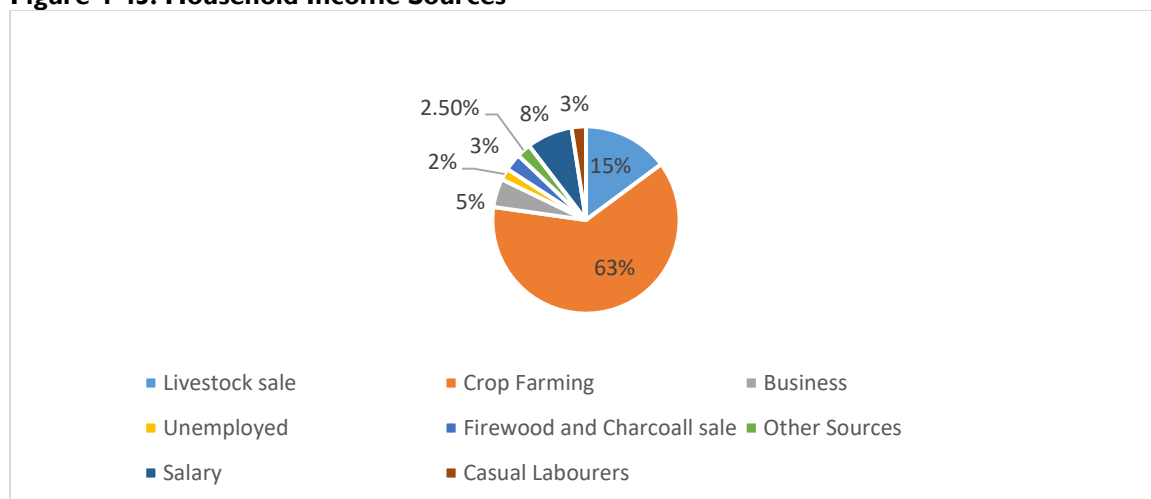
Source: EMC Consultants, 2024.

4.3.4.1.4 Household Cash Income and Expenditure

Sources of Household's Cash Income

At least one household member was reported to have been engaged in some kind of income generating activities 5% (business). The sources of cash income in the households included sale of livestock 15%, crops 63% and was reported as the main sources of income. Remittances, casual work, petty trade, and employment are also important source of cash income reported by surveyed households.

Figure 4-43: Household Income Sources



Source: EMC Consultants, 2024.

Household Annual Cash Income

Capturing reliable monthly or annual income from all income sources was a challenge owing to the fact that most rural households are not salaried, and no proper records exist. Households interviewed report income from crops and livestock accounted for 78% of household annual income, trade (5%), casual labour 3%, remittance 2.5% respectively. Proportion of household income varied by district with crops and livestock sale as a source of income relatively higher in the villages located in Gabiley, where agro-pastoralism is predominant as compared to villages in Berbera and Hargeisa where livelihood is mainly pastoralism. Villages close to Hargeisa and Berbera which are major towns had a higher 60% of annual income emanating from casual labour, trade, and formal employment as compared to the villages that were far from these main cities. The average annual cash income per household based on the survey households was 982,219 Somalia Shilling.

Household Annual Expenditure

Average annual expenditure based on the survey findings in the affected villages is 812,012 SOS per household with expenditure mainly being on food items (70%), clothing 5.2%, energy (cooking and fuel) 12.5%, healthcare 3%, transport 2.5% education 4.6% and water 7.8%.

4.3.5 Settlement Patterns and Housing Features

4.3.5.1.1 Housing Conditions and Household Service and Facilities

Most houses observed in the project affected villages are made from local materials. The quality of housing in the villages as an indicator of the quality of life was found deficient, as most of the housing was traditional, devoid of any sanitary services. Majority (89%) of the households are living in mobile housing structures which is common among Somali pastoralist and agro-pastoralist communities and the remaining 11% of the households live in non-mobile fixed housing structures which is common. Construction materials for the houses include tents, polythene, and other different materials for roofing (89.3%) especially in the mobile structures and corrugated iron sheet and grass/thatch for roofing (10.7%) in the fixed structures. Due to the weather condition and construction materials

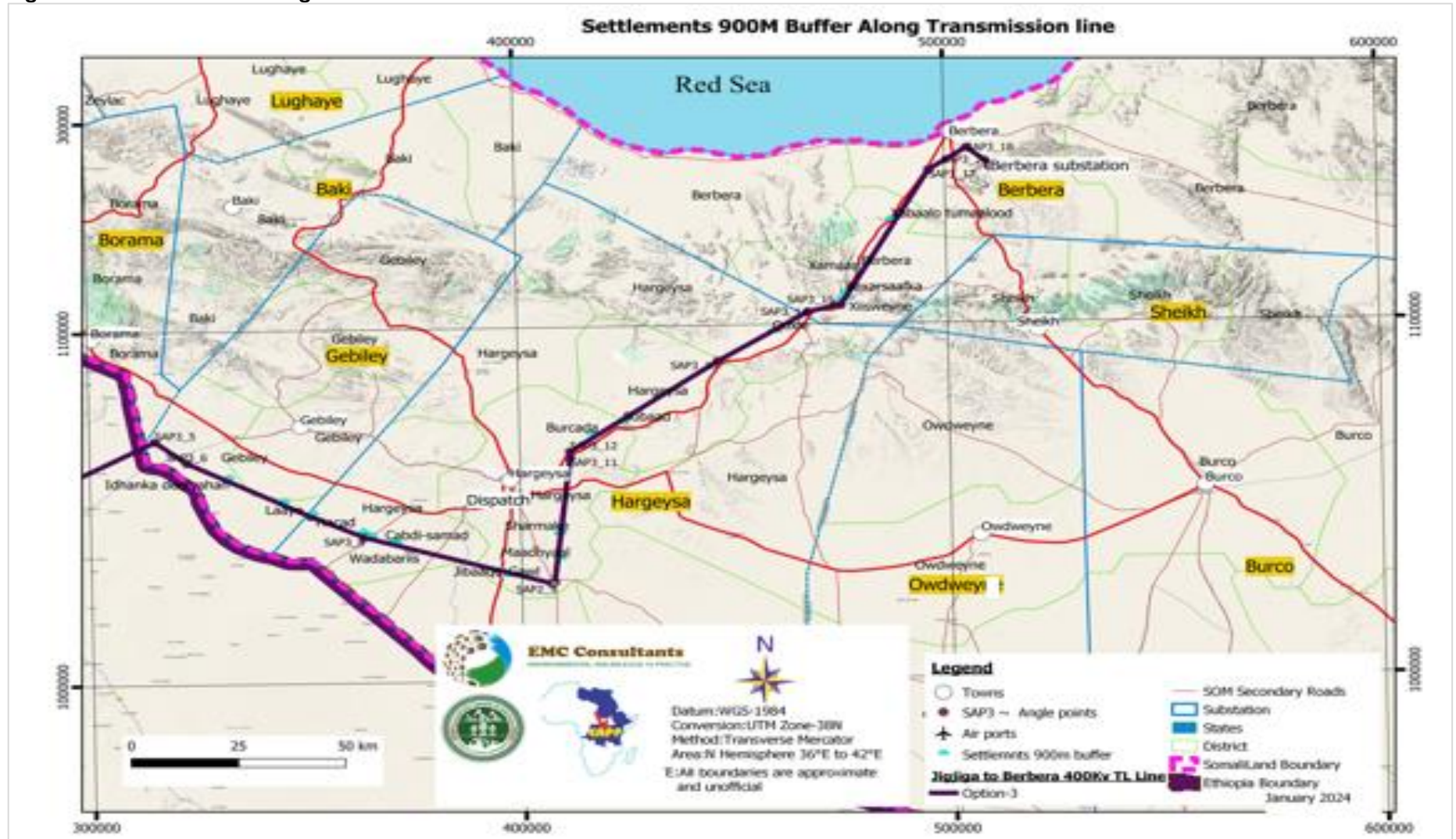
for structures, majority of the households (91.3%) use a separate kitchen for cooking. The structures in all the villages based on the survey do not have private toilet (pit latrine) with majority of the households using communal pit latrine (78.8%) and others using open field defecation 21.2%. None of the residential structures has modern features such as an inside bathroom or toilet or running water. Concrete floors are absent compared with clay floors, which are found in 99% of the surveyed households.

Figure 4-44. Housing Structures Along Transmission Line Route



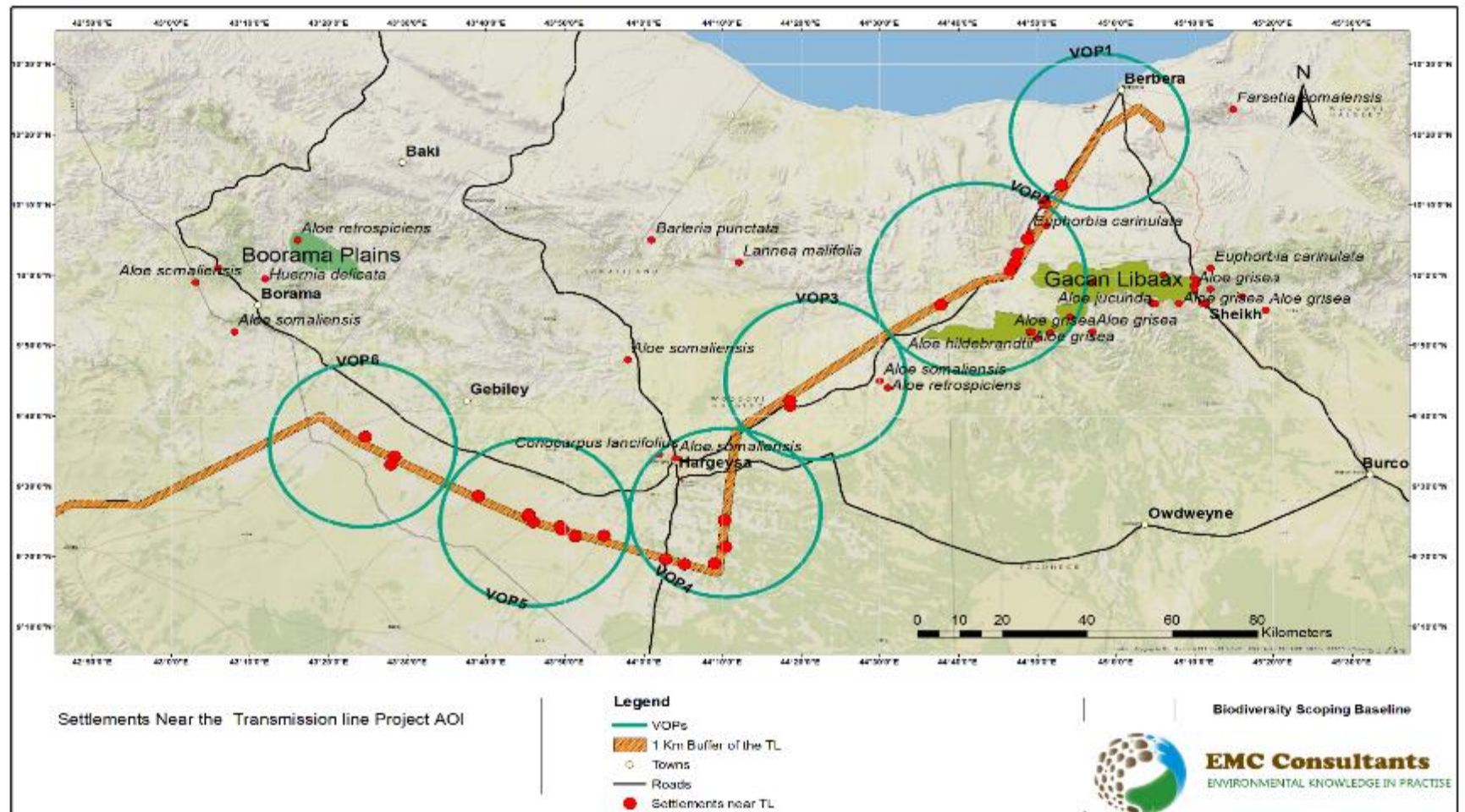
Source: EMC Consultants, 2024.

Figure 4-45: Settlements Along Transmission Line



Source: EMC Consultants, 2024.

Figure 4-46. Settlements Along Transmission Line

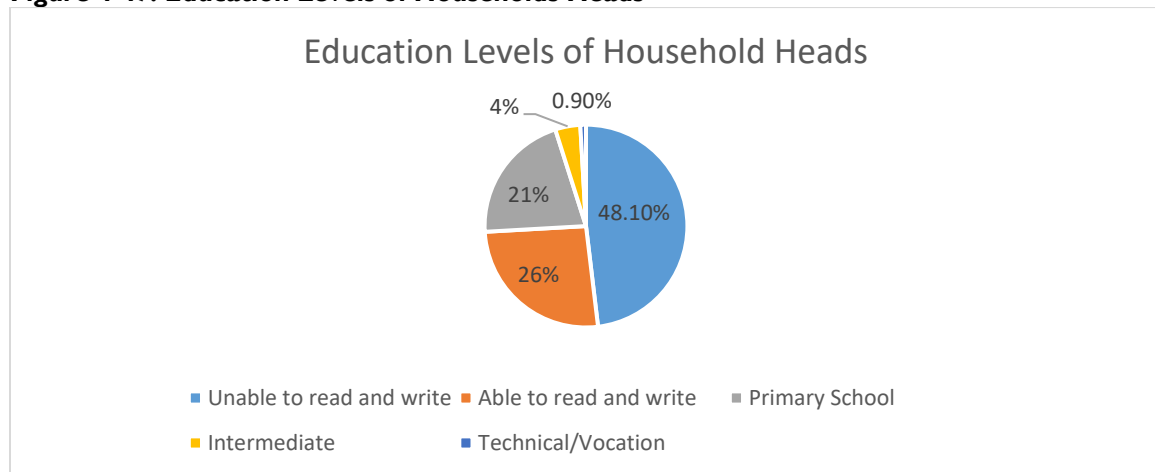


Source: EMC Consultants, 2024.

4.3.6 Education Coverage, Services and Facilities

The proportion of illiterate household heads in the project affected villages in terms of education attainment is significantly high (48.1%) depicting a situation where majority of the household heads have not attended any kind of education, formal or informal. The remaining 26% of the household heads can read and write. Household head attaining primary school education is 21% and 4% intermediate. From the survey, the rate of illiteracy is slightly higher in female household heads compared to male household heads. The educational level of the surveyed household heads further revealed that about below 1.1% of the household heads have had some kind of college/vocational/technical and university level education.

Figure 4-47: Education Levels of Households Heads

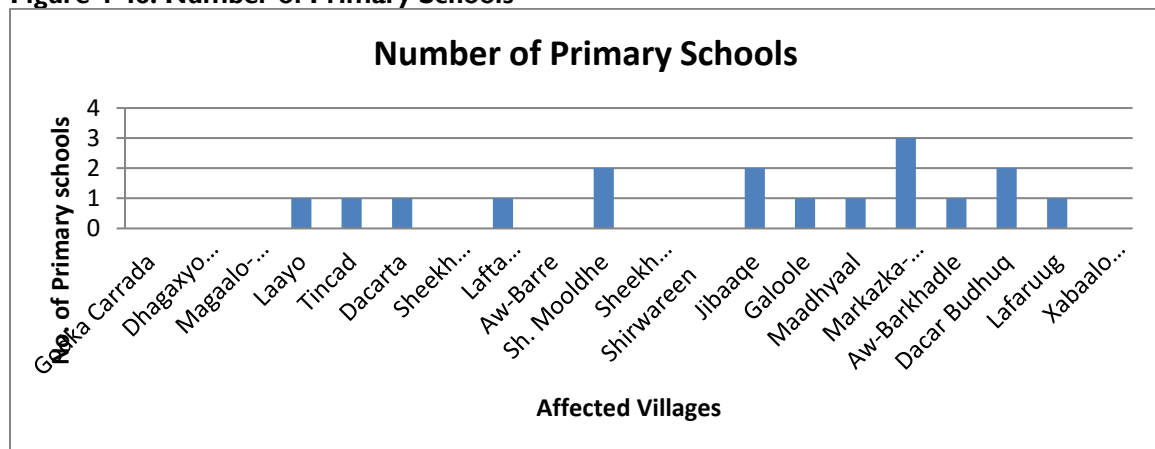


Source: EMC Consultants, 2024.

4.3.6.1.1 School Facilities

Majority of the schools in all the villages traversed by the transmission line are primary schools with secondary schools found in only 2 villages Da'arta and Godka. There are no Technical and Vocational Training (TVET) centres in any of the villages. A branch of Alpha University located in Hargeisa is found in Da'arta village.

Figure 4-48: Number of Primary Schools



Source: EMC Consultants, 2024.

4.3.6.1.2 Student Enrolment

According to information collected from education offices, an estimated 1950 students of which (57.9% male and 42.1% female) are enrolled and studying at various level of education in all schools found in the affected villages. A large proportion of the enrolment (92.4%) are primary school, followed by secondary schools (7.1%) and 1.5% for tertiary institutions. The low enrolment in secondary schools and tertiary is mainly due to the absence of these facilities in the affected villages. The households enrol their children in secondary schools located in other villages or in major towns like Hargeisa and Berbera. The total number of teachers serving the primary schools in the villages is 65 (40 male and 25 female) and having mainly diploma qualification with only very few teachers found to be having a degree in terms of level of education. Shortage of classrooms, lack of hygiene facilities (toilets), lack of textbooks and other education equipment such a desk, chairs, computers, student drop out and inadequate number of teachers (student teacher ration) etc are some of the challenges and constraints faced by the schools in the affected villages.

Figure 4-49: Primary Schools in Affected Villages



Source: EMC Consultants, 2024.

4.3.7 Health Services and Facilities

Despite the collapse of health systems during the civil war in 1988, the government has successfully re-established the national health system with partially functioning primary and secondary services with limited finance. The main challenges facing the health sector include financial and human resource constraints, limited infrastructure, donor dependency and fragmented health system. However, considerable health outcomes have been achieved in the areas of reproductive health, maternal, neonatal and child health. According to Ministry of Planning and National Development (2021), there are 27 public hospitals across the country.

Table 4-23: Health Facilities

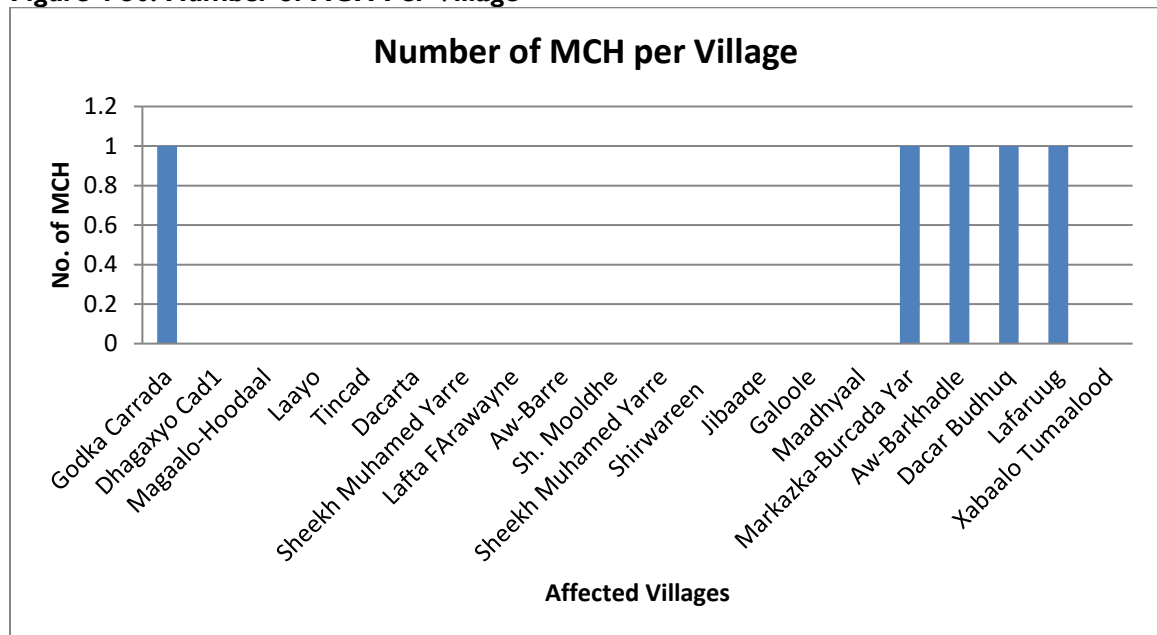
Health Facilities	2017	2018	2019
Public Hospitals	24	21	27
Private Hospitals	17	39	
Health Centre/Referrals	129	122	275
Primary Health Units	155	173	118
TB Centres			19

Source: MoPND, 2021

Out of the 20 villages in the study area, only 5 villages have a health facility referred as

mother and child health care center (MCH) in Somaliland. The rest of the villages lack a health facility and have to travel to other villages or districts to seek health services.

Figure 4-50: Number of MCH Per Village



Source: EMC Consultants, 2024.

Figure 4-51: Vulnerability of Household Members

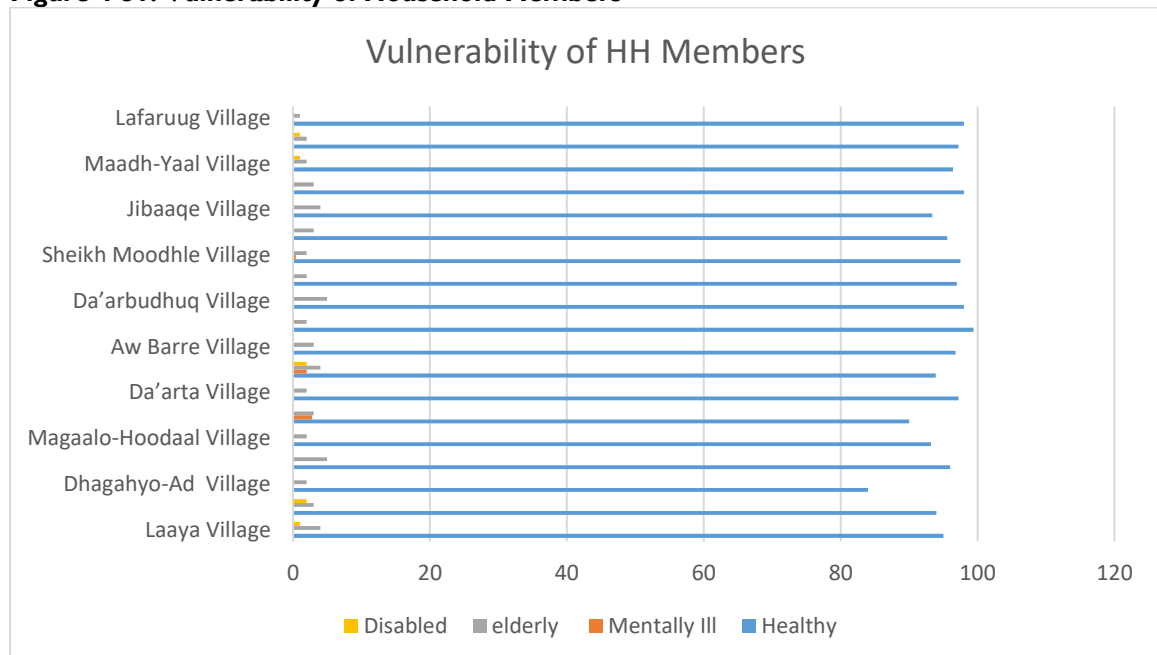


Figure 4-52: Vulnerability of Household Members

Source: EMC Consultants, 2024.

Hargeisa district has the greatest number of MCH, 4 out of the 5. The MCH lack essential

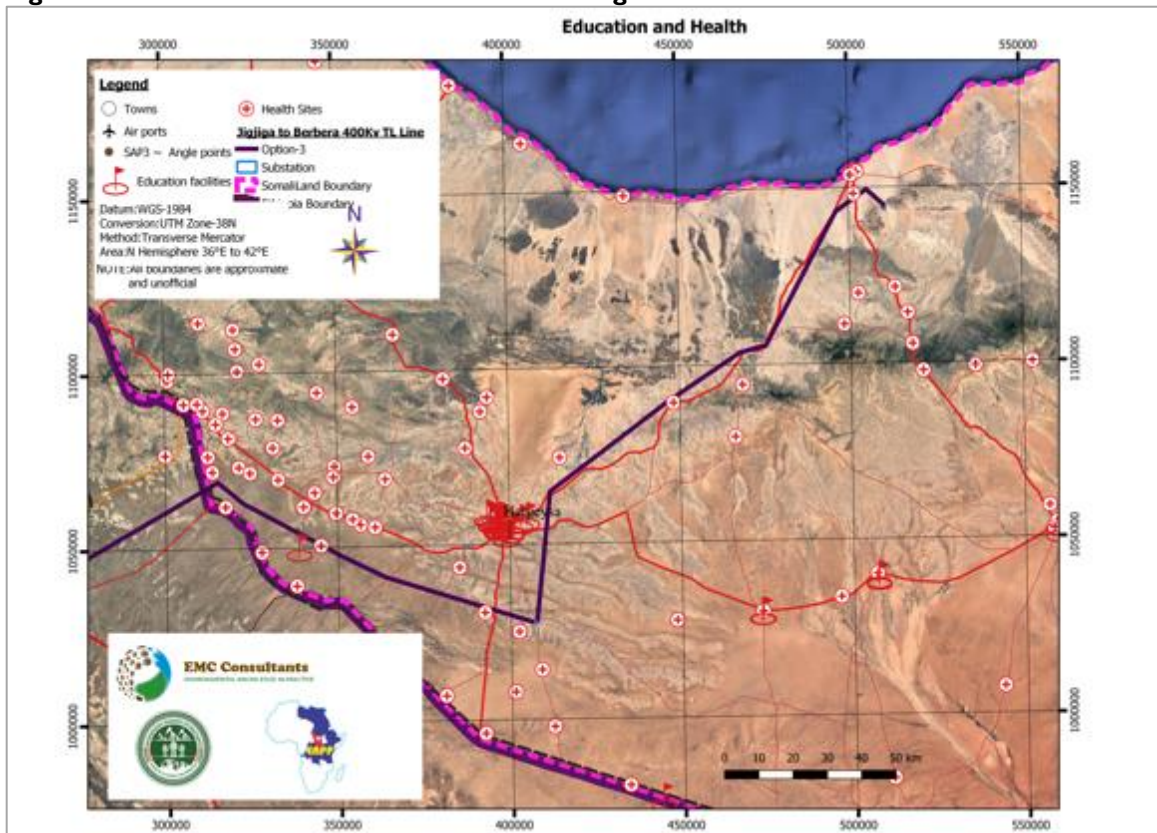
resources (material and human) to sustain the operations. The health center provides health services to all communities living in the villages. The health centers in the villages are having challenges to access energy. They use intermittent solar panel that are not providing adequate and reliable energy, hence impacting the freezers and laboratory equipment to function.

Figure 4-53: Health Facilities in Affected Villages



Source: EMC Consultants, 2024.

Figure 4-54: Health and Education Facilities Along Transmission Line



Source: EMC Consultants, 2024.

4.3.8 Energy

The electricity system in Somalia comprises isolated diesel-based mini-grids operated by Energy Service Providers (ESPs) on the basis of licenses issued by ministries of energy. The system of delivering electrical energy to users comprises a network of isolated distribution grids with embedded generation. These island networks are the property of ESPs, each of which owns and operates its independent generation-distribution-customer revenue chain.

Table 4-24. Installed Generation Capacity in Major Cities

Town	Capacity (MW)	Provider
Hargeisa	60-80	SomPower owns about 95 percent. There exist 4 ESPs, out of which 3 have agreed to merge further.
Berbera	8-10	BEC (Berbera Electricity Company (BEC) operates the entire network that was formerly state owned

The cost of electricity in Somaliland, at approximately US\$1 per kilowatt, is one of the highest in the world. This is in stark contrast to rates in neighbouring countries such as Ethiopia, which is able to source electricity at approximately US\$0.05 cents per kilowatt. High electricity costs in Somaliland hamper development of the manufacturing sector and establishment of enterprises, acting as a constraint on economic growth and development. One reason for Somaliland's high electricity costs is the lack of an effective regulatory framework or regulatory body to enable development of the sector, guide private sector operators, provide incentives for investment in the sector and support uptake of renewable energy sources. The result is a highly fragmented and inefficient sector. It is also a risk to the health and safety of consumers and employees with no health and safety standards in operation. The GoSML has developed an energy policy including the establishment of an independent regulator—the Somaliland Energy Regulatory Commission.

In Somaliland, the Ministry of Energy and Minerals (MoEM) has the mandate over the energy sector. At the federal member state level, there are also ministries responsible for electricity, although most of these are yet to be fully functional. Key sector decisions are made by the MoEM in Somaliland. Due to the absence of regulations and codes of practice, there is no mechanism to vet and enforce electricity services' quality or health and safety standards, thus exposing both ESP employees and the consumers to safety risks. This is further compounded by the lack of capacity to develop, enforce, and monitor the sector by the government institutions. In Somaliland, government efforts have led to the emergence of a nascent policy, legal, and regulatory framework through the Somaliland Energy Policy adopted in 2010 and Somaliland Electrical Act (2013), which is awaiting parliamentary approval.

Somaliland reports one of the highest costs of power in the world. Considering the major load centers alone, there are at least 113 HSDG systems currently operating, with a median capacity of 315 kW in Somaliland. These generators are estimated to consume over 121,000 liters of diesel fuel/day. With increasing demand for electricity, it is projected that diesel consumption could increase to 694,000 liters/day in the medium term if additional capacity is to be met by HSDGs alone. This trend is changing as ESPs are increasingly

integrating renewable energy (solar and wind) in their generation mix. However, these are of small-scale capacity due to inadequate financing and limited technical capacity to design and synchronize the systems. Based on field data collected in 2017, the cost per kWh in Somaliland, ranges from US\$0.30 to US\$0.90 per kWh, with a weighted average of about US\$0.68 per kWh (according to the 2018 PSMP).

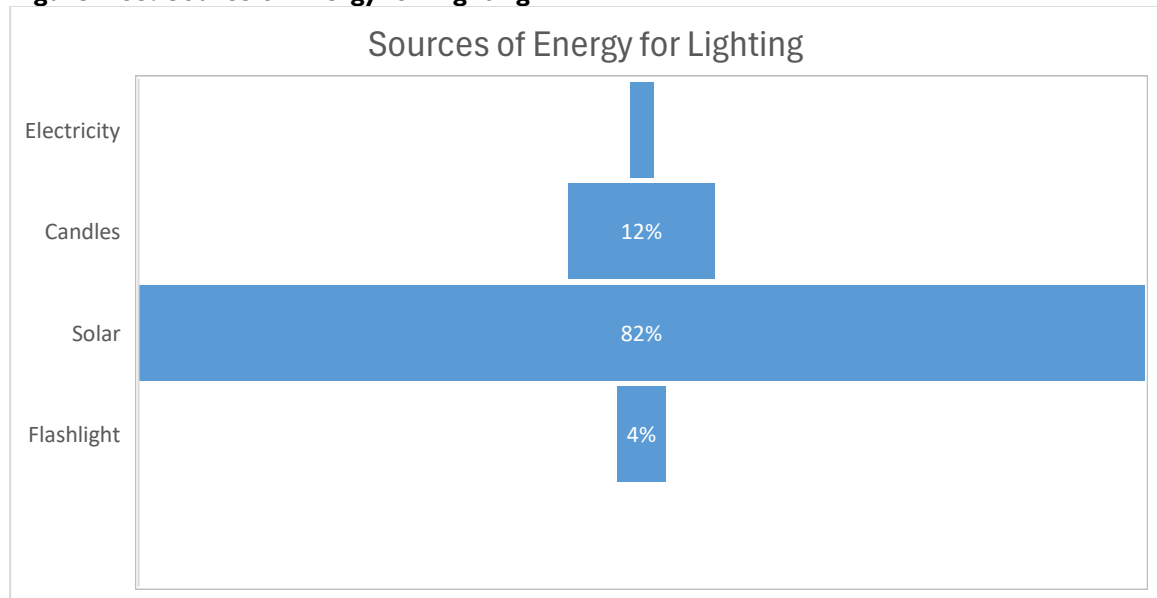
System losses are high, varying from 25 to 40 percent. Electricity distribution networks' losses mainly stem from the use of LV (415/240 V) as the main distribution voltage, with the lines extending over long distances and aging equipment. These losses could be much higher if losses in generation are considered. Technical losses are further exacerbated by the ESPs' duplication of generation, distribution, and retail infrastructure. In addition, the metering systems are deficient, and they cannot provide reliable data regarding electricity consumption. In some instances, ESPs charge a fixed fee based on estimation of the consumer load, such as the number of lightbulbs or other appliances in use, due to lack of consumer meters. This provides no incentive for end-users to reduce equipment use or buy more energy-efficient products, contributing to overall energy inefficiency and driving up electricity costs. The Somaliland National Development Plan (NDP) II (2017–2021) has set a target to reduce technical losses for each ESP by 7.5 percent by the end of 2021, through investment in new infrastructure. Investments in the sub transmission network in the major load centers are also required to strengthen the current distribution networks.

Installed generation capacity is inefficiently used. Nearly 100 percent of generation is derived from HSDGs. Due to the lack of sector regulations and limited capacity of ESPs to invest in the equipment required to synchronize existing HSDG units, coupled with a shortage of operations and maintenance (O&M) staff, most of the existing installed generation capacity is not being used efficiently. As a result, “wet stacking” (diesel fuel waste, increased pollution, performance degradation, and shorter HSDG lifespans) is widespread. By addressing the synchronization of generation units and, ideally, supplementing the thermal units with a renewable energy source, the gains could contribute to lower cost of generation by about 30 percent. The Somaliland electricity sector presents opportunities for effective service delivery, harnessing renewable energy and building institutions.

4.3.8.1.1 Source of Energy for Lighting

Majority of households in the project affected villages (82%) use solar (small household solar panels) as their main source of energy for lighting while 2% electricity, followed by generators 1%, and 4% rely on flashlight. Majority of the households (98%) indicated that they were not satisfied with their present energy sources for lighting and preferred access to electricity as their primary energy source for lighting.

Figure 4-55: Source of Energy for Lighting



Source: EMC Consultants, 2024.

Figure 4-56: Types of Energy Sources

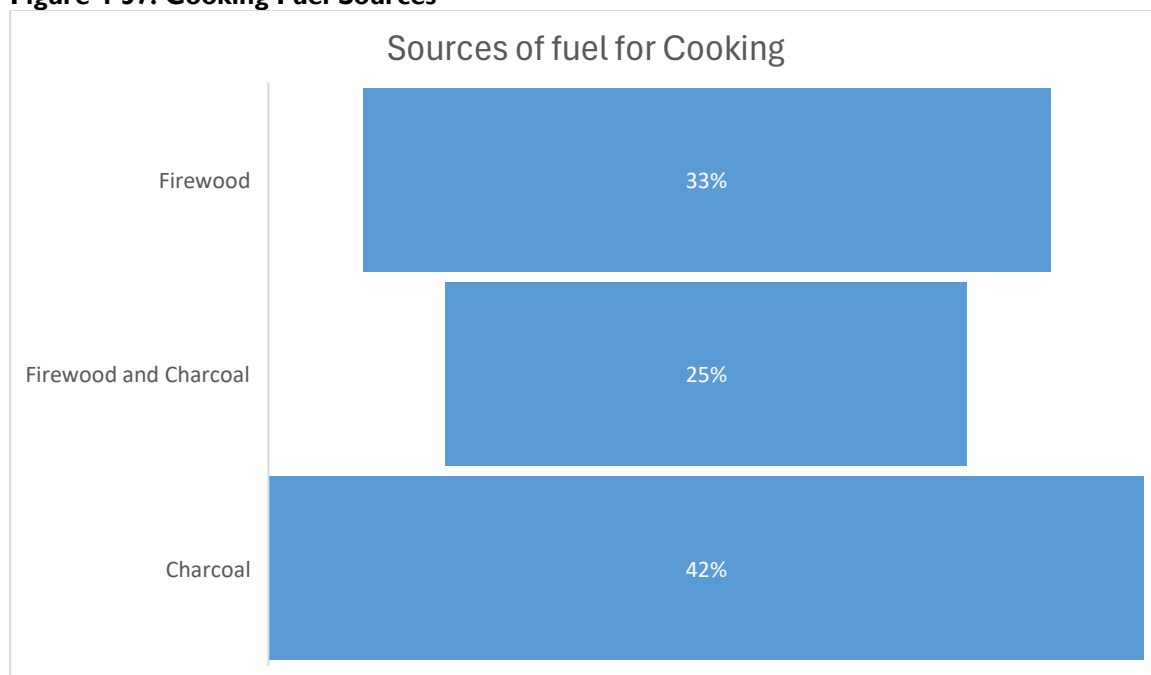


Source: EMC Consultants, 2024.

4.3.8.1.2 Source of Energy for Cooking

Charcoal and firewood were used in combination as a source of energy for household cooking in all the affected villages. According to the survey, 33% of the households in the villages along the transmission line use firewood as their main source of energy for cooking, while 25% use a combination of firewood and charcoal, while 42% use charcoal only. Most households reported to be purchasing charcoal from traders while firewood was mostly collected by women and girls.

Figure 4-57: Cooking Fuel Sources



Source: EMC Consultants, 2024.

4.3.9 Water and Sanitation

Generally, water scarcity is a persistent phenomenon in Somaliland, even without drought. There are concerns about water, which face overall decreasing volumes and have tended to temporarily dry up completely. The country's water supply comes mainly from boreholes, shallow wells and berkads, and access to water and sanitation is very low. The majority of open wells, berkads (e.g., seasonal water reservoir) and some shallow boreholes in Somaliland are likely to be contaminated due to the common practice of open defecation and the absence of a system for controlling water quality. Water sources have been increasingly drying out as a result of the drought, and the scarcity of water has prompted abnormal migrations and increased the cost of potable water. The average distance to water points has increased to 50km, with some communities making a round trip of up to 125km for water. The lack of water and competition for this scarce resource is also one of the triggers for conflict in Somaliland.

The water supply situation in Somaliland is poor, particularly in rural areas where women and children travel long distances to a water source in the dry season to collect water for domestic and livestock use. Surface water resources are generally scarce because of their dependency on seasonal climatic variations that leave traditional surface water storage facilities either partially filled or empty. The majority of the Somaliland population have no access to an improved source of water and access to improved sanitation facilities.

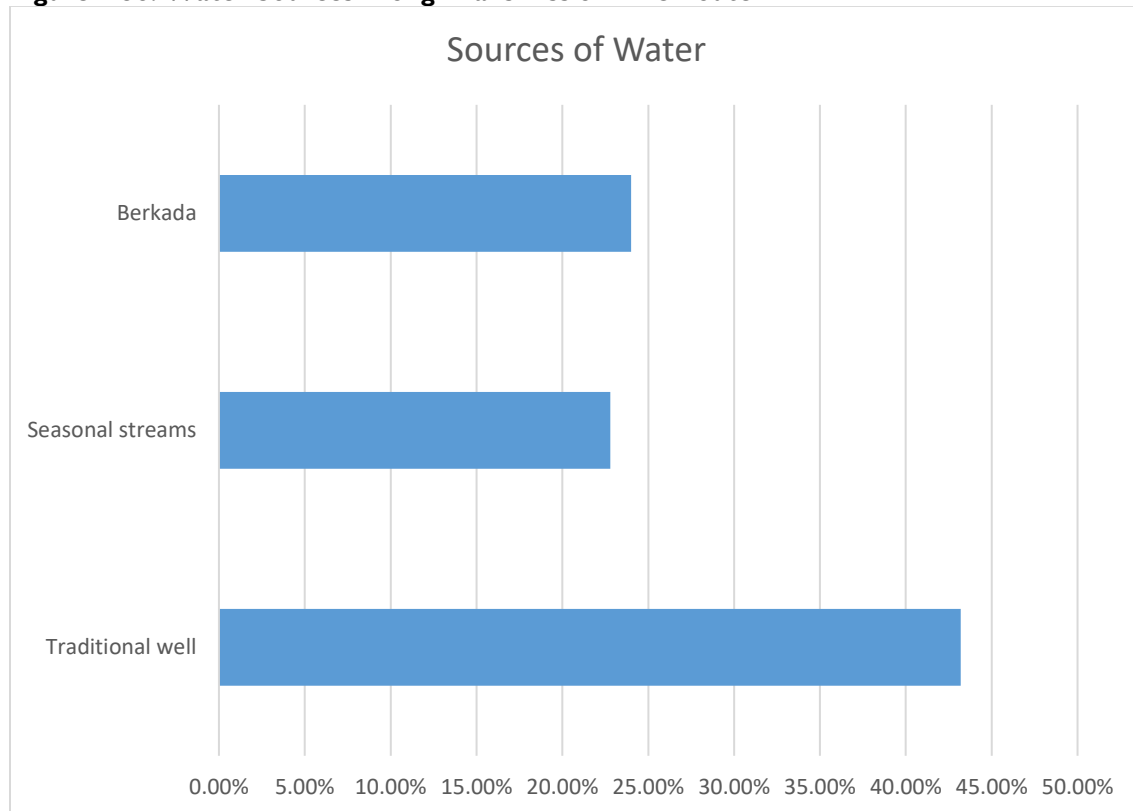
Table 4-25: Number Water Facilities, Status by Region 2018-2021.

Regions	Years	Rehabilitation of Boreholes	Drilling new bor holes	Shallow wells	Sub surface brackets	Mini water system	Total
Awdal	2018	12	1	32	32	24	101
	2019	9	3	12	2	18	44
	2020	4	1		4	11	20
Marodijeh	2021	-	-	-	-	-	-
	2018	1	1	13	31	7	53
	2019	8	8	8	2	11	37
	2020	3	2		1	5	11
	2021	-	-	-	-	-	-
	2018	1	8	2	0	4	15
Sahil	2019	4	3	4	10	7	28
	2020	4	3				7
	2018	4	0	16	12	10	38
Togdher	2019	12	0	3	25	6	55
	2020	3	6		2	1	12
Sool	2021	-	-	-	-	-	-
	2018	12	2	5	25	7	61
	2019	17	2	3	17	5	44
	2020	12	5		6	5	28
Sanag	2021						
	2018	3	3	1	19	20	92
	2019	16	7	4	10	8	45
	2020	4	7		1	8	20
	2021	-	-	-	-	-	-

Source: Ministry of Water Resource Development

The water supply situation in the villages along the proposed transmission line is exceptionally severe. This is due to its very low rainfall. Boreholes constitute the primary source of water with 46% of the population in the villages traversed by the transmission line. 32% of the households rely on cemented water reservoirs known as *Berkeds* which are used to harvest water during the rainy season. 11% of households along the transmission line get their water from nearby dams, while 3% and 4% of the households get their water from seasonal rivers and springs, or wells as shown in figure 4-57. Fetching water is primarily the responsibility of women and girls (90%) with men and boys responsible only in 10% of the surveyed households.

Figure 4-58: Water Sources Along Transmission Line Route



Source: EMC Consultants, 2024.

The existing water resources along the transmission line corridor were mapped which included surface and ground water sources. The general observation made was that between SAP 3_5 (Wajaale town) and SAP 3_11 (Hargeisa town) the predominant source of water is surface dams. According to SWALIM, 9 dams, 3 boreholes and 1 dug well are located in this stretch. Between SAP 3_12 (Hargeisa) and SAP 3_16 (Lafa-Ruug town), the predominant source of water is the dug wells (11 number) which are shall and are constructed mostly on the dry river beds or at the river banks and between SAP 3_16 (Lafa Ruug) and SAP 3_19 (Berbera town), the predominant source of water are the high yielding boreholes (4 number). The water resources available near the power transmission corridor are provided in table 4-26 below.

Table 4-26. Water Resources Inventory Along Transmission Line Route

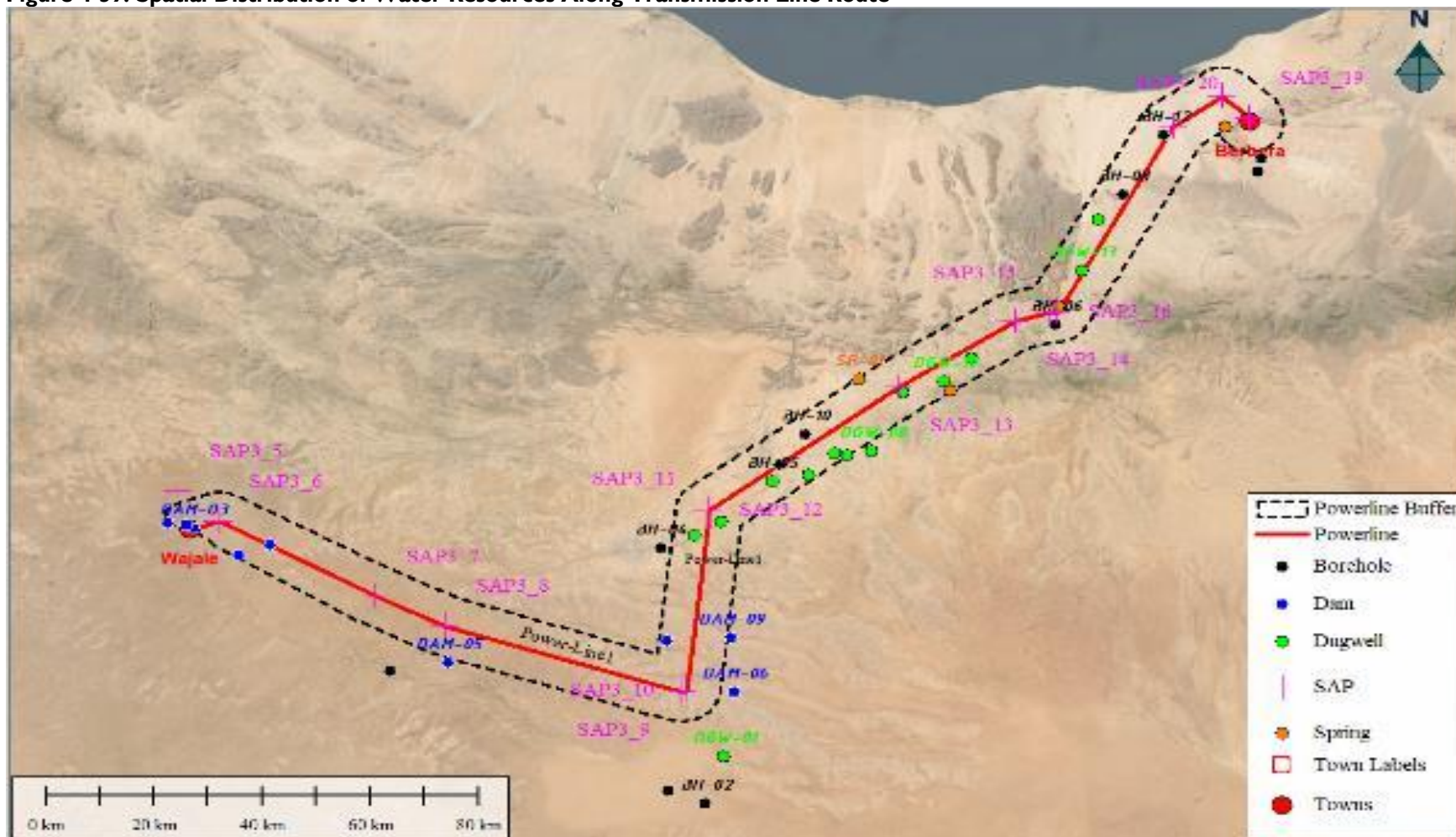
LONGITUDE	LATITUDE	LABEL	ITEM
43° 40' 07.3200" E	9° 19' 56.6400" N	BH-01	Borehole
44° 11' 29.4000" E	9° 05' 16.8000" N	BH-02	Borehole
44° 07' 45.8400" E	9° 06' 37.4400" N	BH-03	Borehole
44° 07' 06.6000" E	9° 33' 37.0800" N	BH-04	Borehole
44° 18' 01.8000" E	9° 41' 01.3200" N	BH-05	Borehole
44° 46' 19.9200" E	9° 58' 27.4800" N	BH-06	Borehole
44° 18' 52.2000" E	9° 42' 56.8800" N	BH-07	Borehole
44° 53' 03.8400" E	10° 12' 55.8000" N	BH-08	Borehole
45° 06' 49.3200" E	10° 16' 53.7600" N	BH-09	Borehole
44° 21' 25.9200" E	9° 46' 17.4000" N	BH-10	Borehole

45° 06' 27.7200" E	10° 15' 25.5600" N	BH-11	Borehole
44° 57' 04.0680" E	10° 19' 31.5480" N	BH-12	Borehole
43° 18' 01.0800" E	9° 36' 25.2000" N	DAM-01	Dam
43° 19' 48.7200" E	9° 36' 10.8000" N	DAM-02	Dam
43° 24' 59.0400" E	9° 32' 47.4000" N	DAM-04	Dam
43° 28' 11.2800" E	9° 33' 58.6800" N	DAM-05	Dam
43° 45' 50.4000" E	9° 20' 55.6800" N	DAM-05	Dam
44° 14' 19.6800" E	9° 17' 36.6000" N	DAM-06	Dam
44° 07' 35.7600" E	9° 23' 21.1200" N	DAM-08	Dam
44° 14' 01.3200" E	9° 23' 42.0000" N	DAM-09	Dam
43° 20' 27.2400" E	9° 35' 48.4800" N	DAM-03	Dam
44° 13' 17.7600" E	9° 10' 30.0000" N	DGW-01	Dug Well
44° 10' 27.8400" E	9° 35' 02.7600" N	DGW-02	Dug Well
44° 13' 08.0400" E	9° 36' 29.8800" N	DGW-03	Dug Well
44° 18' 11.5200" E	9° 41' 00.9600" N	DGW-04	Dug Well
44° 21' 48.6000" E	9° 41' 47.7600" N	DGW-05	Dug Well
44° 24' 17.2800" E	9° 44' 10.6800" N	DGW-06	Dug Well
44° 25' 36.4800" E	9° 43' 59.8800" N	DGW-07	Dug Well
44° 28' 03.3600" E	9° 44' 25.0800" N	DGW-08	Dug Well
44° 31' 08.0400" E	9° 50' 51.0000" N	DGW-09	Dug Well
44° 35' 10.1040" E	9° 52' 06.8520" N	DGW-10	Dug Well
44° 37' 59.1600" E	9° 54' 42.4800" N	DGW-11	Dug Well
44° 46' 15.2400" E	10° 00' 14.4000" N	DGW-12	Dug Well
44° 49' 01.2000" E	10° 04' 27.8400" N	DGW-13	Dug Well
44° 50' 38.0400" E	10° 10' 07.6800" N	DGW-14	Dug Well
44° 26' 45.9600" E	9° 52' 22.0800" N	SP-01	Spring
44° 35' 55.3200" E	9° 51' 09.3600" N	SP-02	Spring
44° 46' 37.5600" E	10° 00' 29.8800" N	SP-03	Spring
45° 03' 10.0800" E	10° 20' 25.8000" N	SP-04	Spring

Source: (SWALIM 2016)

The spatial distribution of the water resources is shown in Figure 4-55.

Figure 4-59. Spatial Distribution of Water Resources Along Transmission Line Route



Source: EMC Consultants, 2024.

It was not possible to determine the yield of the springs and capacity of the dams and dug wells. This is attributed to the fact that these sources of water are seasonal and may run dry during the prolonged dry spells. However, some of these sources may be considered to augment boreholes sources especially between Wajaale and Hargeisa where the local community obtains water predominantly through surface dams. The borehole yields, depths and capacities of that are operational within the proximity of the proposed transmission line were collected and are presented in table 4-27.

Table 4-27: Boreholes Along Transmission Line Corridor

Bore Hole Code	Borehole Yield (m ³ /hr)	Borehole Depth (m)	Available Storage (m ³)
BH-01	4.0	270	10
BH-02	2.5	300	10
BH-03	4.0	377	10
BH-04	5.0	280	10
BH-05	10	127	10
BH-06	5.0	36	10
BH-07	15	150	50
BH-08	9.0	70	40
BH-09	35	70	35
BH-10	2.5	42	24
BH-11	35	130	50
BH-12	2.5	70	35
Total	129.5		294

Source: (SWALIM 2016)

Figure 4-60: Borehole Under Development and Fenced Water Reservoir “Berked”.





Source: EMC Consultants, 2024.

Figure 4-61: Cement and Metal Water Tanks



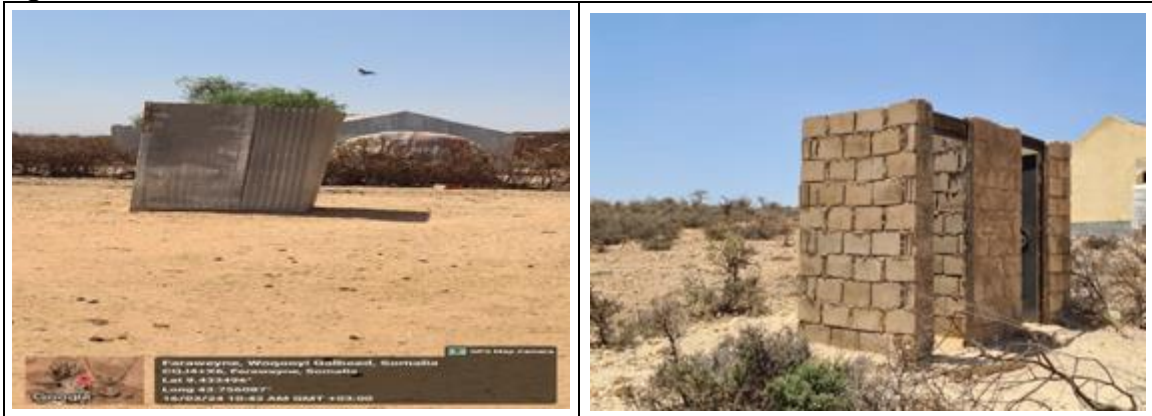
Source: EMC Consultants, 2024.

4.3.9.1.1 Sanitation

The sanitation of households along the transmission line is poor, as most of the households have no organized disposal system for the human excreta or other domestic waste. Of the households enumerated during the survey, 98% did not have latrines in their compounds

hence used the nearby bushes. It was therefore important to emphasize good sanitation habits as well as the dangers associated with improper habits during sensitization meetings.

Figure 4-62: Sanitation Facilities

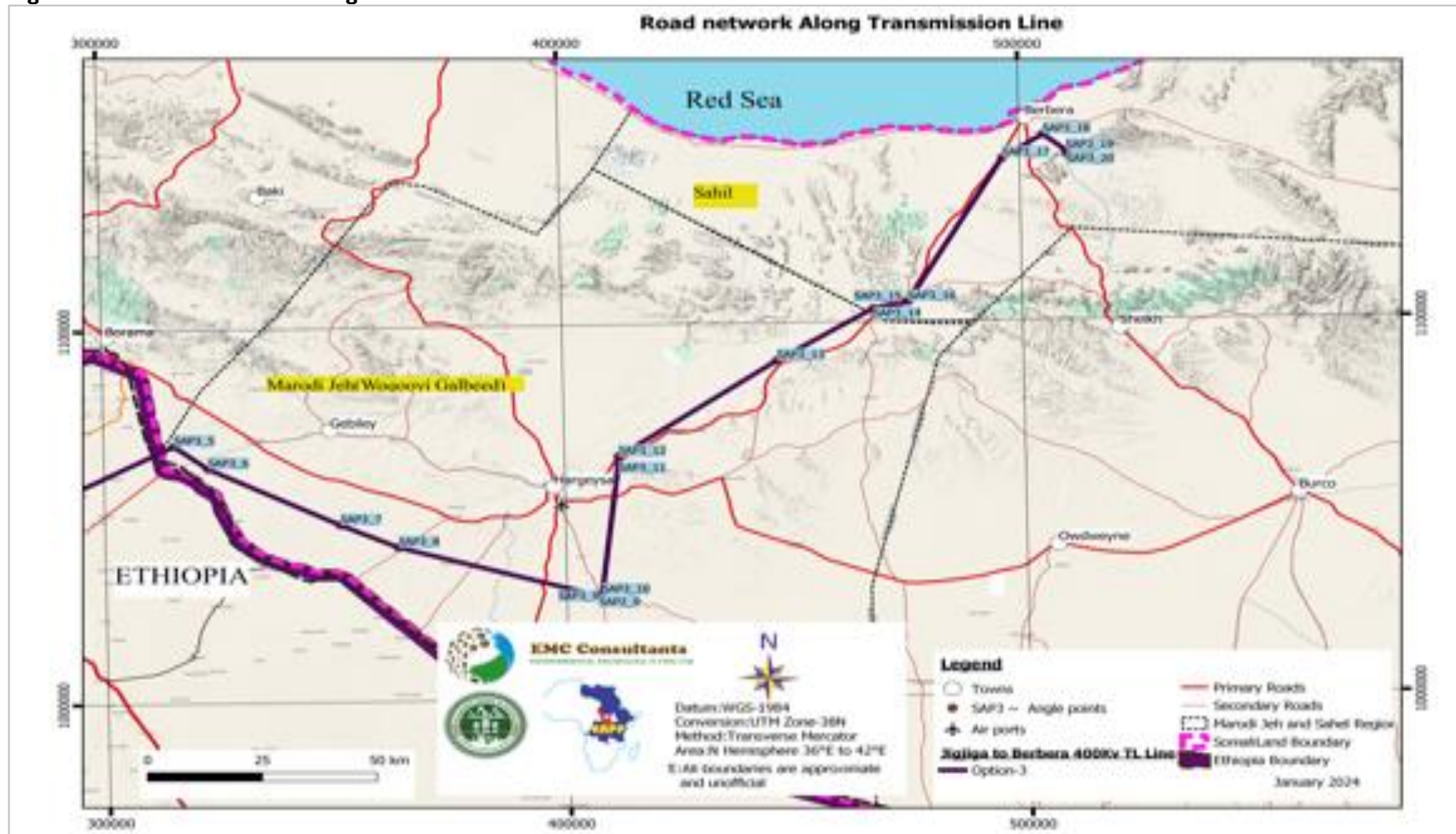


Source: EMC Consultants, 2024.

4.3.10 Transport Infrastructure

All transport leaving from Hargeisa to the eastern regions of Togdheer, Sool and Sanaag regions go through Berbera. The long tarmac road that passes the town is the main attraction for the drivers despite the longer distances it entails. This makes the road to Berbera one of the busiest roads in the country. There is newly rehabilitated Berbera-Hargeisa Road that serves as part of the Berbera corridor which connects the Berbera city to the Ethiopian border town of Wajaale. This will include dry ports, silos, warehouses, container yards, cold chain depots, ICT infrastructure and technology to ensure efficient functioning of the corridor and smooth, secure and transport transfer of cargo through the entire transportation journey. The road infrastructure that will connect Berbera port to the Wajaale town remain the main corridor project. In the project affected villages, the connection is through all-weather gravel roads with limited transportation service. By air: Berbera has a well-renovated airport that is ready to use, but there are no regular flight recently and Hargeisa International Airport is the only one functioning. By road: Wajale-Berbera corridor is located quite centrally: it's a 250km drive transversing the capital of Somaliland. Mobile network connection is available almost in all the villages but with some villages having poor network coverage and network interruption. Overall, based on the survey, the existing telecommunication service in most project impact areas are generally good.

Figure 4-63. Road Network Along Transmission Line Route



Source: EMC Consultants, 2024.

4.3.1 | Security Situation Along Corridor

The corridor between Wajaale, a border town in Ethiopia, and Berbera, a port town in Somaliland, is a significant trade route in the Horn of Africa. Wajale is situated in the Somali Region of Ethiopia, near the border with Somaliland. It serves as a crucial trading post between Ethiopia and Somaliland, facilitating trade in goods such as livestock, agricultural products, and consumer goods. Wajaale sees a substantial flow of goods crossing between Ethiopia and Somaliland, benefiting from its strategic location on the border. Berbera is located on the coast of Somaliland, overlooking the Gulf of Aden. The Port is one of the major seaports in the region, serving as a key maritime gateway for landlocked Ethiopia and a trans-shipment hub for the wider East Africa region. It offers an alternative to Djibouti as a maritime gateway for Ethiopian imports and exports, potentially reducing dependency on a single port.

The corridor between Wajale and Berbera facilitates the movement of goods, primarily from Ethiopia to Berbera Port for export and vice versa for imports. Efforts have been made to improve infrastructure along this corridor to enhance trade efficiency, including road upgrades and logistical improvements. Enhancing this corridor aims to boost economic integration between Ethiopia and Somaliland, promoting regional trade and economic development. Overall, the Wajaale-Berbera corridor plays a vital role in regional trade and economic connectivity, offering strategic alternatives and opportunities in the Horn of Africa region.

Table 4-28. Security Situation

Roads	Distance & Time	Safety & Escort	Comments
Wajale–Hargeisa	43 km 1hr	The road to the Wajale-Berbera corridor is safe and escorts are not needed, but the Somaliland government requires all internationals to travel with at least 2 SPU officers, and this rule is enforced at each government checkpoint	Tarmac road. Wajale, is under Gebiley district which recently upgraded to a region. Two seasonal streams were challenging the traffic during the flooding between Hargeisa and Gabiley, but the road upgrading recently improved the movement.
Hargeisa-Berbera	158 km 2 hrs	The road to the Wajale-Berbera corridor is safe and escorts are not needed, but the Somaliland government requires all internationals to travel with at least 2 SPU officers, and this rule is enforced at each government checkpoint	The tarmac road is a newly upgraded highway and, mostly in good condition

Despite the country’s preparing for new political parties and Presidential elections scheduled for November 2024, the security situation in Somaliland remains stable. The west side regions in which the corridor lies have been safe, with low-scale occurrences, mostly perpetrated by individual criminals armed with blunt and blade weapons. In general, foreign nationals feel safe and enjoy operating in most regions, despite the eastern regions with medium risk requiring consideration to maneuver, particularly on the approach of hiring vehicles familiar to the area. Inter-clan conflict over revenge killings,

land, and water disputes remains an internal security challenge in Somaliland. The Ministry of Interior (MoI) devoted considerable resources and time in resolving or mitigating inter-clan conflicts. The MoI has successfully resolved prolonged clan-conflicts of Cel-Afwayn and Fadhi Gab in the eastern regions.

Moreover, Al Shabaab (AS) had never anchored foothold in Somaliland, the only incidents recorded were three parallel Vehicle Borne Improvised Explosive Device (VBIED) attacks in 2008 in which they targeted the presidential palace, Ethiopian Consulate and UNDP compound and this was an isolated incident. Residents engage in community policing by working with security authorities and reporting any suspicions. The security agencies mostly conduct routine security operations targeting the suspected individuals and there is not a single affiliation of these global insurgents. Meanwhile, AS vehemently opposed and threatened to react violently to the MoU that Somaliland and Ethiopia recently reached. However, Somaliland alerted its security agencies to remain vigilant, and the routine security operation continued. Before embarking on any field mission, it is advisable to get security information from the concerned security agencies. It is strongly advisable to first meet with the regional authorities such as governors, mayors and regional officers. When visiting rural areas, inform the police commanders in case of any need for SPU. The Police Special Protection Unit (SPU) is a unit designated to protect humanitarian workers international individuals and their assets. The unit is not needed within the town; however, it is advisable to use it when travelling out of the major towns. Non-Somali's travelling out of the major towns will also need SPU as per Somaliland government regulations. A Security Risk Assessment and Management Plan (SRAMP) has been prepared as part of this ESIA (see Annex J).

Table 4-29. Security Incidents in Last Three Months

Incident Narrative	Date	Locality
Police arrested five students who were allegedly destroying school property during the riot.	27/6/2024	Hargeisa
A group of students staged an outcry demonstration over the national examination. The protestors marched on the streets, blocking roads before the police officers dispersed them by shooting in the air.	25/6/2024	Hargeisa
Angry students marched to the street pelting stones and burning tires over the national examination. The stones hit and damaged some vehicles which were parked in the area. Police officers opened fire in the air to disperse the crowd injured a woman bystander.	25/6/2024	Hargeisa
A man armed with a knife stabbed and injured the deputy regional officer of Wadani party over a personal dispute. The police arrested the perpetrator, and the victim was admitted to the hospital for medication.	23/6/2024	Berbera
Police officers arrested Wadani Party politician upon his arrival at the airport. The arrest angered residents who responded by burning tires and blocking the roads leading to the airport. The authority officials' elders and police intervened to disperse the crowd.	20/6/2024	Hargeisa
Police forces arrested a man involved in stealing mobile phones and seized other stolen devices in his possession in the Mahmoud Haybe area.	15/6/2024	Hargeisa
A teenager stabbed and wounded a fellow clansman over a personal dispute. Police forces arrested the perpetrator.	7/6/2024	Hargeisa
A group of port workers held a demonstration against a local company. The protestors appeared in front of the regional court to submit their complaints over delayed wages.	20/5/2024	Berbera
A group of young gang members disturbed the traffic flow and threatened pedestrian and drivers with crude weapons during the 18 May festivity preparations. Contingents of police officers were deployed to the streets to disperse the crowd and the gangs' interrupting movements. No casualties were reported.	17/5/2024	Hargeisa
Police forces intercepted and confiscated 202 liters of alcohol at a checkpoint. The police arrested the smuggler and the vehicle carrying the consignment.	12/5/2024	Gebiley

Police forces arrested an individual who had killed his friend in Mohamed neighborhood in Hargeisa the previous day.	8/5/2024	Hargeisa
A teenager stabbed and killed his friend over a personal dispute before fleeing the scene of the attack.	7/5/2024	Hargeisa
A group of businesspeople demonstrated against local government plans to evict them from the public land. The protestors attempted to oppose the eviction, prompting police gunfire discharge in the air. No casualties were reported, but several people were temporarily arrested.	27/4/2024	Hargeisa
Police forces in Hargeisa arrested a man for allegedly robbing a female pedestrian walking in the central market.	22/4/2024	Hargeisa
Somaliland police arrested a young man who publicly on social media shared his view on the unity of Somalia while stating he did not recognize Somaliland.	18/4/2024	Hargeisa
Police forces confiscated 434 liters of alcohol for Eid consumption in Hargeisa, committing to crack down on smugglers and buyers, highlighting the rule on alcohol possession charges.	10/4/2024	Hargeisa
Somaliland police forces arrested two women for theft in Hargeysa. The individuals were arrested in possession of seven mobile phones.	7/4/2024	Hargeisa
Two burglars broke into a local company's warehouse in Mohammed Mooge area and stole construction items and other goods from the warehouse.	5/4/2024	Hargeisa
A fistfight broke out between two groups of local businesswomen over a disagreement at the Gulleed Hotel exhibition. A businesswoman sustained minor injuries during the fighting. Police officers guarding the Gulleed Hotel discharged their guns in the air in an attempt to disperse them, causing no casualties. Later, the police arrested three women, and two men involved in the incident.	4/4/2024	Hargeisa

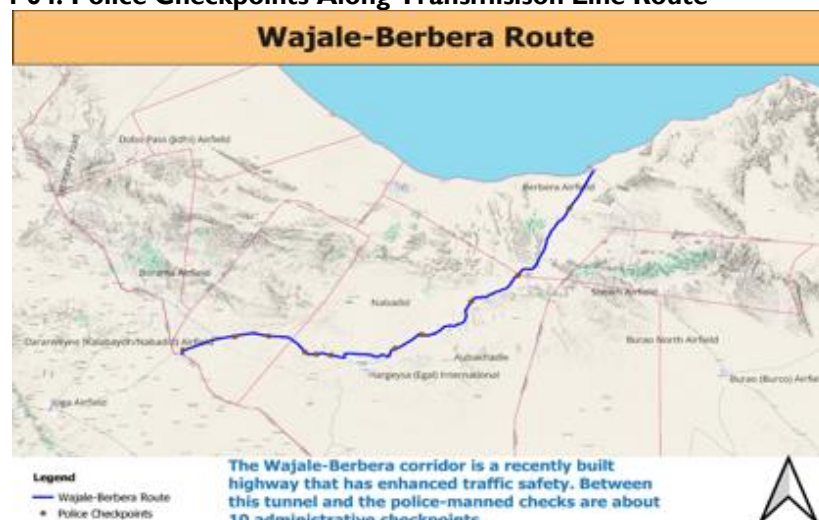
Source: United Nations

4.3.11.1 Police Force

The Somaliland Police Force (SLPF) has grown over the years into a functioning force that keeps relative peace, maintains high levels of personal commitment, and closely works with communities along with their traditional leaders to resolve disputes and render justice. Furthermore, the SLPF enjoys a level of public recognition and support across Somaliland's communities. A notable successful operation for the Somaliland police, in cooperation with other security institutions, was for the 2021 election. More than ten thousand police officers were deployed during voting registration and election process (pre-election, during the election, and post-election). The police made notable progress in the following areas:

- Community policing, counterterrorism
- Riot control
- Training in various fields
- Construction of over 30 police stations
- Modernising communication systems
- Improving criminal investigation capabilities
- Recruitment of police officers from the National Service Program

Figure 4-64. Police Checkpoints Along Transmisison Line Route



4.3.12 Culture and Traditional Institutions

4.3.12.1 Language

Somali language is the dominant language that is widely spoken by large segment of the population in project impact areas.

4.3.12.2 Religion

Islam is the bedrock religion in Somaliland. The constitution in Somaliland makes Islam the official religion of the country.

Figure 4-65: Mosques in Affected Villages



Source: EMC Consultants, 2024.

4.3.12.3 Cultural Resources

Somaliland has rich cultural heritage due to its own cultural goods 'dhaqan', including the fundamentals of a segmentary society and the resulting social fabric. Traditions often originate in the proto-Somali cultural era or originate in the many interactions Somali populations had with other cultures, including those from the Arabian peninsular, India, and sub-Saharan Africa. There are several cultural heritage sites spread over the administrative areas in Somaliland this includes archaeological sites, historical sites,

heritage sites and monuments. These sites are located in Awdal, Sanaag Sool, and Nugaal. Deliberate efforts have to be made to protect cultural heritage. Unfortunately, the country's legislation around these issues has not yet been developed and does not legally enforce the protection and preservation of cultural artefacts, cultural heritage and distinct sub-national identities. Especially infrastructure development project therefore needs to support the protection of places of cultural and religious significance, including graveyards, religious buildings, and historical sites. There are no known cultural heritage sites along the transmission line AoI. However, 2.5kms from the AoI, there is a pre-historic site Laas Geel which could nevertheless be adversely affected by activities of the contractors especially when determining access routes, laydown areas or locations for establishing worker's camp.

4.3.12.3.1 Laas Geel Pre-Historic Site

Laas Geel, one of the most important rock art sites in Somaliland. The site is placed on a granite outcrop that rises from a plateau at an altitude of 950 meters above sea level, at the confluence of two seasonal rivers, a key fact to explain the existence of rock art in the outcrop. The site was discovered in 2002 by a French team led by Xavier Gutherz which studied the beginning of pastoralism in the Horn of Africa. Along with the paintings, lithic tools were found scattered throughout the site, and tombs marked with stelae and mounds can be seen in the neighbourhood. The paintings are distributed along 20 rock shelters, the biggest being around 10 meters long. Most of them correspond to humpless cows with curved or lyre-like white horns (sometimes with reddish tips) and marked udders. Paintings are enormously colourful, including red, white, black, violet, brown and yellow both isolated and combined. However, the most distinctive feature of these cows is their necks, depicted rectangular, abnormally wide and either blank or infilled with red and white stripes, either straight or wavy. These strange necks have been interpreted as mats hanging from the actual neck, in what could be interpreted as a ceremonial ornament.

Figure 4-66: Laas Geel Pre-Historic Site



Source: EMC Consultants, 2024.

4.3.13 Clan Dynamics

4.3.13.1 Ethnic Composition

The political constitution of the Somali society lies in kinship and its specific kind of social contract. The Somalis are dependent on their kinship lineage for security and protection, responsibilities, duties, rights, and liabilities is still continuing to be perceived along collective rather than individual terms. Hence, the clan is remaining collectively responsible for actions of its individual members, and rights of women and children will continuously be seen in the context of the interests of maintaining the strength of the male-based clans. The clan-system is the most important constituent social factor among the “nomadic- pastoralist Somalis” and this segment lineage system can be differentiated into categories of clan-hereby, descent is based on the father’s lineage. The clan-family, clan, sub-clan, primary lineage, and mag-paying group as divisions of varying size (Lewis 1961; Gundel, 2006).

The clan unit is divided in to sub clans and sometimes with many subdivisions. The lineage unit system is counted vertically on segmentary lineage system in which individuals find their origin based on their perineal descent traced in the male line. The clan family is the upper limit of the clanship in which the genealogical length stretched as far as thirty generation to a common ancestral line. This segmentary clan system is categorized by four clan families their descendants: Darood, Hawwiya, Dir and Issaq. The most distinct descent group within the clan is ‘primary lineage’ this lineage is explained as in which a person describes himself as a member (Gundel, 2006).

For Somalis, the family is the ultimate source of personal security and identity. The importance of family is reflected in the common Somali question, what is your lineage? Somalis typically live in nuclear families although older parents may move in one of their children. Households are usually monogamous; in polygamous household’s wives usually have their residences and responsible for different economic activities. The clan families are so huge and dispersed in vast areas and it is rarely effective in relative peacetime. However, in case of conflict between two clan families a clan identity come into effect for protection. Hence, clan family and allegiance play a major role in the modern political history of Somali. The society of the pastoral Somalis is democratic traditional decisions are made by councils of men. These councils are egalitarian, sometimes to the point of anarchy. Although age lineage seniority and wealth can have influence. Lewis says all men are councilors and all men politicians (Lewis, 1993).

Clan affiliation is both a force that has influenced conflict and violence as well as a mechanism for protection and dispute resolution. Customary traditions and conventions help define rights and obligations among kin, clans, and subclans, with an emphasis on the preservation of social stability over individual rights in communities and families. At the local level, clan arbitration through the customary system known as xeer has helped regulate access to shared resources, such as grazing areas and water. Settlement patterns in cities are shaped by clan dynamics through ownership and development of urban land, resulting in communities that are often segregated on the basis of clan. Clan affiliation further affects the extent to which IDPs are included or excluded from development opportunities and access to basic services. Consequently, a resultant pattern of inequality

is emerging in Somaliland's cities (Aubrey and Cardoso 2019). In the project affected villages, the clans and sub clans that exist are shown in the table 4-30 below.

Table 4-30. Clans and Sub Clans

Clan	Sub Clans
Isaaq	Eidagalle, Ishaq
Dalal	Essa Musa
Deeryoyahan.	Eidagalle
Sa'ad Muse	Ishaq
Ahmed Abdalle	Arab
Abane Abdalle	Abdalle Abokor
Aran	Sa'ad Muse
Abdalla Sa'ad	Jibril Abokor
	Reer Abanne
	Eidagale

4.3.13.1.1 Somali Cutomary Law of Xeer

The customary law (*xeer*) has its roots in the nomadic pastoral societies; it has been established in pre-colonial period and continues to be the most used legal system in Somaliland and supported by the social clan structure. The *xeer* consists of a set of unwritten agreements and social practices reached by the clans, and derived from elders' experiences and memories, or are the set of rules and obligations developed among traditional elders to facilitate relations between clans and sub-clans. It has traditionally a mixture of more general prescriptions on behaviors, such as the appropriate behavior towards guests and vulnerable groups (Lewis, 1960; Gundel, 2006) and more specific contracts between clans or sub-clans on how to act towards each other, levels of compensation for conflicts or disputes and how to manage disputes among different clans or sub-clans.

Under *xeer*, elders serve as judges and help mediate and decide cases using precedents. There is no central authority that establishes *xeer* rules, but generally, clan rules are basically the same, with slight variation in the interpretation and application of *xeer* among different clans.⁸ The laws that are widely accepted by the community are called *xeer guud* and those particular to a specific clan are referred to as *xeer tolnimo*. As with legal systems in Western states, the *xeer* legal system also demands a certain amount of specialization of different functions within the legal framework. Thus, one can find *odayal* (judges), *xeer beegti* (jurists), *xeer yaqaano* (lawyers)²¹.

The challenges faced in *xeer* are many, as *xeer* and the rulings of *xeer* are not based on equal representation of all groups. Although all men can, in theory, participate in negotiations and take part in the mediation, access has normally been open only to men of

²¹ APD 2007. Land-based conflict project

a certain age (not young men) and no access is allowed to women or minorities²² (Lewis, 1961). Women can only be represented by male relatives²³.

4.3.14 Gender Issues

4.3.14.1 Gender Based Violence and Gender Dynamics

Differentiated social roles and responsibilities between men and women across livelihood systems have implications for domestic relations and violence. Available economic opportunities, however, are still quite limited for both men and women and female-headed households remain among the most vulnerable populations. Unemployment rates remain particularly high for women often remain reliant on charity through social protection mechanisms and contributions from the diaspora in the form of remittances. Women who are engaged in income generating activities are often engaged in the informal sector and further bear the double domestic burden of earning an income and taking care of the home. The consequences of this burden often fall to girls in the family, who are expected to contribute to the maintenance of the home, often at the expense of girls' education and skills development.

Women representation in politics and governance bodies has remained low. Political power and authority are predominately masculine spaces, and the few women who are included in politics mostly act through their husbands or other male family. Analytical work on political economy in Somaliland has shown that political power is deeply rooted in access to resources. Women's economic empowerment should therefore play a fundamental role in their rise in politics and decision-making spheres. However, to date no analysis has explored the links between economic empowerment initiatives and political empowerment, nor has rigorous political economy analysis been coupled with a gender analysis. At least 30 per cent of seats in the national Parliament are reserved for women; while women's representation in Parliament has improved in recent years, at 24 percent representation, this quota remains unmet. While there is a lack of statistical data on the situation of women in Somaliland, the available evidence shows that Somali women are still far from enjoying equal rights and treatment. The Social Institutions and Gender Index for 2014 places Somaliland on the 6th lowest position in the world, with 'very high' discriminatory family codes, 'very high' levels of restricted physical integrity, and a 'very high' level of restricted resources and assets. Lack of access to services, such as education and health, or lack of access to agricultural production or other livelihoods and employment opportunities have kept most of the female population of Somaliland disempowered.

The findings of Somaliland Health and Demographic Survey (SLHDS), 2020 indicate that more than 70 percent of women indicated that the forms of domestic violence are physical assault, denial of education, forced marriage, rape and sexual harassment. The survey also noted that women with higher education are more likely to acknowledge the occurrence of domestic violence as opposed to women without lower levels of education. Twelve percent

²² Lewis, I. 1961. A Pastoral Democracy: A Study of Pastoralism and Politics Among the Northern Somali of the Horn of Africa

²³ IDLO. 2010. Evaluating the effectiveness of legal empowerment approaches to customary law reform in Somaliland and Puntland

of women aged 15-49 had encountered physical violence since the age of 12, while 6 percent reported experiencing physical violence in the 12 months preceding the survey. Older women are more likely to experience physical abuse, with one in every four women (25 percent) aged 40 years and above experiencing violence since the age of 12 and 17 percent experiencing violence in the same age group the year prior to the survey. Regarding opinions of women about who the most common perpetrators of violent acts against women are, the survey found that 66 percent of women believe that husbands commit the most violent acts against women in the community. Ten percent of women who were ever-married reported being physically abused by a spouse, while 2 percent reported emotional violence by a spouse.

Based on the survey, most forms of GBV include physical violence and sexual violence (rape). Most domestic violence and sexual violence cases are dealt with through the customary and Sharia legal systems. Anecdotal evidence indicates that some customary practices result in a double victimization of women and girls, denial of justice for many survivors, and impunity for perpetrators. The customary justice system is focused on clans. Justice is delivered for the clan rather than for the survivor of the sexual violence. Traditional approaches to dealing with rape seek resolution or compensation through negotiation between clan. Restitution is paid to the clan and not to the survivor. Once restitution is paid, the perpetrator of the sexual violence is free from further punishment and the case is considered finalized. In some cases, the woman or girl is forced to marry the perpetrator of the violence as a form of “restitution” ordered by customary courts. The customary system is widespread, and many families and clans choose it over other justice systems. A SEA/SH Action Plan has been prepared as part of the ESIA (Annex F).

5 STAKEHOLDERS CONSULTATIONS

5.1 Introduction

This section provides a description of the main stakeholders of relevance to the Project, including an overview of the stakeholder engagement programme that will be implemented by the Project. This programme is designed to cover all phases of the Project. This section is complemented by the Project's Stakeholder Engagement Plan (EMC, 2024) presented in Appendix B.

5.2 Stakeholder Engagement Objectives

The objectives of this stakeholder engagement were as follows:

- To identify and map all relevant stakeholders, their context and concerns
- To establish a two-way dialogue to understand concerns, management options and external perspectives.
- To promote and secure participation of PAPs by building their capacity for informed participation with special attention given to vulnerable PAPs in key decision making.
- To build and maintain trust between stakeholders.
- To support the resolution of emerging tension and maintain the project's social license to operate.
- To manage stakeholders' expectations
- To facilitate the collection of quality primary and secondary information relevant; to the project processes including monitoring
- To triangulate data collected and analysis done to inform decision making.
- To document information disclosed and public consultation efforts
- To comply with regulations and requirements on disclosure and consultation
- To provide information about the project and its potential impacts to those interested in or affected by the project and their opinion in this regard.
- To identify additional impacts/issues and possible mitigation measures
- To inform the process of developing appropriate mitigation measures and facilitate consideration of alternatives and trade-offs (if any)
- To reduce chances of conflict through early identification of contentious issues
- To ensure transparency and accountability of decision-making; and
- To increase public confidence in the project.

5.3 Stakeholder Identification

Stakeholders include individuals or groups that may influence or be impacted by the Project, described as follows:

A stakeholder is any person, group of persons, or organization on which the Project (or activity) has an actual or potential, direct or indirect, positive, or negative impact, or one that has an actual or potential, direct or indirect, positive, or negative impact on the Project (or activity).

The level of interest and impact of any given group of stakeholders is dependent on several factors including level of authority, socio-economic context, influence, education and cultural factors. Stakeholder identification began at Project inception and planning and has continued through the various stages of the Project development. Stakeholders identified to date represent the organisations and individuals who may be directly or indirectly (positively or negatively) affected by the Project or who may have an effect on how the Project is implemented.

Stakeholders identified to date for inclusion in engagement activities meet one of the following criteria:

- Have an interest in the Project;
- Would potentially be impacted by or have an influence on the Project (negatively or positively); and/or,
- Could provide commentary on issues and concerns related to the Project.

Stakeholders were categorised, based on their various needs, interests, and potential influence on the Project as outlined in table 5-1 below.

Table 5-1: Stakeholder Category List

Stakeholder Categories & Groups	Connection to the Project	Stakeholders
National Government Authorities (Ministries in Hargeisa and/or their Regional Offices)	National Government is of primary political importance to the Project in terms of establishing policy, granting permits or other approvals, and monitoring and enforcing compliance with Somaliland's law throughout all stages of the Project life cycle	Ministries and Directorate General offices of relevant Ministries.
International agencies	Organizations with direct interest in the Project, and its social and environmental aspects, and that are able to influence the Project directly or through public opinion. Such organisations may also have useful data and insight and may potentially become partners to the Project in areas of common interest such as the implementation of community investment or CSR projects if applicable.	International agencies with offices Hargeisa e.g, FAO.
Civil society	Organizations with direct interest in the Project, and its social and environmental aspects, and that can influence the Project directly or through public opinion. Such organisations may also have useful data and insight and may potentially become partners to the Project in areas of common interest such as the implementation of community investment or CSR projects if applicable.	Oxfam, Save the Children, MSF, World Vision.
Businesses	Private sector industries and companies that may be affected directly or indirectly affected by the proposed Project and its activities.	■ TBD
Potentially affected communities/groups	Communities may be directly or indirectly affected by the proposed Project and its activities. These communities need to be made aware of the Project's schedule and its planned activities as well as of the potential benefits that will come in the form of employment and Community Investment or CSR if applicable.	■ Communities living in the settlements in the AoI.
Vulnerable groups	Vulnerable groups may be affected by the Project by virtue of their social or economic standing, limited education, lack of employment or access to land.	■ Very poor households ■ Vulnerable groups living in the settlements in the AoI ■ Women and female-headed households ■ Unemployed youth ■ Elderly and orphans ■ Disabled persons ■ Children
Media	Local, regional, and federal level media will typically have a higher level of influence over the Project and may be leveraged to influence local stakeholders' perceptions of the Project.	■ Mainstream media companies (local and international)

5.4 Approach and Methods of Stakeholder Engagement

Below is a summary of the approaches and strategies adopted throughout the stakeholder consultation exercise.

5.4.1 Mobilization

- **Introduction letters:** MoEM provided the ESIA consulting team with official letters of introduction informing relevant stakeholders about the proposed project, introducing the ESIA consulting team, informing about the planned consultation activities and requesting them to support the consultants wherever possible.
- **Mobilisation through local administration:** MoEM and the ESIA consulting team visited the offices of the local administrators and informed them about the proposed project and the upcoming consultation activities. Other than information sharing, these meetings were aimed at requesting the administrators to further mobilise the concerned stakeholders. Local administrators consulted included district and village administrators.
- **Confirmation of appointments:** Prior to the appointment dates, the ESIA consultant reconfirmed the appointments by contacting the focal persons at each venue at least one day prior to the meeting to verify whether the proposed schedule was still valid for the expected audience.
- **Household Interviews and Public Meetings Undertaking interviews:** The ESIA consulting team undertook household interviews as part of the socio-economic survey and administered questionnaires to sampled households along the transmission line, including Focus Group Discussions, public meetings, and key informant interviews. Tables 5-2, 5-3 and 5-4 provide summaries of dates, venue of public consultations and number of stakeholders consulted. Annex A contains list of participants consulted during the public meetings.

5.4.2 Baseline Phase Stakeholder Engagement

Engagement as part of the ESIA process was conducted during the field survey from January 10th-30th March 2024 and was led by EMC Team. The purpose of the field survey was:

- Briefly present the Project to stakeholders.
- To collect specific socio-economic data at the local level to the extent available and at the district and village levels;
- Document stakeholder opinions, questions, concerns, and expectations to assist in defining the terms of reference and inform the scope of the ESIA.

As part of the engagement process meetings were held with the national, regional, district and villages level administration representatives to disclose basic Project information and collect feedback on the Project and request baseline data. Meetings held in Hargeisa during that same time frame focused on national level stakeholders and included central ministry offices and relevant agencies, while data collection activities at the regions and districts focused on regional and district offices, and at the village level the focus was on village government representatives and local community members. At the village level, the social baseline data collection meetings were conducted as individual meetings with relevant government ministry representatives (i.e. administrators) and community members (i.e.

farmers, pastoralists) etc. At the start of every meeting, a high-level introduction about the Project and the ESIA process was provided to inform stakeholders. It was followed by a discussion on various topics, including but not limited to: community health, infrastructure and public services, livelihoods (agriculture), employment, worker issues, gender issues, cultural change, health and education, recommendations and opinions from those stakeholders met and a review of the follow-up data collection actions agreed.

Table 5-2. National Level Stakeholder Consultations

DATES	VENUE	NO. OF PARTICIPANTS	NO. OF MALES	NO. OF FEMALES
10 th January 2024	Director of Energy Department, MoEM	1	1	0
10 th January 2024	Ministry of Employment, Social Affairs and Family	1	1	0
11 th January 2024	Ministry of Agriculture Development (MoAD)	1	1	0
09 th January 2024	Ministry of Environment and Climate Change	1	1	0
13 th January 2024	National Energy Commission	2	2	0

Table 5-3. Regional Level Stakeholder Consultations

DATES	VENUE	NO. OF PARTICIPANTS	NO. OF MALES	NO. OF FEMALES
9 th January 2024	Municipality of Hargeisa; Director of Disaster Risk Management and Social Affairs.	1	1	0
9 th January 2024	Gabiley Municipality Social Service Director	1	1	0

Table 5-4. Village Level Stakeholder Consultations

DATES	VENUE	NO. OF PARTICIPANTS	NO. OF MALES	NO. OF FEMALES
14/01/2024	Community in Idinka Deerayahan	23	17	6
15/01/2024	Community in Burcadda Village	16	10	6
18/01/2024	Community in Haamas Village	18	11	7
13/03/2024	Community - Laaya Village	20	16	04
13/03/2024	Community - Sheikh Mohamed Yare Village	24	19	05
13/03/2024	Community - Dhagahyo-Ad Village	32	21	11
13/03/2024	Community - Godka Village	21	13	08
14/03/2024	Community - Magaalo-Hoodaal Village	30	17	13
14/03/2024	Community - Tin'ad Village	27	16	11
14/03/2024	Community - Da'arta Village	21	11	10
16/03/2024	Community - Lafta Faraweyne Village	18	15	03
16/03/2024	Community - Aw Barre Village	20	11	09
17/03/2024	Community - AW-Barkhadle Village	14	11	03
17/03/2024	Community - Da'arbudhuq Village	27	20	07

17/03/2024	Community - Xabaalo Tumaalood Village	17	06	11
18/03/2024	Community - Sheikh Moodhle Village	22	16	06
18/03/2024	Community - Shirwareen Village	21	12	09
19/03/2024	Community - Jibaaqe Village	14	09	05
20/03/2024	Community - Galoole Village	21	13	08
20/03/2024	Community - Maadh-Yaal Village	18	13	05
21/03/2024	Community - Markazka-Burcada Yar	21	16	05
23/03/2024	Community - Lafaruug Village	33	20	13

The comments and concerns raised by the community during stakeholder consultation and the responses given by both the consultants and the client are highlighted table 5-5 below.

Table 5-5. Stakeholders Summary of Concerns

Theme	Comments and Issues	Response
Employment	Community members inquired whether there will be employment opportunities and what would be the criteria for gaining access to such opportunities. They decried an ongoing pattern of contractors hiring persons who don't reside in their localities to carry out tasks that locals are capable of doing and requested that, in this project, they be given first priority whenever employment opportunities arise. Female participants were especially concerned that they would not be given opportunities to work in the project because of societal perceptions that they are physically weak and are exclusively responsible for domestic affairs. In addition to this, they foreshadowed possibility of rise in incidences of children dropping out of school to take up paid labour in the project.	The consultants informed stakeholders that they have incorporated the development of a Community Engagement Plan and a Labour Recruitment Plan in the ESIA. These plans will cover all employment issues ranging from recruitment, dismissal, hours of work, non-discrimination, child labour, fair remuneration and grievance management. Stakeholders were however cautioned that where specialist skills are required for the project and the skills are not locally available, specialist would be hired from other jurisdictions through a competitive process.
Land Use and Compensation	The members noted that they would incur loss of land and property since residents may be required to relocate. They noted that relocation would interfere with their	The community was informed that a RAP study will be commissioned and will be conducted and implemented in accordance with World Bank Standards and national legislation.

	economic affairs and separate them from their kin. They inquired about the land acquisition process, timelines for compensation, persons entitled to compensation and the amount of money to be paid.	This will ensure that all affected persons are compensated in a fair and timely manner. Compensation will be done following proper identification of affected persons and thorough valuation of their assets. They were further informed that the RAP process would incorporate grievance-handling mechanism to settle any disputes that may arise.
Waste Generation	Stakeholders were concerned about waste generation and methods of waste disposal during project implementation.	The consultants informed community members that the ESIA report will recommend that a waste management system be put in place; Waste will also be handled and transported by certified waste handlers.
Social impacts	It was a concern of the community members that the proposed project will increase the population in the project area and its surroundings which could lead to socio-cultural diversification and cultural contamination. There were fears that with the increase in population, there will be an increase in the spread of HIV and AIDS, teenage pregnancies, drug and alcohol abuse and prostitution. Further they stated that enhanced economic status particularly among the women and youth would lead to increased occurrences of SGBV. Concerns were also raised about competition for limited resources due to population influx. This would particularly manifest in inadequate housing and shortage of water supply.	The consultants and the clients' team informed the community that it will put in place sufficient safeguards to mitigate such incidences through for instance, developing and implementing a grievance redress mechanism; putting in place a sexual harassment policy and a HIV/AIDs prevention and awareness plan. The proponent will also work closely with other government agencies, in particular law enforcement and social protection offices to manage project-related incidents. GBV (SEA and SH) resulting from project operations will be managed in line with the GBV Action Plan that will be prepared and will apply the principle of survivor centered approach. The project will facilitate survivor/guardians to access referral pathways that they wish to access, such as legal, police, counselling services etc., which the project is expected to map as part of GBV management.
Flora and Fauna	Loss of protected forests/conservation areas/rare plants	Identify vegetation that will need to be removed/protected; Remove identified trees in such a way as to minimise damage to surrounding vegetation; Ensure the construction crew is aware remaining vegetation must not be touched or damaged; Avoid installation of the transmission line through vegetation areas; compensation in accordance with RAP; Preserve valuable habitats and important trees along the high-power transmission lines, discussion with clan leaders

Health and Safety Issues	The stakeholders were concerned that there would be electromagnetic radiations and risk of electrocution that may affect those residing near the way leave. Some community members were wary of the presence of the high-voltage wires in their immediate environment, due to perception that it causes cancer	The team informed the community that possible health hazards will be mitigated using up to date state of the art technologies and measures will be put in place to ensure health and safety measures are observed at all times through the development and operation of the project. They were reminded that in such projects, the proponent is always required to develop and implement a community health and safety plan and the proponent has been informed to do so through the ESIA.
Aviation Risks	Hazards to low flying aircrafts	The proposed project must be installed based on the rule and regulation of civil aviation authority and smaller air strips have to be identified and considered during the installation of the high-tension power with its future expansion. The transmission line route is not close to any airport or airstrip.
Noise and Vibration	Questions concerning potential air and sound pollution arising from excessive noise and vibration also arose from community members	The Consultants informed the stakeholders that the project will be using up to date technologies to improve efficiencies to reduce noise and vibrations and further mitigation measures will be recommended in the ESMP.
Air Pollution	Some of the stakeholders feared that the project will generate emissions and generate dust leading to air pollution.	The consultants informed the members that the project will be using up to date technologies to improve efficiencies to reduce emissions and mitigation measures will be put in place to reduce emissions in line with national air quality regulations and international best practice.
Water Quality	The community raised concerns on impact of the project on water quality. They stated that water resources may be contaminated by project waste rendering it unfit for human consumption. They were also concerned about over abstraction during project implementation.	The consultants informed the community that the ESIA will propose that a waste management system be put in place. Stakeholders were also informed that the project had taken into account the estimated water usage for the project and made plans for alternative water sources to ensure adequacy of water for the project without depleting local resources.

5.5 ESIA Disclosure and Consultations

This ESIA Report will be disclosed to the stakeholders and the public both in electronic form and as hardcopies. The availability of the ESIA report for public consultation will be announced in due course so that stakeholders have time to review the documents before being invited to provide feedback and/or attend disclosure meetings.

This ESIA study report will be disclosed in accordance with the country's disclosure requirements as well as WB's disclosure standards described in ESS 10. The report upon approval by FGR and Republic of Somaliland will be disclosed on MoEM website, as well as on the World Bank's external website. Hard copies will also be made available at the Contractor's office, district, and village administration offices. Summaries of the ESIA will be disclosed to PAPs in culturally appropriate languages and formats using feasible engagement techniques such as FGDs and public barazas, in accessible locations and in a timely manner that ensures meaningful consultations and considering any mobility, literacy and disability challenges.

Figure 5-1. Stakeholder Consultations



5.5.1 Considerations for Future Stakeholder Engagement

The stakeholder engagement programme is designed to cover all phases of the Project. The general objectives of stakeholder engagement under this SEP are as outlined in table 5-6 below.

Table 5-6. Future Stakeholder Consultations

Phase 0 Permitting and Preparation phase (ongoing)	Phase 1 Site Preparation Construction Pre commissioning and Commissioning	Phase 2 Operations and Maintenance	Phase Decommissioning
Obtain licences and permits (including ESIA approval) Initiate actions to obtain the social license to operate the Project. Establish a Grievance Mechanism Manage the recruitment process of local workforce	Update stakeholders on Project progress. Address any grievances. Renew licenses and permits as required. Maintain the social license to operate the Project. Sustain peaceful working relationships with stakeholders	Update stakeholders on Project progress. Address any grievances. Renew licenses and permits as required. Maintain the social license to operate the Project. Sustain peaceful working relationships with stakeholders	Update stakeholders on decommissioning works and progress in schedule. Address Project decommissioning related grievances. Understand requirements from authorities. Manage the retrenchment process.
Appointment of the CLO Grievance procedure establishment Disclosure of ESIA and Project activities to stakeholders Engage around ESMP development	Site presence of CLO and regular engagement Maintain grievance procedure. Maintain stakeholder register. Define and implement mutually agreed in country value and social investment programs	Manage the retrenchment process during transition from construction to operations. Site presence of CLO and regular engagement Engagements related to transition from Phase 1 to Phase 2 Maintain grievance procedure. Maintain stakeholder register Implement	Site presence of CLO and regular engagement through engagement tools Engagements related to retrenchment. Maintain grievance procedure. Maintain stakeholder register.
Project design and planning Tendering ESIA approval process Permitting process	Facilities construction, transmission line and equipment and personnel mobilization.	Operations of the substation, and transmission lines	Hand over or decommissioning of facilities. Reinstatement and restoration Exit audits

Note: The social license to operate refers to the level of acceptance and (informal) approval by local stakeholders and communities where the Project operates. This does not consist in any formal permitting document.

Specific planning and engagement activities will be necessary at each Project phase. These are presented in Project's Stakeholder Engagement Plan—in Appendix B. The activities that will be ongoing throughout the entire Project cycle and are therefore common to the different phases include the following:

- Regular update of the Non-Technical Summary (NTS) as the Project moves forward and activities, schedules and milestones evolve.
- Regular update and revision of the stakeholder register including stakeholder analysis and re- evaluation as necessary throughout the different Project phases.
- Addressing comments, questions, and grievances regularly and through appropriate channels, and issuing information to stakeholders. This includes regular refreshers to stakeholders about the Grievance Mechanism and related processes.
- Regular reporting to the different stakeholders as appropriate.
- Regular Project Monitoring reports.

5.6 Grievance Redress Mechanism

Grievance redressal is a critical component of effective ESMP implementation. The purpose of GRM is to provide a forum to the internal and external stakeholders to voice their concerns, queries, and issues with the project. Such a mechanism would provide the stakeholders with one project personnel or one channel through which their queries will be channeled and will ensure timely responses to each query. This will allow for trust to be built amongst the stakeholders and prevent the culmination of small issues into major community unrest. The GRM will be accessible and understandable for all stakeholders in the project and for the entire project life. The GRM will be communicated to all relevant stakeholders and will also be applicable for any contractor that will occupy and/or use land during the construction and operations phase.

The World Bank's Environment and Social Framework require Grievance Mechanisms to provide a structured way of receiving and resolving grievances. Complaints should be addressed promptly using an understandable and transparent process that is culturally appropriate and readily acceptable to all segments of affected communities and is at no cost (except legal redress through courts) and without retribution. The mechanism should be appropriate to the scale of impacts and risks presented by a project and beneficial for both the company and stakeholders. WBG standards require that PAPs and other stakeholders be informed of the rights that they have to know and access at no cost, other administrative redress mechanisms such as the World Bank Grievances Redress Service and the World Bank Inspection Panel. The mechanism must not impede access to other judicial or administrative remedies. This section contains the following:

- Grievance definition and categories and GRM principles; and
- The process of receiving, documenting, addressing, and closing grievances.

5.7 Grievance Definition/Categories

As stated earlier, a grievance is a concern or complaint raised by an individual or a group within communities affected by company operations. Both concerns and complaints can result from either real or perceived impacts of a company's operations and may be filed in the same manner and handled with the same procedure. Grievances may take the form of specific complaints for actual damages or injury, general concerns about project activities,

incidents and impacts or perceived impacts. Based on the understanding of the project area and the stakeholders, an indicative list of the types of grievances have been identified for the project, as can be seen below: -

Internal Grievances: Grievances from employees (including both direct and indirect employees, including local workers and migrant workers through contractors):

- Complaints pertaining to amount of wage, salary, other remuneration or benefits as per Company's human resource policy
- Gender discrimination
- Workplace sexual harassment.
- Violence against children (e.g., child labour)
- Issues related to workers organization
- Labour Accommodation
- Health and Safety issues; and
- Extended working hours.

External Grievances: Grievances from community members:

- Issues related to sexual exploitation and abuse by project workers against community members
- Issues related to gender-based violence at the community-level, e.g. domestic violence;
- Issues related to child labour and protection
- Issues related to transportation and traffic
- Increase in environment pollution
- Impact on community health
- Disturbances to locals due to influx of migrant workers in the area
- Issues arising out of sharing of employment and business opportunity; and
- Concerns over the impact on local cultures and customs.

The list of grievances will be regularly updated as and when the new one arises.

5.7.1 Project Grievance Mechanism

During consultations, it was revealed that the client will hire a Community Liaison Officer (CLO) who will serve to meet all community liaison responsibilities. The CLO will assist the contractor social specialist in grievances management, (the bidding documents will reflect these requirements). The grievance mechanism will be advertised and announced to affected stakeholders so that they are aware of their rights to submit comments and how to go about it. The grievance mechanism will be founded on the following principles:

- Responsibilities will be adequately assigned: A responsible person or team will be constituted and mandated to organise the resolution of grievances. This will enable the system run without undue impediments.
- The process will be accorded due importance: It is important for affected communities and other stakeholder groups seeking to have their complaints resolved, to perceive the grievance management process as transparent and fair. The grievance management process will enhance outcomes and give people satisfaction that their complaints have been heard, even if the outcome is less than optimal.

- The grievance procedures will be readily understandable, accessible, and culturally appropriated by the local population. From the outset, clarification will be made on who is expected to use this procedure. The people will be assured that there will be neither costs nor retribution associated with lodging a grievance. The entire process (from how a complaint is received and reviewed, through to how decisions are made and what possibilities may exist for appeal) will be made as transparent as possible through good communication.
- The mechanism will be scaled as needed for the Project: The grievance mechanisms will be designed to fit the context and needs of the project. As much as possible, it will have relatively simple means of addressing complaints, such as through community meetings, community liaison personnel and suggestion boxes allowing for anonymity. It may also need a more formalized process and mechanism, and a higher level of dedicated resources for receiving, recording, tracking, and resolving complaints. The grievance mechanisms will not be taken as a substitute for community engagement process or vice-versa. The two are complementary and will be made mutually reinforcing. Not all grievances shall be handled in the same way.
- The process will be documented and publicized: The process will be put in writing and publicized. MoEM-PIU and EAPP-PIU recognizes that the GRM cannot be effective if nobody knows about it. Thus, the grievance procedures will be put into writing, publicized, and explained to relevant stakeholder groups. The people will be informed on where to go and whom to talk to if they have a complaint and understand what the process will be for handling it. As with all information, it will be provided in a format and language readily understandable to the local population and/or communicated orally where it's established that literacy levels are low. It will not be overly complicated to use, nor will it require legal counsel to complete.
- The process will be made accessible: Projects that make it easy for people to raise concerns and feel confident that these will be heard and acted upon can reap the benefits of both a good reputation and better community relations. One of the best ways to achieve this is to localize your points of contact. Hire people with the right skills, training, and disposition for community liaison work and get them into the field as quickly as possible. Maintaining a regular presence in the local communities greatly helps to personalize the relationship with the company and engender trust. Talking with a familiar face who comes to the village regularly, or lives nearby, creates an informal atmosphere in which grievances can be aired and sorted out, or referred up the chain of command. This is usually more convenient and less intimidating to people than having to travel distances to the company offices during business hours to file a formal complaint.
- Response time will be defined, and transparency upheld: MoEM-PIU and EAPP-PIU will publicly commit to a certain time frame in which all recorded complaints will be responded to and ensure this response time is enforced. This will help allay frustration by letting people know when they can expect to be contacted by MoEM-PIU and EAPP-PIU personnel and/or receive a response to their complaint. Combining this with a transparent process by which stakeholders can understand how decisions are reached will inspire confidence in the MoEM-PIU and EAPP-PIU system. During critical times such as construction, there will be immediate responses to time-sensitive complaints. A related issue is making sure that the community liaison officer has the

authority to resolve basic complaints herself, as well as a direct reporting line to senior managers if the issue is more serious or costly to address.

- Good record-keeping and feedback: a grievance logbook will be kept where necessary, and a sophisticated database will be maintained where required. Written records of all complaints will be kept as this is critical for effective grievance management. The record shall contain the name of the individual or organization; the date and nature of the complaint; any follow-up actions taken; the result; and how and when this decision was communicated to the complainant. Overly personal data such as national identity and phone numbers will be optional and kept confidential unless required to disclose to authorities. In addition to informing the complainant of the outcome (in writing where appropriate), as part of the broader community engagement process MoEM-PIU and EAPP-PIU will report back periodically to communities and other stakeholder groups as to how the company has been responding to the grievances it has received.
- There will be a separate reporting and documentation mechanisms for GBV (SEA and SH) cases that are discrete and anonymous. The MoEM-PIU and EAPP-PIU Community Liaison Officer (CLO) will be the focal point and will establish the system to handle these complaints that will include reference to confidentiality, safety, and survivor- centred approach. All registration of the data will be confidential and anonymized. MoEM-PIU and EAPP-PIU will recruit a CLO with experience in community engagement and liaison as well as GBV-SEA/SH management. The CLO will assist MoEM and EAPP-PIU's social specialist in GBV-SEA/SH management. Access to legal remedies will not be impeded: If the project is unable to resolve a complaint, it may be appropriate to enable complainants to have recourse to external experts. These may include public defenders, legal advisors, or NGOs. The client may find that it can work in collaboration with these third parties and affected communities to find successful resolution of the issues. However, this is not always possible, and situations may arise where complainants will choose to pursue legal recourse. In this case, MoEM-PIU and EAPP-PIU will not impede access to these mechanisms.

5.7.1.1 Maintaining a Grievance Register

Each grievance thus received, shall be recorded in a grievance register. The format for the grievance register shall be as follows.

Table 5-7. Sample Grievance Recording Form

Date	GR #	Name of Grievant	Ward/Village	Grievance Details	Concerned Department	Name of Recording Person	Present Status	Remarks

This grievance register shall be updated at each stage of the grievance redressal. Once the grievance is recorded in the register, a preliminary analysis shall be undertaken by the Community Liaison Officer to ensure that the grievance is within the scope of the GRM. The process to be followed for the redressal of the external stakeholder grievances is summarized below.

5.7.1.2 Publicizing and Disclosure of the GRM

The GRM and other project-specific management plans will be disclosed to PAPs in culturally appropriate languages, formats, and techniques (e.g., FGDs, public barazas etc.) and considering any disability, mobility and literacy challenges in a timeframe that ensures meaningful consultations.

5.7.1.3 Receiving and Recording Grievances

As part of the GRM, the grievances from the stakeholder or their representatives may be communicated verbally (in person or over a telephonic conversation) or in written form (in the format given below) to the project representatives or to the CLO directly. If the grievance is received directly by the CLO or other project representatives, it will be recorded directly into the Grievance Form as soon as the personnel return to site. A sample grievance form is as follows.

Table 5-8. Sample Grievance Recording Form

GRIEVANCE REGISTRATION	
CASE No.	DATE
Name	
Department/Contractor Name	
Phone Number	
Details of Grievance	
Name of Person Recording Grievance	
Designation of Person Recording Grievance	
Proposed Date of Response to Grievance	
Signature of Recording Person	Signature of Complainant
GRIEVANCE REDRESSAL RESPONSE	
Date of Redress	
Decision of CLO (Give full details)	

All project staff and community members will be informed that they must pass all grievances, communications to the CLOs on site as soon as possible after they are received. Details of the person lodging the grievance shall be noted and passed along with the grievance. The CLO in turn will communicate all grievances to the Environmental and Social Officers for the contractor or MoEM-PIU and EAPP-PIU. For assisting the communication of grievances, a register will be maintained at the project office at which any individual/group can come have their complaint registered. Village leaders and government departments will also be advised to pass any complaints they receive to the site level community liaison officer.

5.7.1.4 Maintaining a Grievance Register

Each grievance thus received, shall be recorded in a grievance register. The format for the grievance register shall be as follows. This grievance register shall be updated at each stage of the grievance redressal. Once the grievance is recorded in the register, a preliminary analysis shall be undertaken by the social officer to ensure that the grievance is within the scope of the GRM.

5.7.1.5 Acknowledgment of Grievance

Upon the completion of the recording of the grievance, the stakeholder will be provided with an acknowledgment of the receipt, along with a summary of the grievance.

Sample Acknowledgement Receipt for Claimant

This receipt is acknowledgement of grievance registration by _____, resident of village _____ on date _____ His case number is _____ and the date for response is _____ Full name & signature of recording person _____

In case the grievance is assessed to be out of the scope of the GRM, a communication towards the same shall be made to the grievant, and an alternative mode of redressal shall be suggested.

5.7.1.6 Site Inspection and Resolution

For the purpose of verifying and resolving the grievances received, site inspection may not be required in all the cases. Depending upon the sensitivity of the issue, requirement of a site inspection will be identified. Site inspection will be undertaken by the site level community liaison officers, or the project member assigned by the contractor's Environment and Social officer. The purpose of the site inspection will be to check the validity and severity of the grievance. For this purpose, the personnel may also undertake discussions with the concerned external stakeholder. The inspection will be undertaken within ten days of receiving the grievance. The assigned individual will then work with other relevant members of the Project team to investigate the problem and identify measures to resolve the grievance as appropriate. The personnel to be involved in the grievance resolution shall be dependent upon the nature of the grievance.

5.7.1.7 Resolution, Escalation, and Closure

Based on the understanding thus developed, the CLO, in consultation with the concerned departments, shall identify a suitable resolution to the issue. This could involve provision of information to clarify the situation, undertaking measures to remedy actual problems or compensate for any damage that has been caused either by financial compensation or compensation in-kind, and introduction of mitigation measures to prevent recurrence of the problem in the future. This resolution shall be accordingly communicated to the grievant within 10 working days of completing the site investigation.

5.7.1.8 Update of Records

The records of the grievance register shall be updated every working week with the present status of the grievance. Once the grievance is resolved, and the same has been

communicated to the grievant, the grievance shall be closed in the grievance register. The grievance register should also provide an understanding of the manner in which the grievance was resolved. These instances shall then serve as references for any future grievances of similar nature.

5.7.1.9 GBV (SEA/SH) GRM

There will be a separate reporting and documentation mechanisms for GBV (SEA and SH) cases that are discrete from the standard GRM, that will be utilized by survivors or their representatives, to ensure all GBV cases are reported and handled confidentially. PAPs and all workers/staff will be made aware of these mechanisms through awareness sessions and staff inductions respectively. MoEM's Social Expert supported by the Social Expert from the contractor's end will be the focal point and will establish the system to handle these complaints that will include reference to confidentiality, safety, and survivor-centered approach. All registration of the data will be confidential and anonymized.

5.7.1.10 GRM Monitoring and Implementation

It is important to monitor GRM to ensure that the grievances are addressed and resolved. The monitoring of the GRM implementation will be undertaken on a monthly basis by the MoEM-PIU and EAPP-PIU team. Monitoring will include:

- Auditing the implementation of the GRM
- Monitoring the formal and informal consultation activities conducted with the stakeholder groups with respect to GRM.
- Tracking feedback received from engagement activities.
- Recording and tracking commitments made to communities; and
- Assessing the efficacy of the engagement activities in terms of the desired outcomes and the participation of the stakeholder groups.

5.7.1.11 GRM Reporting

The performance of the GRM will be reviewed on a quarterly basis during the implementation period. For the purpose of review, the quarterly reports will be considered for analysis and discussion. On the basis of these reports, a Grievance Redressal Report will be prepared.

5.7.2 External Grievance Mechanism

5.7.2.1 World Bank Grievance Redress Service

If individuals or communities believe a World Bank-supported project is, or could be, negatively impacting them, they can raise their concerns through the project's GRM or the World Bank's Grievance Redress Service (GRS). The GRS is designed to enhance accountability and ensure that grievances are reviewed and resolved quickly. For details on how to submit a complaint to the World Bank's GRS, visit: [World Bank Grievance Redress Service](https://www.worldbank.org/grs).

Anyone who feels impacted by a World Bank project can file a complaint. These complaints must be submitted in writing and sent to the GRS. Here's where to send them:

- Online through the GRS website at www.worldbank.org/grs

- Email at grievances@worldbank.org
- Letter or hand delivery to any World Bank Country Office
- Letter to the World Bank Headquarters in Washington at The World Bank Grievance Redress Service (GRS) MSN MC 10-1018 1818 H St NW Washington DC 20433, USA.

5.7.2.2 World Bank Inspection Panel

The Inspection Panel is an independent body that allows people and communities to raise concerns if they believe a World Bank-funded project has harmed or may harm them. The Panel isn't part of the World Bank's management or staff—it's impartial and reports directly to the Board. The goal of the Inspection Panel is to ensure accountability, give affected people a stronger voice in World Bank-supported activities, and provide remedies when necessary. The Panel reviews projects to determine if the World Bank has followed its own operational policies and procedures, which are designed to deliver social and economic benefits while avoiding harm to people or the environment. For more information about filing a complaint with the Inspection Panel, visit: <https://www.inspectionpanel.org/how-to-file-complaint>

6 ANALYSIS OF PROJECT ALTERNATIVES

This chapter describes the analysis of technically and financially feasible alternatives considered in the development of the Project and provide documentation of the rationale for selecting a particular option. The purpose of the alternatives analysis is to identify feasible alternatives that could improve the sustainability of the Project's design, construction, and operation.

6.1 No Project Alternative

No project alternative is the option of not constructing the proposed power transmission line project at the identified routing. This alternative would result in no environmental and social impacts in the project area. Whilst this would without doubt result in complete avoidance of impacts, this needs to be balanced with the strategic need for the development of new electricity generation capacity in Somaliland.

The no project alternative is the least preferred from the socio-economic and partly environmental and social perspective due to the following factors:

- There will be no added values to the reference plot.
- There will be no added value to other establishments in the neighborhood.
- The proponent will not benefit from the revenue expected from the project.
- The government kitty will not benefit from the revenue to be earned due to the establishment of the proposed project.
- The economic status of the Somali's and the local people would remain unchanged.
- The local skills would remain underutilized.
- Reduced interaction both at local, national, and international levels.
- No employment opportunities will be created for thousands of Somalis who will work in the project.

From the analysis above, it becomes apparent that the No Project Option is no alternative to the proponent, local people, and Somaliland. Subsequently, the do-nothing alternative is not a preferred alternative and will not be assessed in further detail during this ESIA phase.

6.2 Alternative Transmission Line Route

The analysis of alternatives route involved the evaluation certain sensitivities associated with the various options. Table 6-1 below summarizes the sensitivity criteria used for the alternative analysis. Each sensitivity aspect was assigned a score, and the score was used as a basis for comparison between options.

Table 6-1. Route Selection Criteria

#	Bio-Physical and Social Considerations
1	Criteria-4: An overhead line route must avoid or minimise impact on visual or historically sensitive areas.
2	Criteria-5: Where possible, conflicts with residential, commercial, and industrial land use such as settlement dwellings, residential, business and airport zones must be avoided. The selected line route must deviate from settlement areas and cultivated areas.

3	Criteria-6: An overhead line must minimize impact on significant cultural resources i.e. protected areas, heritage sites, ethnographic and archaeological sites.
4	Criteria-7: As far as possible, the selected route must avoid or deviate from commercial areas i.e. areas of potential urban, tourist or recreational development.
Engineering Consideration	
1	Criteria-8: Line length and constructability issues must be considered during the line route selection process
2	Criteria-9: Location of structures along steep slopes and ecologically sensitive areas such as wetlands must be avoided or minimised
3	Criteria-10: The selected line route must comply with all statutory requirements i.e. statutory requirements for crossings and clearances to infrastructure e.g. Airport zones, railways and settlement areas must be assessed.
4	Criteria-11: Where possible, major crossings must be avoided or limited i.e. roads, railways and large river and mountain crossings.
5	Criteria-12: An overhead line must be accessible for construction, operation and maintenance. Although access to all locations along the overhead line is not required, access to every structure location is necessary and must be considered during the line route selection process.
6	Criteria-13: An overhead line must maintain public health and safety
Economic Factors	
1	Criteria-14: As far as possible, the selected line route must be the shortest route possible and must have a minimum number of bend points or line angles
2	Criteria-15: Where possible, major crossings must be avoided or limited.
3	Criteria-16: A route passing through good agricultural land must be avoided.
4	Criteria-17: The route must limit required land acquisitions
5	Criteria-17: The route must limit required land acquisitions.
6	Criteria-18: The selected line route should ensure that locations of the transmission structures (and hence foundations) in unfavourable topographical areas such as rivers, wetlands or rough terrain are avoided or limited thus minimising the impact on line capital cost.
7	Criteria-19: Constructability issues must be considered during the line route selection process as capital cost will be impacted.

Table 6-2: Route Selection Criteria

Route Selection Criteria								
#	Bio-Physical and Social Considerations	Route Options			Weighting Factor	Normalised Weights		
		Option 1	Option 2	Option 3		Option 1	Option 2	Option 3
1	Criteria-4: An overhead line route must avoid or minimise impact on visual or historically sensitive areas.	1	1	1	40%	0.4	0.4	0.4
2	Criteria-5: Where possible, conflicts with residential, commercial and industrial land use such as settlement dwellings, residential, business and airport zones must be avoided. The selected line route must deviate from settlement areas and cultivated areas.	1	3	1	15%	0.15	0.45	0.15
3	Criteria-6: An overhead line must minimize impact on significant cultural resources i.e. protected areas, heritage sites, ethnographic and archaeological sites.	1	1	1	30%	0.3	0.3	0.3
4	Criteria-7: As far as possible, the selected route must avoid or deviate from commercial areas i.e. areas of potential urban, tourist or recreational development.	1	2	1	15%	0.3	0.15	0.3
					100%	1.15	1.3	1.15
Engineering Consideration								
1	Criteria-8: Line length and constructability issues must be considered during the line route selection process	1	1	3	20	0.2	0.2	0.6
2	Criteria-9: Location of structures along steep slopes and ecologically sensitive areas such as wetlands must be avoided or minimised	1	1	1	5	0.05	0.05	0.05
3	Criteria-10: The selected line route must comply with all statutory requirements i.e. statutory requirements for crossings and clearances to infrastructure e.g. Airport zones, railways and settlement areas must be assessed.	2	2	1	35	0.7	0.7	0.35
4	Criteria-11: Where possible, major crossings must be avoided or limited i.e. roads, railways and large river and mountain crossings.	1	1	1	15	0.15	0.15	0.15
5	Criteria-12: An overhead line must be accessible for construction, operation, and maintenance. Although access to all locations along the overhead line is not required, access to every structure location is necessary and must be considered during the line route selection process.	1	3	1	15	0.15	0.45	0.15
6	Criteria-13: An overhead line must maintain public health and safety	1	2	1	10	0.1	0.2	0.1
					100%	1.1	1.5	0.75
Economic Factors								
1	Criteria-14: As far as possible, the selected line route must be the shortest route possible and must have a minimum number of bend points or line angles	3	2	1	30%	0.9	0.6	0.3
2	Criteria-15: Where possible, major crossings must be avoided or limited.	1	1	1	20%	0.2	0.2	0.2
3	Criteria-16: A route passing through good agricultural land must be avoided.	1	1	1	10%	0.1	0.1	0.1

4	Criteria-17: The route must limit required land acquisitions	1	1	1	20%	0.2	0.2	0.2
5	Criteria-18: The selected line route should ensure that locations of the transmission structures (and hence foundations) in unfavourable topographical areas such as rivers, wetlands or rough terrain are avoided or limited thus minimising the impact on line capital cost.	1	2	2	5%	0.05	0.1	0.1
6	Criteria-19: Constructability issues must be considered during the line route selection process as capital cost will be impacted.	1	2	1	15%	0.15	0.3	0.15
					100%	0.5	0.7	0.55
						2.75	3.5	2.45

Route Ranking		Length of Line Route
1st	Option 1	278.8
2nd	Option 2	290.2
3rd	Option 3	271.6

Weight (Lowest impact = 1, Medium Impact = 2, Highest Impact = 3

6.2.1 Preferred Transmission Line Route/Option 3

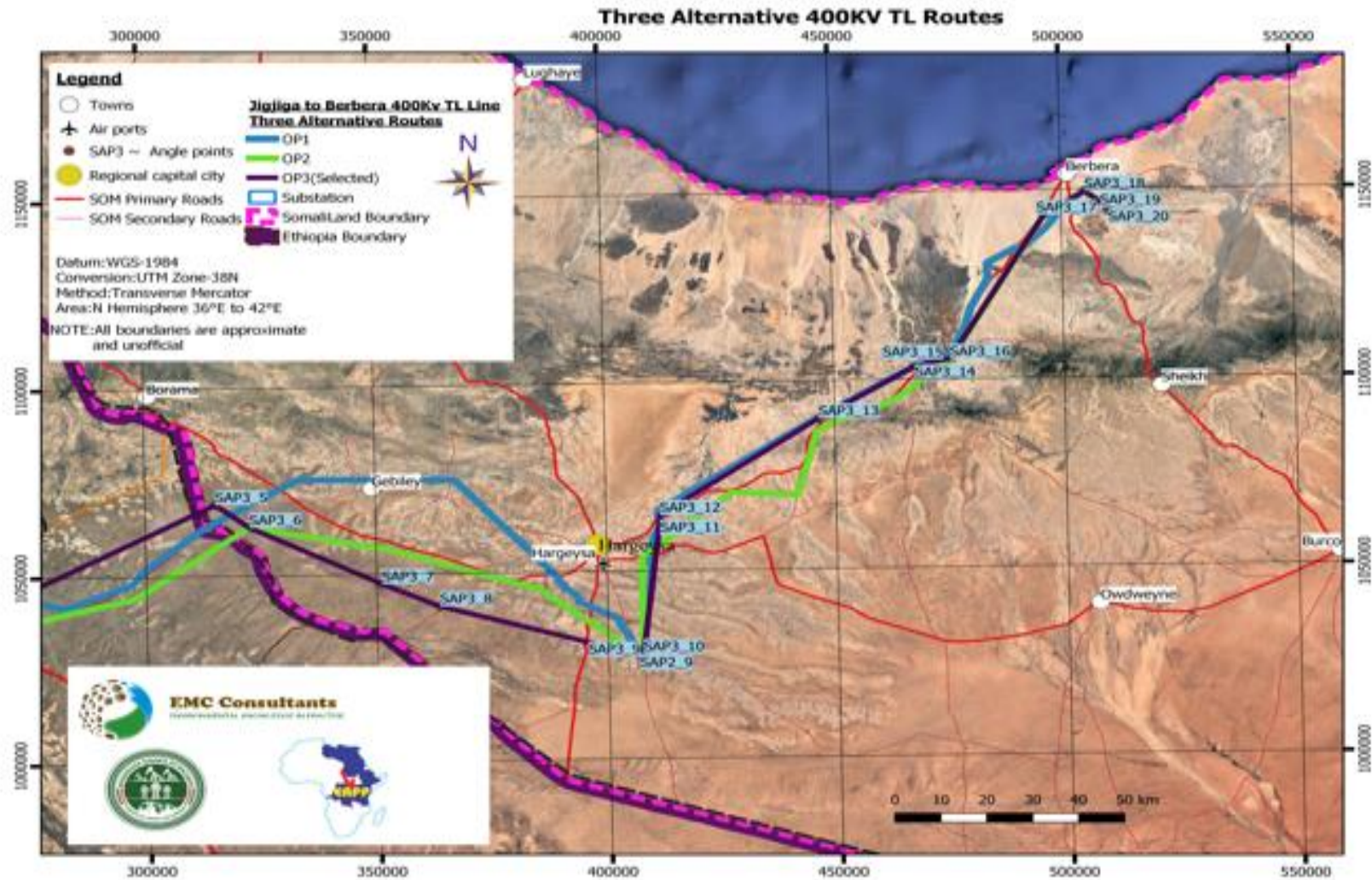
In proposing the above line route, consideration was given to the adverse social and environmental impacts of the project. The transmission line will generally follow open ground with minimum settlement to avoid areas of dense settlement and where adverse impacts on the environment and local people e.g. from loss of farmland or grazing land are minimal. The proposed route of the transmission line was selected to avoid ecologically sensitive areas such as forests, game reserves, wetlands, and hilltops etc. Therefore, there would be no added benefit of rerouting the route as all important parameters were considered in mapping the current route.

Table 6-3. Features Along Potential Transmission Line Routes

		Option 1 278.8	Option 2 290.2km	Option 3 271.6km
Aspect				
No. of Angle Points		38	25	20
Wildlife sanctuaries		0	0	0
River crossings	Main river	2	2	2
	Small river	12	4	8
Road crossings	Highway crossings	6	4	6
	Major road crossings	3	3	4
	Minor road crossings	5	6	9
Railway crossings		0	0	0

Major powerline	132 kV and 220kV	0	0	0
	220kV	0	0	0
	400kV	0	0	0
Communication line crossings		0	0	0
Wetlands (seasonal flood area)		1	2	1
Forests (area in square meters)				
Settlements	Spatial	1	1	1
	Clustered	4	4	3

Figure 6-1: Transmission Line Route Options



Source: EMC Consultants, 2024.

6.3 Alternative Construction Methods Practises

The table below, shows the different construction practices/methods that may be adopted by the contractor and the associated justification for such construction practices. The contractor will be expected to select the most appropriate methods/alternatives as needed and subject to site characteristics and cost implication.

Table 6-4: Differences in Construction Practices

N o.	Project Type	Construction Technique normally used	Alternative Methods of construction available	Reason
A. Transmission Line				
1	Tower material	Manual labour used to carry material to site of erection from the last accessible point on access road	Tower material reached to erection site by high boom cranes in hilly areas	Cost issues and status of access roads.
2	Tower foundation	Digging, reinforcement cement concrete (RCC)	Digging, casting using mechanical tools and prefabricated casts	Terrain issues and cost of erection
3	Tower erection	It is erected member by member using chain pulleys manually	Tower structure is completely erected lying on ground and then mechanically/aerially erected.	Terrain issues and cost of erection
4	Installation of Tower suspension accessories	They are erected manually by hauling the accessory using chain pulley	Tower material reached to top of erection site by high boom cranes	Terrain issues and cost of erection
5	Paying out	Manually controlled conductor drums used.	Mechanically (diesel/gas) operated conductor drums	Cost issues and lack of equipment
6	Stringing of pulling line over each stinging block for the conductor	The pilot wire is manually strung over valley in mountainous area which is attached to power cable	The pilot wire is sometimes shot using a winch or through drones.	Cost issues and lack of equipment
7	Tensioning and sagging of conductor.	Tension and sag corrected using manual winch, chain pulleys, bull wheel type pullers and other associated equipment	Mechanically operated (diesel/gas) powered pullers and tensioners to correct the tension and complete sagging operation.	Cost issues and lack of equipment

6.4 Alternative Transmission Materials and Technology

The project considered alternatives of construction materials and processes before and during the construction process where it is environmentally found to be viable. Alternatives and their advantages or disadvantages are described in table 6-5 below.

Table 6-5. Alternative Transmission Material and Technology

Type of pylon by material used	
Concrete pylon: or concrete pole, is an electricity pylon made from reinforced concrete. Concrete pylons are manufactured at the factory and put up at the power line's right of way. Concrete pylons, which are not prefabricated, are also used for constructions taller than 60 meters. This alternative was considered and rejected.	
Steel tube pylon: is a pylon, which is manufactured from a steel tube. This type of pylon is generally assembled at the factory and set up on the power line's right of way with a crane. This alternative was considered and rejected.	
A lattice steel pylon is an electricity pylon consisting of a steel framework construction. Lattice steel pylons are used for power lines of all voltages. For lines with operating voltages over 50kV, lattice steel pylons are the form of pylon used most often. Lattice steel pylon is usually assembled from individual parts at the place where it is to be erected. This makes very high pylons possible (generally up to 100 meters-in special cases even higher). This is the preferred option.	

Table 6-6. Advantages and Disadvantages of Concrete and Wooden Poles

Material	Advantages	Disadvantages
Concrete poles	-These materials cost less when compared to steel contraptions. -Will not be eroded or rot	-Likely to collapse due to loose soils -Suitable for lower voltage electricity lines -Requires heavy machinery for installation because they are heavy -Have low tensile strength and needs to be reinforced -Low ground clearance of cables
Wooden poles	-Low installation cost. -Easy to transport. -Readily available.	-Not durable due to rot and decay. -Can easily collapse.

6.5 Energy Evacuation/Transmission Alternative

Overhead energy transmission is the proposed option by MoEM to evacuate the electricity using lattice steel pylons. However, electricity can also be evacuated through installation

of underground transmission cables. The table 6-7 below shows the advantages and disadvantages of both methods and justification for selecting overhead transmission.

Table 6-7. Alternative Transmission Modes

Transmission Mode	Advantages	Disadvantages
Underground transmission cable/line	-Underground cables ensures that the aesthetic pollution associated with pylons is avoided -Ensures dangers posed by pylons such as birds strikes are avoided -Underground cables are less affected by bad weather, vandalism, and acts of terrorism -Risks of accident in construction and maintenance of the lines is reduced when using underground cables.	-Construction and maintenance on the lines is a complex undertaking -The costs of insulated cable and excavation during construction are much higher than overhead construction -Electric faults in underground transmission lines take longer to locate and to repair
Overhead transmission line	-Less civil works compared to underground transmission -Easy to repair and maintain. -Lower installation costs -Appropriate for long distance transmissions -More durable compared to underground transmission lines.	-Affected by extreme weather and may cause outages -Susceptible to lightning strikes -May interfere with flight paths and communication lines

7 ASSESSMENT OF POTENTIAL RISK AND IMPACTS

This chapter presents the assessment of the issues likely to arise as a result of implementation of the proposed project and possible mitigation measures.

7.1 Methodology For Impact Assessment

The significance of the identified impacts and risks was determined using the approach outlined in Table 7-1 below. This incorporates two aspects for assessing the potential significance; occurrence and severity, which are further sub-divided as indicated. The impact ranking was described only for the impacts post implementation of mitigation measures.

Table 7-1. Impact Classification for Impact Assessment

Occurrence	Severity
Direction	Magnitude
Probability	Geographic
Duration	Extent
Scale	Reversibility
	Frequency

1. **Direction** of an impact may be positive, neutral, or negative with respect to the particular impact (e.g., a habitat gain for a key species would be classed as positive, whereas a habitat loss would be considered negative).
2. **Probability of occurrence** is a description of the probability of the impact actually occurring as improbable (less than 5% chance), low probability (5% to 40% chance), medium probability (40% to 60% chance), highly probable (most likely, 60% to 90% chance) or definite (impact will definitely occur, 90% to 100%). Duration refers to the length of time over which an environmental impact may occur i.e., transient (less than 1 year), short-term (0 to 5 years [construction]), medium term (5 to 15 years [operational]), long-term (greater than 15 years with impact ceasing after closure of the project) or permanent.
3. **Magnitude** is a measure of the degree of change in a measurement or analysis (e.g., the area of pasture, or the concentration of a metal in water compared to the water quality guideline value for the metal), and is classified as: negligible: no measurable effect (<1%) from current conditions; low: <10% change from current conditions; moderate: 10 to 20% change from current conditions; and high: >20% change from current conditions. The categorization of the impact magnitude may be based on a set of criteria (e.g., health risk levels, ecological concepts and/or professional judgment) pertinent to each of the discipline areas and key questions analysed. Each specialist study will attempt to quantify the magnitude and outline the rationale used.
4. **Scale/Geographic** extent refers to the area that could be affected by the impact and is classified as local; site: effect restricted to the local study area; regional: effect extends beyond the local study area into the regional study area; and beyond regional: effect extends beyond the regional study area.
5. **Reversibility** allows for the impact to be described as reversible or irreversible.

6. **Frequency** may be low: occurs once; medium: occurs intermittently; or high: occurs continuously.
7. **Environmental Consequence** is defined as the overall residual consequence for each effect, and is classified as negligible, low, moderate, or high by evaluation of the rankings for magnitude, geographic extent, and duration, as highlighted below.

Impact Rating Variables

The impact rating variables was evaluated relating to the extent of the impact, timing of occurrence of the impact, intensity of the impact and probability of the impact are as explained in Table 7-2 below.

Table 7-2. Impact Rating Variables

Impact Rating	Description
Extent	An area of influence covered by the impact, if the action produces a much-localized effect within the space, it is considered that the impact is low (1). If, however, the effect does not support a precise location within the project environment, having a pervasive influence beyond the project footprint, the impact will be at location level (3) or could be Beyond County (5)
Timing:	Refers to the moment of occurrence, the time lag between the onset of action and effect on the appearance of the corresponding factor, classified in five categories from a weight of (1) implying short term to a weight of (5) implying permanent.
Intensity	Refers to the degree of impact on the factor, in the specific area in which it operates, ranked from low (1) to high (5).
Probability	Refers to the likelihood of the impact occurring during the project implementation, this is also ranked as probable to highly probable.

Impact Severity

Impact severity was determined based on the capacity of the receptor to sustain shocks triggered by the impact. In this regard the impact severity could be termed as negligible, low, medium, or high as summarized in Table 7-3 below.

Table 7-3. Impact Severity

Sensitivity	Definition (considers duration of the impact, spatial extent, reversibility, and ability to comply with legislation)	Colour Connotation
High	Vulnerable receptor (human or ecological) with no capacity to absorb proposed changes or no opportunities for mitigation.	
Medium	Vulnerable receptor (human or ecological) with limited capacity to absorb proposed changes or limited opportunities for mitigation.	
Low	Vulnerable receptor (human or ecological) with some capacity to absorb proposed changes or moderate opportunities for mitigation	
Negligible	Vulnerable receptor (human or ecological) with good capacity to absorb proposed changes or and good opportunities for mitigation	

For the purposes of this project geographic scale has been defined as follows:

- Local site: restricted to the site; meaning the actual site and immediately adjacent area, including the worker's area the site

- Regional: effect extends beyond the local study area into the region; meaning generally the project area and the geographic extent beyond; and
- Beyond regional: effect extends beyond the region to trans-boundary.

For effective impact identification, the environment characteristics will be assigned weights based on the severity of environment impacts (Leopold, 1971) as detailed in Table 7-4 on below.

Table 7-4. Impact Rating Criteria for Environment and Social Risks

Extent		Duration		Intensity		Probability		Weighting Factor (WF)		Severity Rating (SR)		Mitigation efficiency	
Foot print	1	Short term	1	Low	1	Probable	1	Low	1	Low	0-19	High	0,2
Site (1km radius)	2	Short to medium	2			Possible	2	Low to Medium	2	Low to Medium	20-39	Medium to High	0,4
Location	3	Medium term	3	Medium	3	Likely	3	medium	3	medium	40-59	medium	0,6
Sub County	4	Long term	4			Highly likely	4	Medium to high	4	Medium to high	60-79	Low to medium	0,8
Beyond County	5	Permanent	5	High	5	High	5	High	5	High	80-100	low	1,0

7.1.1 Bird Survey Methodology

Field surveys were done using methods including fixed-point counts, general encounter surveys, and visual identification and bird call identification (See section 4.2.4). The surveys were focused as follows:

- **Desktop Assessment:** Exhaustive database and detailed literature searches and a literature review of available literature and GIS information on avifauna that may occur within the Project areas and determine the conservation significance (of species identified) at a local, regional, and international level, including identification of endemic species.
- Walkover surveys and fixed-point counts done within the Area of Interest (AOI), to determine bird presence and use of these areas.
- Fixed point surveys undertaken in order to understand migratory bird use and confirm the predictions of the Critical Habitat Assessment
- Data from targeted bird surveys supplemented with incidental observations from surveys targeting other taxonomic groups.
- **Vantage Point Surveys:** -were done at the location of the proposed routes of transmission lines to gather data for collision and bird strike risk.
- **Opportunistic encounters** were recorded
- **Local Knowledge and Consultations:** Interviews with key informants and locals were done to gain an understanding of what species are in the area.

7.1.2 Bat Survey Methodology

The principal survey methods used for survey bats in the Project areas are outlined as follows:

- **Desktop assessment:** Exhaustive database and detailed literature searches and a literature review of available literature and GIS information on bats that may occur within the Project areas and determine the conservation significance (of species identified) at a local, regional, and international level, including identification of endemic species.
- **Searches:** - Daytime searches for roosting bats was undertaken in the study site in areas bats are likely to roost
- **Local Knowledge and Consultations:** Interviews with key informants and locals was done to gain an understanding of what species are in the area.

7.2 Beneficial Impacts

Stimulation of Local Economies: Construction and operation of the transmission infrastructure will result in significant short-term employment for laborers, engineers, and others in the area where the infrastructure is being built. Workers who build the power line will require support services (food, lodging, and other services) and will attract and provide employment for community of vendors and others to serve those working on the project.

Reduction in Fuel Costs: The interconnector between Ethiopia and Somaliland will offer opportunities to reduce generation fuel costs per unit of electricity delivered to Ethiopia by allowing generating plants with low fuel costs to be connected to loads, and also by allowing plants with low fuel costs to run more by presenting a flatter demand load curve.

Avoided Generation Capacity Costs: The interconnection will lead to avoidance of costs related to new generation. Somaliland will reduce generation capital costs can through the interconnection as a result of power imports, through reduction in power plant siting costs, through economies of scale in generation, through flattening of the load curve and related capacity trade-offs between countries, and through reduction in required reserve margin. The grid interconnection will result in reduced capital costs of electricity generation capacity by displacing the need for new domestic capacity in an electricity importing country.

Reduced Operations Costs: Besides costs saving in fuel and/or capital costs other costs include savings in variable operating costs—costs that vary with the amount of electricity produced, and fixed operating costs, which vary (at least somewhat) with the amount of generating capacity, but not with the amount of generation in any given year.

Reduced Transmission System Improvements Costs: The interconnector will reduce national investments in transmission system improvements in Somaliland and Ethiopia. The interconnection, will allow existing or new electricity customers living in remote areas near international borders to be provided with electricity service, thereby reducing costs that would have been incurred to connect those customers directly to the national grid. The interconnection will be able to serve towns and cities in the border regions through or near where the interconnection will pass more easily than the services could have been provided from the main power grid of the two countries.

Improved Power Supply in Somaliland: Power systems in Somaliland will be stabilized by the interconnection, a key indirect benefit on the local and national economy. The interconnection will allow the electrification of areas that had previously lacked electricity and is expected to contribute to the local economy through improving the productivity of agriculture, reducing the amount of labour needed for household tasks such as water provision and making possible the development of other local industries. The improvement from a situation where electricity supplies are intermittent to a situation where electricity supplies are always or nearly always available will make the siting of new industrial capacity more attractive and feasible, contributing to the development of the local economy. Improved power supplies will also benefit existing businesses and their employees; reducing shut down when power is unavailable.

Education and Health: New and/or better access to electricity for communities will mean improved access to educational opportunities (such as the use of electric lights for study at night), and better health care (light for examination rooms, refrigeration for medicines) which may reduce productive time lost due to illness.

Reduced GHG Emissions: The proposed project may contribute to reduction in Green House Gaseous (GHGs) emissions due to the fact that beneficiaries may not continue to rely on biomass as a main source of energy at the domestic level which leads to felling of trees and hence contributing to the green-house effect.

7.3 Adverse Impacts

Following a scoping process, this impact assessment was focused on interactions between the Project activities and various resources/receptors that could result in significant impacts.

7.3.1 Pre-Construction Phase

7.3.1.1 Land Acquisition and Involuntary Displacement Impacts

This construction of the transmission line will lead to loss of land or restrictions on land use and land-based livelihoods during construction. Potential impacts include: -

- Physical displacement.
- Economic displacement.

The loss of agricultural land and grazing areas and agricultural crops (livelihood sources) will be as follows:

- Temporary tower site working areas inside of the 40m OHTL RoW:
- Temporary loss of access to land for the establishment of the temporary tower sites working areas (average 40mx50m). These construction sites will be located entirely inside the 40m OHTL RoW.
- Permanent loss of access to land in the 40m OHTL RoW.
- Restricted access
- Removal of trees and crops.

The loss of access to land associated with the 40m OHTL footprint corridor, temporary tower sites working areas, and maintenance corridor will result in the loss of land used for seasonal crops, removal of trees, and restrictions to animal grazing. With respect to animal

grazing activities, potential impacts during the construction phase stem from farmers having restricted access to grazing land due to the establishment of the tower sites working areas and access roads. In the case of land compensation, MoEM will ensure to provide land with higher or equal productive potential and locational advantages.

Table 7-5. Pre-Mitigation Impact Assessment

Impact Temporary loss of livelihoods and household income as a result of temporary land take and loss of access to land during construction					
Impact Nature	Negative		Positive		Neutral
	The temporary land take during construction activities may lead to a temporary loss of livelihoods and household income.				
Impact Type	Direct		Indirect		Induced
	Potential loss of livelihoods and household income due to a direct interaction between the Project (i.e. land taken) and land users/owners.				
Impact Duration	Temporary		Short Term	Long Term	Permanent
	The majority of the construction land take will be reinstated after construction (18-24 months). Permanent impacts are expected on livelihoods related to trees removal in the 40m OHTL footprint corridor and substation area.				
Impact Extent	Local		Regional		International
	Impact limited to the Study Area				
Impact Scale	Land required for the project in the construction phase				
Frequency	The impact is expected to be continuous over the months of construction. Some permanent impacts such as the restriction will also extend to the operation phase.				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the parameters above and the embedded measures in place to minimize land take and land clearance the magnitude is considered substantial.				
Resource/ Receptor Sensitivity	Low	Substantial			High
	The sensitivity of the receptors is considered substantial considering the dependence on agriculture as a main source of livelihood in the area.				
Impact Significance	Low	Moderate		Substantial	High
	Considering the magnitude is substantial and sensitivity is substantial, the impact on livelihoods and household income during construction activities is considered of substantial				

Displacement of Physical Structures and Potential Resettlement (Pre-Construction)

The proposed transmission line route has been designed to avoid the displacement of physical structures to the extent possible. The proposed route has reduced the number of sensitive receptors at risk of removal inside the 40m OHTL footprint corridor and substation area. Considering the measures in place to minimize the number of structures at risk of being physically resettled (selected route option avoids settlements), the magnitude of the impact is considered *moderate to substantial*. The receptors sensitivity is considered *substantial* given the low incomes and presence of households with disabled and elderly household members as well as female or child-headed households. Impact significance is therefore considered *substantial*.

Table 7-6: Pre-Mitigation Impact Assessment

Displacement of physical structures and potential resettlement during construction Impact				
Impact Nature	Negative		Positive	
	Neutral			
	The temporary land taken during construction activities may lead to the permanent relocation of residential and non-residential structures.			
Impact Type	Direct		Indirect	
	Induced			
	Potential relocation of physical structures and potential loss of employment and livelihoods related to economic structures due to a direct interaction between the Project (i.e. land taken) and land users/owners.			
Impact Duration	Temporary		Short Term	
	Long Term		Permanent	
	Although land take for construction is temporary, the displacement of physical structures is considered permanent.			
Impact Extent	Local		Regional	
	International			
	Impact limited to the Study direct Area of Influence (regional).			
Frequency	The impact is expected to be a one-time impact occurring before the start of construction activities.			
Impact Magnitude	Positive		Low	
	Moderate		Substantial	
	High			
	Based on the measures in place to reduce the number of physical structures at risk of displacement, the magnitude is considered to be medium.			
Resource/ Receptor Sensitivity	Low		Moderate	
	High			
	The sensitivity of the receptors is considered high given the low incomes and presence of households with disabled and elderly household members as well as female or child-headed households			
Impact Significance	Low		Moderate	
	Substantial		High	
	Considering the medium impact magnitude and medium sensitivity of receptors, the impact related to the displacement of physical structures is considered to be of major significance.			

Mitigation Measures

Pre-Construction

As introduced previously, the main embedded measures for land and livelihood related impacts developed by MoEM will be delivered through avoidance through detailed routing and design which was aimed at;

- Avoiding or minimizing the number of towers sites working areas in agricultural areas or areas of community resources.
- Minimizing clearance of the maintenance road as in some cases clearance may not be necessary since other access roads are available.
- Minimizing as far as possible tree cut-off and tree trimming in the temporary tower sites working areas.

In addition, MoEM-PIU and EAPP-PIU will develop a Resettlement Action Plan (RAP) to ensure that Project Affected Persons (PAPs) receive adequate compensation for the loss of crops and related loss of income and, when required, are provided with access to alternative land of equal productivity. Compensation will also take into account the investment required to prepare new agricultural plots (for alternative land) and to return the reinstated

land to initial productivity levels for seasonal and permanent crops. The objectives of the RAP are as follows:

- To provide compensation for loss of assets at replacement cost and for the loss of income opportunities from seasonal and permanent crops. This also includes community-level compensation for the loss of community resources inside the 40m footprint corridor and related livelihood and subsistence losses.
- To provide compensation for PAPs who lose their pasture grounds or are restricted from grazing grounds due to project activities
- Ensure that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected.
- Improve or, at a minimum, restore the livelihoods and standards of living of displaced persons to pre-project levels, so as to facilitate sustainable improvements to socio-economic status (including the provision of alternative land for cultivation with equal or better soil productivity, and the provision of improved replacement housing). The provision of improved assets and alternative land constitutes a positive outcome that contributes to offsetting the inconvenience and disturbance and potential risk to livelihoods of the economic and physical displacement.
- Pay particular attention to the needs of vulnerable groups, identifying additional compensation and livelihood restoration measures as necessary.

Operations Phase

Permanent Loss of Livelihoods and Household Income Due to Permanent Land Restrictions

The following restrictions will apply during operations to ensure access for the maintenance of the transmission lines and towers:

- Crop trees: planting of trees is not allowed inside the 40m footprint corridor. These restrictions will result in reduced areas available for cultivation and other livelihoods. The permanent land take and restrictions to trees is a direct negative impact which is permanent in nature. The amount of land where restrictions will apply are relatively small in the overall context of the land around the settlements. Receptor sensitivity is considered high considering the level of dependence on agriculture as the primary source of subsistence and livelihoods. The potential impact is therefore considered moderate.

Table 7-7: Pre-Mitigation Impact Assessment

Displacement of physical structures and potential resettlement during construction impact				
Impact Nature	Negative	Positive		Neutral
	The temporary land taken during construction activities may lead to the permanent relocation of residential and non-residential structures.			
Impact Type	Direct	Indirect		Induced
	Potential relocation of physical structures and potential loss of employment and livelihoods related to economic structures due to a direct interaction between the Project (i.e. land taken) and land users/owners.			
Impact Duration	Temporary	Short Term	Long Term	Permanent
	Although land take for construction is temporary, the displacement of physical structures is considered permanent.			

Impact Extent	Local	Regional			International
	Impact limited to the Study Area.				
Frequency	The impact is expected to be a one-time impact occurring before the start of construction activities.				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the measures in place to reduce the number of physical structures at risk of displacement, the magnitude is considered to be medium.				
Resource/ Receptor Sensitivity	Low	Moderate			High
	The sensitivity of the receptors is considered high given the low incomes and presence of households with disabled and elderly household members as well as female or child-headed households				
Impact Significance	Low	Moderate	Substantial	High	
	Considering the medium impact magnitude and medium sensitivity of receptors, the impact related to the displacement of physical structures is considered to be of substantial significance.				

Mitigation Measures

Operations

Impacts during the operations phase will be managed by MoEM as operator of the line. Mitigation measures will include the following:

- Responsibilities will include monitoring and providing the necessary follow-up to support households to restore their livelihoods throughout the operations phase.
- The grievance mechanism established during the construction phase will be maintained during operations to ensure that local communities and stakeholders have an adequate channel to voice concerns.

Residual Impact

Provided the above mitigation measures are implemented, the residual impact related to temporary land taken during construction and permanent restrictions and land take during operations is reduced to **low** levels.

Table 7-8: Residual Impact Significance

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Temporary loss of livelihoods and household income as a result of temporary land take and loss of access to land	Construction	Moderate	Low
Physical displacement of PAPs during construction	Construction	Substantial	Low
Permanent loss of livelihoods and household income due to permanent land take and restrictions	Operation	Moderate	Low

7.3.2 Construction Phase

7.3.2.1 Construction Air Pollution Impacts

Air pollution during construction include gaseous and dust emissions which may have an impact on air quality. Project activities that have potential to impact air quality include emissions of air pollutants from temporary power generators, construction equipment and vehicles. The construction of the transmission line and sub-station will entail the use of motorized machinery and vehicles which will lead to air pollution which will impact human health and the environment in general. Pollutants from motorised equipment during construction will include:

1. CO -Carbon monoxide;
2. HC–unburned hydrocarbons generated through combustion processes and fugitive fuel evaporation, including benzene, a known carcinogen;
3. CO₂-Carbon dioxide;
4. NO_x– Nitrogen oxides including NO₂ - nitrogen dioxide and NO – nitric oxide;
5. PM₁₀ – fine particulate matter including soot/black; and
6. Sulphur dioxide (SO₂): SO₂ is of concern because of its impacts on health and vegetation.
7. Dust is defined as all particulate matter up to 75 µm in diameter and comprising both suspended and deposited dust, whereas PM₁₀ is a mass fraction of airborne particles of diameter 10 µm or less. Dust and PM₁₀ emissions arise from a number of sources, so both construction activities and emissions from vehicles associated with the construction site need to be considered.

Construction vehicles are generally fueled with diesel, and thus, SO₂, PM, NO_x, VOC and CO emissions are expected to occur along the route. In addition to these mobile source emissions, there will be also stationary emissions from the activities in the sub-station and maybe camp site (if decided upon by contractor). These emissions will be mostly due to power generations in diesel generators if used. Most site equipment (bulldozers, diggers, etc.) can be considered as similar to medium or heavy-duty trucks. Vehicles are used for the transport of materials and equipment on and off site as well as carriage of personnel to and from site using minibuses and cars. Since the project construction phase duration will be about 18-24 months long, air quality impact generated from these activities will not be static. Although the general terms of the construction of phases are similar, their application locations will follow each other. The quantities of motorized equipment (trucks, excavators) etc. will be minimal due to the short length of the transmission line. In addition, quantities of material to be loaded and unloaded, number and type of construction equipment and machinery all which are contributors to air emissions are also expected to be minimal due to project limited scope and footprint. The above pollutants are only likely to be significant where coal or heavy fuel oil are in use. As these fuels will not be used for the Project, significant impacts on air quality from these pollutants are therefore considered unlikely. The above pollutants are of concern due to the adverse effects on human health and natural ecosystems in the local environment.

Construction activities will also create dust in particular where vehicles are using unpaved roads close to properties and agricultural areas. Dust emitted from excavation, earth

moving, loading, handling and transportation of materials. Dust deposition from road traffic is not likely to be a more significant issue than exhaust emissions, as many of the roads used by construction vehicles are paved. The construction of the proposed transmission line and sub-station has the potential to cause emissions of dust Total Suspended Particles (TSP) from land clearing, earthworks, movement of vehicles over unpaved surfaces and roads, handling of friable materials etc. These sources have the potential to increase ambient concentrations of particulate matter, resulting in nuisance at nearby settlements and to affect crops and natural vegetation through dust deposition.

Table 7-9: WB and WHO reference standards and guidelines for NO_x PM, SO_x.

Parameter	WHO Air Quality Guidelines
Sulphur Dioxide, SO ₂	20 µg/m ³
Nitrogen Oxides, NO _x as NO ₂	200 µg/m ³ (1hr)
Suspended Particulate Matter	200 µg/m ³
PM ₁₀	100 µg/m ³
PM _{2.5}	25 µg/m ³
Ozone	100 µg/m ³

Baseline Conditions

Pollutant Levels

Based upon the potential impacts, the pollutants of interest are oxides of Nitrogen, and particulate matter. Baseline dust and PM₁₀ is influenced by a wide range of emissions, including man-made and natural sources. Along the route it is anticipated that there will be locations where the dust and PM₁₀ baseline is elevated and close to and frequently above air quality standards due to existing levels of human activities including vehicle traffic. This includes settlements where there are unpaved roads, at individual properties close to unpaved roads and properties close to agricultural activities. On this basis, the baseline dust and PM₁₀ airshed is considered to be degraded but only on a localized basis.

NO₂ is emitted from combustion sources, and these are almost exclusively man-made. In the absence of significant local sources, NO₂ concentrations are not expected to approach or exceed air quality standards. On this basis, existing levels of NO₂ will be below air quality standards throughout the route and the airshed is considered to be undegraded. The net impact of the project on air quality is not significant and temporary and will be limited to construction period.

Receptor Sensitivity

The sensitivity of receptors in the Area of Influence are defined as follows: For sensitive human receptors:

- High locations where there are particularly vulnerable receptors, including hospitals.
- Medium locations where people are generally present permanently, including dwellings, schools, and settlements; and
- Low—where people are only present for short periods, such as agricultural areas and fishing areas.

There are human settlements/receptors within the AoI.

For sensitive ecological and agricultural receptors:

- High – habitat sites with international designations, such as Ramsar sites
- Medium–habitat sites with statutory national protection, and sites where agricultural activities are producing particularly sensitive crops, such as fruit or green vegetables; and
- Low–local or national habitats sites with no statutory protection, and other agricultural areas

Based on a review of the proposed route and the access roads the following specific sensitivities have been identified:

- Sensitive human receptors are defined as Medium where there are permanent settlements of dwellings, and low elsewhere; and
- Sensitive ecological and agricultural receptors are defined as Low in all locations, as there are no protected habitats.

Impact Assessment

Exhaust Emissions

No detailed traffic data is available at this stage. However, the numbers of Heavy-Duty Vehicles (HDV) and Light Duty Vehicles (LDVs) are expected to be well below the thresholds for potentially significant impacts. On this basis, the magnitude of impacts associated road traffic exhaust emissions are predicted to be Negligible. Combined with the Medium and Low receptor sensitivities identified the overall significance of impacts is Negligible at all locations.

Dust and PM₁₀

There are the potential for impacts to arise from:

- Traffic on unpaved roads
- Earthworks
- Construction activities; and
- Trackout²⁴

The Project will generate traffic on unpaved roads close to dwellings and within settlements. As this is expected to be more than five HDVs/day, and at some locations for more than four weeks, the magnitude is large. The Project will require earthworks along the length of the route. These works will include stripping vegetation from the route, construction of access roads and the route haul track, excavations for the concrete bases for the pylons. Due to the scale of these activities, the Magnitude is Medium. Due to this, the Magnitude is Negligible.

The exact number of HDVs that will be generated is unknown. However, this is expected to range from 10 to 15 HDVs per day category using unpaved site roads. On this basis, the magnitude of trackout is medium. Combined with the Medium and Low receptor sensitivities identified the significance of unmitigated impacts are:

- Traffic on unpaved roads is Major where there are receptors within 50m of unpaved

²⁴ Track-out or carry-out is dirt, mud or other debris tracked onto a paved road surface or area accessible to the public by a vehicle.

roads used by construction traffic, or the haul route.

- Earthworks are Major where there are receptors are within 350m of locations where earthworks are being undertaken, including route stripping, construction compounds and excavations.
- Construction activities are Negligible at all receptors; and
- Trackout are Major at receptors within 50m of routes used to access the construction route where these are within 500m of the access point to the route or construction compounds.

On this basis there is a need for mitigation to be implemented to reduce dust emissions/impacts.

Table 7-10: Pre-Mitigation Impact Assessment

Impact	Degradation of the Airshed during Construction					
Impact Nature	Negative	Positive		Neutral		
	Increase in airborne pollution.					
Impact Type	Direct	Indirect		Induced		
	Impact is a result as a direct interaction between project activities and the environment along the footprint of the project.					
Impact Duration	Temporary	Short Term	Long Term	Permanent		
	The impact is expected to be temporary as emissions arise throughout the construction phase.					
Impact Extent	Local	Regional		International		
	The impact will arise locally in the footprint of the project and immediate surrounds. Impacts will also arise further afield close to unpaved public roads used to access the work sites during construction.					
Impact Scale	The impact is considered as small (local) scale.					
Frequency	Intermittent – impacts will typically only arise during working hours					
Likelihood	Inevitable					
Impact Magnitude	Positive	Low	Moderate	Substantial	High	
	Based on the above the impact magnitude is considered small.					
Resource/ Receptor Sensitivity	Low		Moderate		Substantial	
	The sensitivity of human receptors is Medium in dwellings and settlements, Low elsewhere. The receptors of agricultural activities is Low.					
Impact Significance	Low		Moderate	Substantial		High
	Dust emissions have the potentially to have Moderate significant impacts at nearby sensitive human receptors.					

Mitigation Measures

Mitigation measures are split into general considerations for all construction activities, and specific mitigation measures for traffic on unpaved roads, earthworks and track-out. As general measures for all locations:

- Develop a Dust Management Plan
- Record all dust and air quality complaints, identify cause (s), take appropriate measures.
- Liaise with local communities to forewarn of potentially dusty activities.
- Undertake monitoring close to dusty activities, noting that this may be daily visual inspections, or passive/active monitoring.
- Undertake inspections to ensure compliance with the Dust Management Plan

- Plan potentially dusty activities so that these are located as far from receptors as feasible.
- Erect solid screens if feasible around stockpiles and concrete batching
- Avoid run off of mud and water and maintain drains in a clean state.
- Remove dusty materials from site as soon as possible if not being re-used. If being re-used, cover or vegetate if possible.
- Impose speed limits on haul routes and in construction compounds to reduce dust generation.
- Minimise drop heights when loading stockpiles or transferring materials; and
- Avoid waste or vegetation burning.

For traffic on unpaved roads:

- Undertake watering to attenuate dust near sensitive receptors. The duration and frequency of this should be set out in the Dust Management Plan and will consider water availability and any stakeholder grievances; and
- On unpaved roads in use for more than 1 month, consider use of surface and sealants to reduce the use of water and water trucks. Use of lignin-based sealants recommended due to low environmental toxicity.

For earthworks:

- Revegetate exposed areas as soon as feasible.
- Revegetate or cover stockpiles if feasible.
- Expose the minimum area required for the works and undertake; and exposure on a staged basis to minimise dust blow.

For trackout:

- Where trackout is onto paved roads, use wet road cleaning methods to remove dirt and mud build up.
- Avoid dry sweeping of large areas; and
- Where feasible, undertake wheel washing and vehicle clean down prior to accessing public roads.

Decommissioning Air Pollution Impacts

Air pollution during decommissioning include gaseous and dust emissions from temporary power generators, equipment, and vehicles. The pollutants include Carbon Dioxide (CO₂), Volatile Organic Compounds (VOC), carbon monoxide (CO), Nitrogen Oxides (NO₂) and particulate matter (PM). Excavation, earth moving, loading, handling and transportation of materials will also give rise to fugitive dust. The significance of the impacts on air quality from the decommissioning activities is considered minor. The numbers of vehicles and mobile equipment are expected to be well below the thresholds for any significant impact associated with traffic exhaust emissions. The traffic management plan developed during construction will be used during this phase. The impact on air quality is predicted to be negligible.

Residual Impact

The residual impacts associated with road traffic exhaust emissions are moderate. With the implementation of suitable mitigation and with adequate monitoring, residual impacts associated with dust and PM₁₀ from construction activities are moderate.

Table 7-11: Residual Impact Significance

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Road Traffic Exhaust Emissions	Construction	Moderate	Moderate
Dust and PM 10 from construction activities.	Construction	Moderate	Moderate

7.3.2.2 Noise Emission and Vibration Impacts

Potential noise impacts may arise as a result of the construction activities associated with the transmission line and sub-station. There will be risks and impact of noise and vibration resulting from the construction equipment and machinery on people. Potential sources of noise and vibration during construction will include clearing and grubbing of the transmission corridor, excavations, earthmoving, construction traffic etc. Construction activities and equipment are not expected to result in significant levels of vibration. Equipment that might cause high levels of vibration (such as impact piling or vibratory compaction) will not be used. Blasting as construction activity may occur in areas where the rock profile requires blasting prior to installing of the transmission lines (pylons) etc. Effects of blasting will include noise and vibration that may adversely impact the fauna, local communities and workers health and safety. The equipment used in construction will generate minimum noise during construction of the transmission lines and will not adversely affect communities and fauna.

It is expected that existing access roads can be utilized. Before construction begins, it may be necessary to carry out maintenance work on these roads. Typically, this would involve minor re-grading using a grader. This is not expected to give rise to significant noise impacts and has therefore been scoped out of further assessment. Few if any new access roads will be required. Where required, basic access tracks will be established to each structure position by moving obstacles such as rocks, levelling high points and filling in holes. This is not expected to give rise to significant noise impacts and has therefore also been scoped out of further assessment.

Baseline Conditions

The ambient noise environment at settlements along the transmission line corridor is influenced by activities within settlements including people activities, animals (such as birds), occasional cars, vegetation blowing in the wind, and weather (wind, rain). The noise baseline survey conducted for the ESIA determined that daytime noise levels, LAeq, were generally low and in the range 35 to 41 dB. Noise monitoring was not carried out during the night as significant night-time noise effects from the construction and operation of the Project are not expected.

Concrete foundations will be used to support the steel lattice tower structures, which will be installed using a mobile crane. A sound power level of 105 dB (A) has been assumed for the noisiest phase of construction, which is expected to be foundation works. This includes a concrete mixer truck, a tracked mobile crane, a compressor and a poker vibrator working simultaneously.

When assessing effects from noise, impact significance is not determined in the same way that it is for most other technical disciplines i.e., using a matrix of impact magnitude and receptor sensitivity. Consideration of receptor sensitivity is made at the start of the assessment, and impacts are only assessed where sensitive receptors are identified. Receptor sensitivity is represented by impact criteria determined by reference to appropriate standards or guidelines. The significance of an impact is derived from the impact magnitude but takes account of other factors such as the duration of the impact and the design of the receptor.

World Bank Group General EHS Guidelines provide guidance on acceptable noise levels based on WHO standards and these are set out in Table 7-12.

Table 7-12: World Bank Group Noise Level Guidelines

	Maximum Allowable Ambient Noise Levels, LAeq,1hr, dBA Free field	
	Daytime	Night-time
	07:00 – 22:00	22:00 – 07:00
Residential, institutional, educational	55	45
Industrial, commercial	70	70

The transmission line is not within close proximity of key sensitive receptors including educational and health facilities as well as residential areas and therefore, the emissions from the construction activities are not expected to significantly affect such sensitive receptors.

Impact Assessment Construction

Although the overall construction program may last for up to 18-24 months, construction works to install each tower will affect individual Noise Sensitive Receptors (NSRs) for approximately one month. Installation work will be carried out during the day only. Noise levels exceeding the daytime criterion for a medium magnitude impact are predicted at distances of 19m or less. However, the predictions conservatively assume all equipment will always be located at the closest part of the site to the receptor which is unlikely to be the case in practice. In addition, contractors are required to safeguard the work site to protect the safety of people and animals which may include erecting a temporary fence around the site. Most towers will be located well away from such that impacts would be negligible. Small magnitude impacts of minor significance may affect a small number of the closest receptors during the daytime only.

Table 7-13: Pre-Mitigation Impact Assessment

Impact		Noise During Construction			
Impact Nature	Negative	Positive		Neutral	
	Elevated noise levels from operation of construction equipment.				
Impact Type	Direct	Indirect		Induced	
	Impact is a result of noise generated by construction activities.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	Impacts are expected to be short term (up to one month) at any individual NSR in the vicinity of a proposed steel lattice tower worksite				
Impact Extent	Local	Regional		International	
	The impact will be limited to the NSRs within the immediate surrounds of each tower worksite.				
Impact Scale	Local				
Frequency	Impacts may occur during daytime periods over a short-term duration at each tower worksite.				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the above the impact magnitude is considered negligible to small.				
Resource/ Receptor Sensitivity	Low	Moderate		Substantial	
	Dwellings are considered to have a high sensitivity to noise.				
Impact Significance	Low	Moderate		Substantial	High
	Considering the impact magnitude is small to negligible and the sensitivity is moderate, the overall significance is considered to be negligible to Moderate.				

There will be noise and vibrations generated during the construction phase, but it will be typical of any construction site. The noise impact during construction is expected to be negative and short-term. The major receptors are expected to be the construction workers as well as any immediate neighbouring residential premises. Sources of noise will be trucks and the off-road vehicles in transit, use of compressor to break hard ground and the use of motorized chain saws for vegetation clearing. The noise from the project vehicles is only significant in areas where the proposed line passes through dense settlements such as close to the towns' neighborhoods. The noise from compressors will only be significant where hard ground-breaking is carried out close to settlements. Noise from the motorized chain saws will only be experienced in the wooded areas but it will not be a significant impact since the density of settlements is not very high. Impacts of noise include noise-induced hearing loss for the project employees and nuisance for the affected settlements.

Operation

During the operational phase, high voltage overhead power transmission lines can generate noise by a phenomenon known as 'corona discharge'. The associated noise levels are weather related, and the transmission lines are normally quiet during dry weather with corona noise sometimes occurring during wet weather conditions. However, ambient noise levels also increase significantly during periods of rain. This increased ambient noise level is expected to mask effects from corona discharge noise and this impact has been scoped out of further assessment.

Mitigation

Mitigation measures are set out below, which have been assumed for the base case assessment. They are assumed to result in a 5 dB (A) reduction in the overall noise from construction plant teams. The following standard mitigation measures will be employed:

- Siting noisy equipment as far away as possible from NSRs, and use of barriers (e.g., site huts, acoustic sheds or partitions) to reduce the level of construction noise at receptors wherever practicable.
- Where practicable noisy equipment will be orientated to face away from the nearest NSRs
- Working hours for significant noise generating construction work (including works required to upgrade existing access roads or create new ones), will be daytime only.
- Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units, will be used, where practicable
- Where practicable, stationary equipment will be located in an acoustically treated enclosure.
- For machines with fitted enclosures, doors and door seals will be checked to ensure they are in good working order; also, that the doors close properly against the seals.
- Throttle settings will be reduced, and equipment and plant turned off, when not being used.
- Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked; and
- Fitting of mufflers or silencers of the type recommended by manufacturers.

Decommissioning Noise Emission and Vibration Impacts

Potential sources of noise and vibration include excavations, earthmoving, and traffic. The equipment generates noise levels below values that will adversely affect communities and fauna. To further minimize exposure to noise, work will be carried out during the day only. The significance of the noise impacts during decommissioning has been rated as negligible.

Residual Impact

Standard mitigation measures listed above have been assumed for the base case noise assessment. No impacts above small are predicted and therefore no further mitigation is required. Consequently, the residual impacts are the same as those presented above.

Table 7-14. Residual Impact Significance

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Noise from construction activities affecting nearby dwellings	Construction	Moderate	Low

7.3.2.3 Soil Erosion and Contamination Impacts

Construction activities will have direct physical impacts to soil. Possible direct physical impacts to soil include erosion resulting from activities such as excavation of foundations for electricity pylons, clearing of vegetation for infrastructure such as roads, laydown areas, construction zones and workers camp (if applicable).

The excavation of soil for the construction of sub station and pylon foundations will disrupt the soil cohesion and also may result in surplus soil due to the use of concrete for the foundation. If not properly restored or managed, this soil may erode and wash into nearby surface water bodies adversely impacting these. Any temporary soil stockpiles established during construction of infrastructure will be at risk of erosion from wind and rainfall. Impacts to soil from unplanned events, such as accidental release of hazardous materials is discussed elsewhere.

Baseline Conditions

The potential for soil erosion to occur during the construction phase is based on a number of factors including the type and physical properties of soil, the topographic slope, the vegetation cover, and the nature and duration of construction activities which disrupt the soil. The characteristics of the different soil types along the transmission line is reflected in the baseline description chapter. The sensitivity to erosion of soils along the proposed transmission line depends on the type and properties of the soils.

Impact Assessment

The excavation of foundations and the construction of temporary roads and equipment laydown areas will have a direct negative effect on soil cohesion, thereby increasing the risk of erosion along the entire footprint of the project. The impact is likely to occur, but the extent of the impact is likely to be limited to the footprint of the activities, particularly the construction and use of access roads, laydown areas (i.e., local extent).

The impacts of construction activities on soil erosion are anticipated to last for the duration of the construction phase only (i.e., short term). Given the subtropical location of the Project and the nature of vegetation present, it is anticipated that cleared areas will revegetate naturally and relatively quickly (assuming rainfall patterns similar to the current averages persist), minimizing the risk of erosion.

During construction there is the potential for spills of fuels and oils during construction activities, fueling, maintenance of machinery and vehicles. Spills could occur in a number of locations along the transmission line RoW. Spills have the potential to affect terrestrial environments and could lead to the deterioration of soil, water, and sediment quality. This could lead to knock on effects for flora and fauna and local community users.

If hazardous materials such as fuel were to be released to the soil and surface water resources, this would be limited to the local extent, depending on the volume spilt and rate of spillage. Within the Project AoI there are limited surface water resources such as streams and rivers which could be impacted if the spill were to occur within proximity of the resource.

Likelihood: -Incidental spills of fuels are infrequent but do occur; most frequently due to malfunction of handling systems, poor practice of workers and force majeure. Spills are most likely to occur during refilling and transportation of substances. Large releases of hazardous materials are rare, and it is considered unlikely that a spill would occur of emergency scale.

Operational Phase

The RoW will be reinstated following construction with soil spread and graded and the area revegetated. Following reinstatement, no significant soil erosion is anticipated.

Significance of Impacts: -For impacts to soils, the spatial scale is considered to be local. The impact could be long term and is a direct negative impact. The overall magnitude is considered to be medium. There are areas along the transmission RoW which are used for cultivation and therefore the sensitivity is considered of moderate sensitivity.

Table 7-15: Pre-Mitigation Impact Assessment

Impact	Soil Erosion during Construction				
Impact Nature	Negative	Positive		Neutral	
	Loss of soil cohesion contributing to erosion.				
Impact Type	Direct	Indirect		Induced	
	Impact is a result as a direct interaction between project activities and soil along the footprint of the project.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is expected to be short term, however in the case of serious erosion the impacts may be experienced long term.				
Impact Extent	Local		Regional	International	
	The impact will be limited to the footprint of the project and immediate surrounds.				
Impact Scale	The impact is considered as small (local) scale.				
Frequency	Continuous				
Likelihood	Possible				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the above the impact magnitude is considered small.				
Resource/Receptor Sensitivity	Low		Moderate		High
	The sensitivity of the soil along the proposed transmission line to erosion is considered to be medium to low.				
Impact Significance	Low		Moderate	Substantial	High
	Considering the impact magnitude is small and the sensitivity is medium to low, the overall significance is considered to be Moderate.				

Mitigation

The following mitigation measures will be implemented to minimize the potential for soil erosion:

- Vegetation clearing and topsoil disturbance will be minimized.
- Contour temporary and permanent access roads/laydown areas so as to minimise surface water runoff and erosion.
- Sheet erosion of soil shall be prevented where necessary through the use of sandbags, diversion berms, culverts, or other physical means.
- Topsoil shall be stockpiled separate from subsoil. Stockpiles shall not exceed 2 m height, shall be located away from drainage lines, shall be protected from rain and wind erosion, and shall not be contaminated. Wherever possible construction work will take place during the dry season.
- Topsoil shall be evenly spread across the cleared areas when reinstated.
- Accelerated erosion from storm events during construction shall be minimised through

- managing storm water runoff (e.g., velocity control measures).
- Soil backfilled into excavations shall be replaced in the order of removal in order to preserve the soil profile.
- Spread mulch generated from indigenous cleared vegetation across exposed soils after construction.

Decommissioning Soil Erosion and Contamination Impacts

Decommissioning activities will have direct physical impacts to soil including erosion resulting from excavation to remove stainless steel pylons. This will disrupt the soil cohesion and also will result in surplus soil extracted from the foundation. The removed soil will be backfilled into the excavations in the order of removal to preserve the soil profile. Given the subtropical location of the Project and the nature of vegetation present, it is anticipated that cleared areas will revegetate naturally and relatively quickly. There is also the potential for spills (e.g., of fuels and oils from fueling, maintenance of machinery and vehicles), these have the potential to affect terrestrial environments and could lead to the deterioration of soil, water and sediment quality, the extent of this will be limited to the project site. The overall magnitude is considered to be **moderate**. The mitigation measures employed during construction, will be used to mitigate this impact.

Residual Impact

The implementation of the proposed mitigation measures reduces the significance of the residual impact to negligible to moderate along the entire route of the transmission line.

Table 7-16. Residual Impact Significance

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Loss of soil resources due to erosion	Construction	Moderate	Low

7.3.2.4 Water Quality and Quantity Impacts (Surface and Ground)

Construction activities associated with the transmission lines and sub-station can have significant effects on the surface and ground water resources along the proposed project route. Project activities will interact with water resources in the following ways:

- There will be direct interaction during clearing and construction near to or in surface water bodies.
- There will be indirect interaction in the case of erosion of soils into water bodies.
- There will be direct interaction from the abstraction of water from surface and ground water bodies for construction (e.g., for dust control, use in camp sites, concrete mixing etc).
- There will be direct interaction from the discharge of treated domestic wastewater to surface water bodies (in the event camp sites are established).
- In addition, if vegetation and soil clearing are not properly managed, there is the potential for soils to run into water bodies and increased sediment load. This in turn may have a detrimental effect on water quality and affect surface water users.

During the construction of the transmission line, water will be required for several purposes including for use in the workers' accommodation camp (if determined), substation and transmission line construction process which requires water, cleaning of the vehicles and equipment, keeping down construction dust impacts among others. The potential impacts and risk of the project relating to surface water supply are:

- Stresses on local water resources from construction water abstractions from surface and/or ground water;
- Potential indirect effects from ground and surface water demand caused by local population due to in-migration.
- Overall water supply requirements for the construction of will be significant (See Water Resources Assessment report in annex H) and necessary during concrete mixing only, use in camp by workers and keeping down the dust.

Baseline Conditions

The number of water courses present along the project route are numerous and the transmission line routing crosses 6 surface water bodies (1 major river and 5 small rivers). The potential risks of detrimental impacts on water quality will be higher where construction activities are close to surface water bodies or from the potential destabilization of soils and channel banks that may lead to erosion and deposition of sediment into water bodies. Regarding ground water potential, results of the water balance analysis, shows that the available borehole sources of water cannot meet the project water demand and will result in water deficit.

Construction Phase

Below are risks and impacts on surface water that are likely to be encountered as a result of the project during the construction phase:

1. The construction of the project may cause temporary disturbances and negative effects on surface water resources. These negative impacts could increase without proper scheduling or programming of the works or particular activities. In other words, there are likely to be impacts of construction of the project on water quality where required mitigation activities are not implemented correctly.
2. Water use conflict between contractors and local communities may occur if the existing ground and surface water resources are used which would lead to a water deficit due to competition.
3. Stockpile and other materials may enter any other surface water resources near to the Project site where there are inadequate containment measures. Such surface runoff may carry sediments or harmful wastes, and these may collect in rivers or any other surface water resources and therefore there will be negative impacts on water quality.
4. In addition, in the project site there may be storage areas for chemicals, fuels, oils, etc., used for construction activities including refueling of vehicles. These materials must be stored according to the regulatory requirements, including the related regulation. Otherwise, there may be risk of leakage of all chemicals to the surface water resources, and so there may be impact on water quality.
5. In addition, all chemicals, fuels, oils etc. used for construction activities must be handled, transported, and used according to related regulation and procedures.

Otherwise, there may be risk of spill of these by accidents etc. Therefore, there may be impact on water quality.

6. There may also be risks of pollution from the uncontrolled runoff or accidental spillage of fuels and lubricants, or from the inadequate or unsafe disposal of wastewater from construction sites.
7. Land cleared during the construction of the transmission line and associated service infrastructure will have a direct negative effect on surface water quality by increasing the turbidity and concentration of total dissolved/suspended solids, with potentially adverse effects on river biota.

No information is available about the turbidity and concentration of suspended solids in rivers in the project area, however given the extent of human settlement and agricultural activities it is probable that these are not elevated. The volume of soil like to be disturbed by proposed project activities is likely to be **low** and therefore the extent of the impacts from sediment addition to the river is considered to be local. Owing to the subtropical location of the project and the high probability that cleared areas will revegetate naturally thereby limiting erosion, the duration of this impact is anticipated to be short term.

The nature of the construction activities for the transmission line renders the erosion of soil and subsequent siltation of rivers along the route possible. The **moderate** magnitude of this impact on surface water quality and the **low** sensitivity of these rivers to increased turbidity means the significance of this impact is assessed as **moderate**.

Table 7-17: Pre-Mitigation Impact Assessment

Impact	Siltation of Surface Water				
Impact Nature	Negative	Positive		Neutral	
	Eroded soil entering surface water bodies.				
Impact Type	Direct	Indirect		Induced	
	Impact is a result as a direct interaction between project activities and the environment along the footprint of the project.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is expected to be short term, however in the case of serious erosion the impacts of siltation of surface water may be experienced long term (into the operational phase).				
Impact Extent	Local	Regional		International	
	The impact will be limited to the footprint of the project and immediate surrounds. The dilution of sediments in the river will render this impact negligible at the regional scale.				
Impact Scale	The impact is considered as small (local) scale.				
Frequency	Continuous				
Likelihood	Possible				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the above the impact magnitude is considered small.				
Resource/ Receptor Sensitivity	Low	Moderate		High	
	The sensitivity of the rivers along the proposed transmission line to siltation is considered to be medium to moderate.				
Impact Significance	Low	Modertae	Substantial		High
	Considering the impact magnitude is small and the sensitivity is moderate to low; the overall significance is considered to be moderate.				

Ground Water Quantity

The nature of the construction activities for the transmission line is likely to trigger water use conflict as a result of depletion of existing ground water sources along the transmission line route. The water balance study results that indicate that the borehole water sources cannot meet the project water demand meaning the significance of this impact is assessed as **substantial**. The magnitude of impact on ground water quantity is high in sensitivity and hence substantial.

Table 7-18. Pre-Mitigation Impact Assessment

Impact	Depletion of Ground Water					
Impact Nature	Negative	Positive		Neutral		
	Depletion of ground water leading to deficit and water use conflict					
Impact Type	Direct	Indirect		Induced		
	Impact is a result as a direct interaction between project activities and the environment along the footprint of the project.					
Impact Duration	Temporary	Short Term	Long Term	Permanent		
	The impact is expected to be short term (construction phase), operational phase).					
Impact Extent	Local	Regional		International		
	The impact will be limited to the footprint of the project and immediate surrounds. The depletion of water and related water deficit leading to water use conflict among the communities along the transmission line only will render this impact negligible at the regional scale.					
Impact Scale	The impact is considered as regional in scale.					
Frequency	Continuous through out construction phase					
Likelihood	Possible					
Impact Magnitude	Positive	Low	Moderate	Substantial	High	
	Based on the above the impact magnitude is considered substantial.					
Resource/ Receptor Sensitivity	Low		Moderate		High	
	The sensitivity of the ground water sources (boreholes) along the proposed transmission line to depletion is considered to be substantial.					
Impact Significance	Low		Moderate	Substantial		High
	Considering the impact magnitude is substantial and the sensitivity is substantial; the overall significance is considered to be substantial.					

Operation Phase

Once the RoW is reinstated, no direct disturbance of surface water bodies is anticipated, and ground water requirements is expected to be minimal due to the absence many workers at the sub station and maintenance crew.

Mitigation

The mitigation measures listed for soil management above are also applicable to surface water quality. In addition, the following mitigation measures will be implemented to minimise the potential for siltation of surface water:

- Drill boreholes for use during construction (as recommended in the Water Resources Assessment) report and after completion of construction works, hand over the boreholes to the local community for use
- Activities shall be conducted >100m away from water bodies, except where crossings

are required.

- All wastewater which may be contaminated with oily substances must be managed in accordance with an appropriate waste management plan and no hydrocarbon-contaminated water may be discharged to the environment; and
- Domestic wastewater shall be treated and disposed of in accordance with an approved waste management plan.

Decommissioning Surface Water Quality Impacts

Decommissioning activities could have significant effects on the surface water resources along the project route. The impact will be limited to the footprint of the project and immediate surrounds. Good environmental management, including control of runoff, sediments should be followed. The volume of soil to be disturbed by proposed project activities is projected to be **low** and extent of the impacts from sediment addition to water bodies is considered to be local. The mitigation measures employed during construction, will be used to mitigate this impact.

Residual Impact

The implementation of the proposed mitigation measures reduces the significance of the residual impact to **low-moderate** along the entire route of the transmission line for water quality and moderate to substantial for ground water quality.

Table 7-19: Residual Impact Significance

Impact	Project Phase	Significance (Pre-Mitigation)	(Pre- to Residual Significance Mitigation)	Impact (Post Mitigation)
Availability and quality of water	Construction	Moderate to Significant	to	Moderate to Significant

7.3.2.5 Impact on Flora

According to data from the survey carried out for the ESIA, the areas to be crossed by the transmission line are not having any considerable biodiversity which is a sensitive habitat and vulnerable to changes to its components. To clear a RoW for the project infrastructure, it will be necessary to remove native vegetation particularly. This will cause impacts such as loss of vegetation. This impact of the project on flora along the transmission line will be direct and permanent in nature, since vegetation will be removed to clear the RoW, install the infrastructure and carry out regular maintenance, and along that strip no tree regeneration whose height may compromise the safety of the transmission lines is allowed.

Baseline Conditions

The baseline conditions along the proposed transmission line reflects the vegetation dominated by grasses and shrubs. Figure 4-25 in chapter 4 details the vegetation types along the transmission line route. The land cover along the proposed transmission line corridor spans a range of habitat types, reflecting varying degrees of ecological integrity. Analysis of satellite-derived land cover data integrated into GIS reveals that the corridor is predominantly composed of largely natural (73.6%) and natural habitats (17.3%), with only a small proportion falling under the modified category (4.7%).

Land use along the transmission line route comprises mainly rainfed and irrigated crop fields/farms, shrubland and woodland areas. The open space, plantation areas, cultivation and vegetable farms that have been observed within the transmission line routes are modified areas and have no natural vegetation with any conservation significance (figure 4-36). As indicated in baseline section there are 2 areas categorized as KBA/IBA sites which are 10kms and more than 50kms away from the transmission line route with 3 EN floral species screened as likely to be present within the identified KBA/IBA sites (*Vigna monanth*, *Aloe hildebrandtii* and *Aloe grisea*).

Impact Assessment

Construction Phase

During construction, improved access to some presently remote areas also increases human pressure on the vegetation resources for example where trees are cut for fuel wood and land is converted for agriculture use. The removal and vegetation associated with vehicle movement can also lead to the establishment of favourable conditions for the massive and rapid dissemination of invasive alien plants. Based on the available data it is not expected that the above-mentioned aspects will result in negative impacts on any sensitive species.

This direct impact is permanent, since the shrub vegetation will be removed to clear the RoW, install the infrastructure, and carry out regular maintenance, and along that strip no tree regeneration whose height may compromise the safety of the transmission lines is allowed. The habitats within the transmission line RoW are primarily largely natural, natural and modified and are considered to have a moderate sensitivity in most of the areas. The impact is direct and negative, resulting from the vegetation removal and disturbance during the construction phase. The extent of the impact is presented is restricted to the Project RoW and therefore local in nature. The magnitude of the impact is considered to be moderate. Based on the analysis provided above, the impact of vegetation removal, habitat fragmentation and degradation will be a **moderate** negative impact pre-mitigation (Table 7-19).

Table 7-19: Pre-Mitigation Impact Assessment

Impact	Flora and Vegetation during Construction			
Impact Nature	Negative	Positive	Neutral	
	Disturbance to vegetation and habitat loss and fragmentation as a result of the RoW or degradation to environment and habitat during construction			
Impact Type	Direct	Indirect	Induced	
	Impact is as a result of a direct interaction between the project (i.e. construction activities) and the existing vegetation along the transmission line			
Impact Duration	Temporary	Short Term	Long Term	Permanent
	The effect is considered permanent as the areas where vegetation will be removed for the construction of the line will have to be permanently kept with vegetation for maintenance purposes during the operational phase.			
Impact Extent	Local	Regional	International	
	Impact is limited to AoI			
Impact Scale	The impact is considered moderate in scale and will occur across the whole length of the proposed transmission line RoW and access roads			
Frequency	Once off			

Impact Magnitude	Positive	Low	Moderate	Substantial	High
Resource/ Receptor Sensitivity/Value/ Importance*	Low	Moderate	High	The sensitivity is considered moderate.	
Impact Significance	Low	Moderate	Substantial	High	Considering the impact magnitude is large and the sensitivity is moderate, the overall significance is considered to be of moderate significance.

Operation Phase

During the operational phase there is the potential for impacts on vegetation and flora as a result of the existence of the transmission line, particularly due to the maintenance including periodic clearing of the RoW which perpetuate habitat fragmentation. Due to the inexistence of surrounding protected areas nor sensitive habitats the impact of the operation of the transmission line is expected to have a low sensitivity. The impact is directly negative, will be permanent during the project life period, maintenance will be conducted periodically. The extent of the impact is restricted to the Project RoW and therefore local in nature. The magnitude of the impact is considered to be low. Based on the analysis provided above, the impact of direct loss of vegetation and flora and degradation and fragmentation of habitat will be of **low** significance pre-mitigation (Table 7-20).

Table 7-20: Pre-Mitigation Impact Assessment

Impact	Flora and Vegetation during Operations				
Impact Nature	Negative	Positive	Neutral		
	Disturbance to vegetation and potential grow of invasive species as result of the maintenance works during operation				
Impact Type	Direct	Indirect	Induced		
	Impact is as a result of a direct interaction between the transmission line infrastructure in the RoW				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The effect is considered permanent as the RoW will be kept free of vegetation during operation				
Impact Extent	Local	Regional	International		
	Impact is limited to AoI				
Impact Scale	The impact is considered low scale as most of the impacts related to vegetation removal occurred during the construction phase. However, there will be a degree of habitat fragmentation.				
Frequency	Once off				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
Resource/ Receptor Sensitivity/Value/ Importance*	Low	Medium	High		
	The sensitivity is considered low as most of the major impacts on the vegetation and flora will occur during the construction phase.				
Impact Significance	Low	Moderate	Substantial	High	
	Considering the impact magnitude is small and the sensitivity is low, the overall significance is considered to be of low significance.				

Mitigation

The following standard mitigation measures will be employed:

- Avoidance of impacts should be prioritised. Where impact avoidance is not possible, existing indigenous vegetation must be kept intact, where possible. Vegetation will be removed only as absolutely necessary.
- Alien invasive vegetation should be removed immediately and disposed of properly, at a licensed waste disposal facility as necessary.
- There should be no deviation from the access road position without prior discussions with the authorities.
- Firewood collection by the project's employees should be strictly forbidden.
- Rehabilitation of temporary construction sites and pioneer camps (if needed) should be done as swiftly as possible and always with suitable native grasses and other plants.
- Materials (e.g., pylons and cables) and equipment should not be delivered to the site prematurely, as this could result in need for laydown or storage areas and additional areas being cleared or affected unnecessarily; and
- Whenever possible, all damaged areas shall be reinstated and rehabilitated upon completion of the contract to as near pre-construction conditions as possible.

Decommissioning Impact on Flora and Vegetation

The impacts on flora and vegetation will be **moderate** and temporary impacts as the decommissioning work will take place on areas already modified by the transmission line infrastructure. It is not expected that the activities will result in negative impacts on any sensitive species. Based on the analysis provided above, the impact of vegetation removal, habitat fragmentation and degradation will be **moderate**.

Residual Impact

The impact significance is Moderate after mitigation measures during construction and low post mitigation for operations (Table 7-21). There will be some vegetation loss as well as potential increase of invasive species as a result of the construction, however most of the habitat is modified and not expected to have conservational value with no protected ecosystem or critical biodiverse area within close proximity to the proposed transmission line route. With the proposed mitigation measure the residual negative impacts on flora are assessed to be of a moderate magnitude.

Table 7-21: Residual Impact Significance

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Impact Significance (Post Mitigation)
Disturbance to vegetation and habitat loss and fragmentation as a result of the ROW or degradation to environment and habitat	Construction	Moderate	Low
Disturbance to vegetation and potential grow of invasive species as result of the maintenance works	Operation	Moderate	Low

7.3.2.6 Impacts on Fauna

The land cover along the proposed transmission line corridor spans a range of habitat types, reflecting varying degrees of ecological integrity. Analysis of satellite-derived land cover data integrated into GIS reveals that the corridor is predominantly composed of largely

natural (73.6%) and natural habitats (17.3%), with only a small proportion falling under the modified category (4.7%).

However, when considering a buffer of 10-50km, which is outside the project AoI, there are 2 habitats categorized as KBA/IBA (Boorama Plains and Gacan Libaax) which based on literature review, and biodiversity scoping assessment initial screening of fauna CH qualifying species, 2 EN species (*Oryx beisa* and *Oryx beisa ssp. Beisa*), and 3 CR species (*Diceros bicornis*, *Diceros bicornis ssp. Michaeli* and *Diceros bicornis* are likely to occur in the KBA/IBA sites.

Baseline Conditions

There are no protected areas within approximately 10km distance from the transmission line routes as indicated in chapter 4.2.6 with 2 locations categorized as KBA/IBA 10km from the transmission line. The potential impacts are restricted to disturbance of wildlife in terms of their feeding and general movements, and only at the point of intense construction activities, i.e., at the towers and the substation. Disturbance could be caused by presence of labour force, noise, light, clearing of vegetation, and vibration.

Impact Assessment

Construction Phase

During construction, fauna in the AoI will be disturbed due to noise, light, vibration, vegetation clearance and human and vehicle presence. Disturbance impacts during construction are likely to be temporary and short lived. Impacts as the construction work will be progressive (overall program of 18-24 months). Although disturbance and displacement impacts are likely to be temporary and limited in their magnitude, if combined with the impacts of direct habitat loss, it could lead to disturbance of wild fauna. Based on the survey carried out for the ESIA, it is not expected that there will be any sensitive species in the along the transmission line route of international or local importance.

The impact is direct and negative; The extent of the impact is presented is restricted to the Project RoW and therefore local in nature. The magnitude of the impact is considered to be moderate. Based on the analysis provided above, the impact of direct loss and degradation of habitat will be a **Moderate** negative impact pre-mitigation.

Table 7-22: Pre-Mitigation Impact Assessment

Impact	Fauna during Construction			
Impact Nature	Negative	Positive	Neutral	
	Disturbance to avifauna species and loss of habitat as a result of the RoW or degradation to environment during construction.			
Impact Type	Direct	Indirect	Induced	
	Impact is as a result of a direct interaction between the project (i.e. construction activities) and the fauna population along the transmission line.			
Impact Duration	Temporary	Short Term	Long Term	Permanent
	The effect is considered temporary as it will only occur during the construction period			
Impact Extent	Local	Regional	International	
	Impact is limited to AoI			

Impact Scale	The impact is considered medium scale.				
Frequency	Once off				
Impact	Positive	Low	Moderate	Substantial	High
Resource/ Receptor Sensitivity/Value/ Importance*	Low	Moderate	Substantial		
	The sensitivity is considered low due to the disturbed and modified habitats that occur along the transmission line RoW.				
Impact Significance	Low	Moderate	Substantial	High	
	Considering the impact magnitude is medium and the sensitivity is low; the overall significance is considered to be of moderate significance.				

Operation Phase

During the operational phase there is the no significant impacts expected on fauna populations. The extent of the impact is restricted to the Project RoW and therefore local in nature. The magnitude of the impact is considered to be moderate. Based on the analysis provided above, the impact of direct loss and degradation of habitat will be of Moderate significance pre-mitigation (Table 7-23).

Table 7-23: Pre-Mitigation Impact Assessment

Impact	Fauna during Operations				
Impact Nature	Negative	Positive	Neutral		
	Increase in fauna mortality during operation				
Impact Type	Direct	Indirect	Induced		
	Impact is as a result of a direct interaction between the erection of the transmission lines and the fauna species along the RoW				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is considered permanent throughout the life cycle of the project				
Impact Extent	Local	Regional	International		
	Impact is limited to the Project AoI				
Impact Scale	The impact is considered medium scale.				
Frequency	The frequency is expected to be occasional				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	The impact magnitude is expected to be small due to wildlife mortality				
Resource/ Receptor Sensitivity	Low	Moderate	Substantial		
	The sensitivity is considered Moderate				
Impact Significance	Low	Moderate	Substantial	High	
	Considering the magnitude of the impact is small and the sensitivity is low the overall significance is considered to be of Moderate significance				

The following mitigation measures are recommended during operations:

- All areas disturbed by construction activities shall be landscaped and rehabilitated.
- Speed of project vehicles should be controlled at a maximum limit of 40km/h to minimise roadkill.
- No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct)
- All animal dens in close proximity to the work areas must be marked as no-go areas.
- Guidance shall be given to all staff that they are not allowed to harm any animals during any routine maintenance of the project's infrastructure.

Decommissioning Impacts on Fauna

The impacts on fauna will be **moderate** and temporary impacts as the decommissioning work will take place on areas already modified by the transmission line infrastructure. The modified areas have low sensitivity with no natural fauna of unique importance or conservational significance. The impact of direct loss of fauna and degradation of habitat will be moderate.

Residual Impact

The impact significance is Moderate after mitigation measures during construction and low post mitigation for operations (Table 7-24).

Table 7-24: Residual Impact Significance

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Disturbance to fauna species and degradation to environment during construction	Construction	Moderate	Low
Disturbance to fauna species and degradation to environment during operation and maintenance.	Operation	Moderate	Low

7.3.2.7 Impacts on Avifauna

In terms of avi-fauna, project potential impacts will be focused on the avian populations within the AoI, by habitat loss associated with the construction activities, such as displacement from breeding and foraging habitat and habitat degradation; there are also indirect impacts associated with changes to ecosystem and biophysical processes.

Table 7-25: Potential Impacts to Avian Fauna

Construction Phase	Operation Phase
- Disturbance due to noise, vibration and human and vehicle presence - Loss of habitat as a result of RoW or other project infrastructure	Bird strikes and collisions along transmission lines

Baseline Condition

Along the transmission line route and within the area of influence, the transmission line does not cross into any area designated as an Important Bird Area (IBA). As indicated in chapter 4.2.3, there are 2 IBA sites which based on initial screening for CH avifauna are likely to have avifauna species categorised as CR and EN. These sites are 10 kms away from the transmission line route. Based on biodiversity scoping literature review, and initial field screening as part of the biodiversity scoping survey, even though the presence of avifauna classified as CR and EN are likely to be present in these IBA sites, there were no observations/recordings of these species during the biodiversity scoping survey period which was conducted in February 2024. A biodiversity scoping assessment (Annex K) has been undertaken and will be used to conduct a detailed biodiversity assessment [study](#).

Impact Assessment

Construction Phase

During construction habitat degradation might be detrimental to bird breeding or feeding conditions. That is, clearing of the servitude and corridors will impact and disturb some sensitive species, and open up corridors for predators (avian and mammalian) that may not otherwise occur there. Disturbance in the form of labourers, machinery and noise is the biggest impact to birds, during construction, particularly large breeding birds that use traditional nest sites on cliffs, large trees, or pylon towers. During construction, avifauna within the near surrounds of the AoI will be disturbed due to noise, vibration, and human and vehicle presence. Disturbance impacts during construction are likely to be temporary and short lived. Impacts as the construction work will be progressive (overall program of 18-24 months). Although disturbance and displacement impacts are likely to be temporary and limited in their magnitude, if combined with the impacts of direct habitat loss, it could lead to disturbance of avifauna.

The impact is direct and negative, resulting from the land take and disturbance during construction. The extent of the impact presented is restricted to the RoW and therefore local in nature. The magnitude of the impact is considered to be medium. Based on the analysis provided above, the impact of direct loss and degradation of habitat will be a **Moderate** negative impact pre-mitigation.

Table 7-26: Pre-Mitigation Impact Assessment

Impact	Avifauna during Construction				
Impact Nature	Negative	Positive	Neutral		
	Disturbance to avifauna species and loss of habitat as a result of the RoW or degradation to environment during construction				
Impact Type	Direct	Indirect	Induced		
	Impact is as a result of a direct interaction between the project (i.e. construction activities) and the avifauna population along the transmission lines				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The effect is considered temporary as it will only occur during the construction				
Impact Extent	Local	Regional	International		
	Impact is limited to AoI				
Impact Scale	The impact is considered Moderate scale.				
Frequency	Once off				
Impact	Positive	Low	Moderate	Substantial	High
Resource/ Receptor Sensitivity/Value/ Importance*	Low	Moderate	High		
	The sensitivity is considered low due to the disturbed and modified habitats that occur along the transmission line RoW.				
Impact Significance	Low	Moderate	Substantial	High	
	Considering the impact magnitude is medium and the sensitivity is low; the overall significance is considered to be of moderate significance.				

Mitigation

In addition to the controls mentioned above, as well as those specified for mitigating impacts to flora and vegetation the following mitigation measures are recommended during construction. The following mitigation measures are recommended during operations:

- No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct)
- Guidance shall be given to all staff that they are not allowed to harm any animals during construction.
- All terminal structures (transformers) should be constructed with sufficient insulation on jumper wires and surge arrestors.

Operation Phase

During operation, there is the potential for bird strikes to occur along the transmission lines. This is most likely for large bird species, migrating species and species which have a varied flight pattern (dipping and circling). During the operational phase there is the potential for impacts on avian populations as a result of direct strike with the transmission line and pylons (bird collision) and by electrocution. A number of species of large birds suffer losses resulting from electrocution. This would mainly affect birds associated with the site; and electrocutions on power supply structures by raptors and other medium sized birds on passage. Birds sitting on power poles and /or conductors could cause short circuits between energized wires or short to ground especially numerous medium and large sized birds using the power poles as perching, roosting and even nesting sites. Birds are able to cause electrical faults (short circuits on power lines through bird pollution). The species of bird which are most likely to be impacted by collision with transmission lines are large species (such as raptors and waterfowl), birds that regularly migrate across the path of the transmission line (either daily or seasonal migration) and species whose flight patterns result in an increased time spent at transmission line height in the area of the development (predominantly display flight activities such as looping or circling repeatedly in the area).

Collisions are a significant threat posed by overhead lines to birds. Collision with power lines is a lesser-known problem than electrocution and is harder to detect because it can occur at any point along the transmission line. Collision risk is influenced by the topography of surrounding terrain and the proximity of lines and pylons to nests and other areas used frequently by local species. In most cases the impact of collision would lead to immediate death or fatal injuries. The potential electrocution of birds, mainly large species on support towers has largely been eliminated in the design of modern support structures as described in chapter 2.

The impact is directly negative, will be permanent as the lines will be in place throughout, the project life. The extent of the impact is restricted to the Project AoI and therefore regional in nature. The magnitude of the impact is considered to be moderate. Based on the analysis provided above, the impact of direct loss will be of **Substantial** significance pre-mitigation (Table 7-27).

Table 7-27: Pre-Mitigation Impact Assessment

Avifauna Impacts During Operation Phase			
Impact Nature	Negative	Positive	Neutral
	Increase in bird mortality due to bird strikes during operation		
Impact Type	Direct	Indirect	Induced
	Impact is as a result of a direct interaction between the erection of the transmission lines and the bird species along the RoW		

Impact Duration	Temporary	Short Term	Long Term	Permanent
	The impact is considered permanent throughout the project life.			
Impact Extent	Local	Regional	International	
	Impact is limited to the Project AoI			
Impact Scale	The impact is considered medium scale.			
Frequency	The frequency is expected to be occasional			
Impact Magnitude	Positive	Low	Moderate	Substantial
	The impact magnitude is expected to be small due to bird mortality			
Resource/ Receptor Sensitivity	Low	Moderate	Substantial	
	The sensitivity is considered moderate			
Impact Significance	Low	Moderate	Substantial	High
	Considering the magnitude of the impact is low and the sensitivity is moderate the overall significance is considered to be of substantial significance			

Mitigation

In addition to the controls mentioned above, as well as those specified for mitigating impacts to avifauna the following mitigation measures are recommended during construction. The following mitigation measures are recommended during operations:

- Undertake regular (at least annual) monitoring of the transmission line for evidence of birds nesting on the pylons. In the event of nesting, anti-perch and nest devices will be installed to discourage birds from regularly visiting these structures. These will be replaced when necessary.
- No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct). Guidance shall be given to all staff that they are not allowed to harm any animals during any routine maintenance of the project's infrastructure.
- Artificial bird-safe perches and nesting platforms placed at a safe distance from the energized parts of transmission infrastructure.
- Cross-arms, insulators and other parts of the power lines to be constructed such that there is no space for birds to perch where they can come into contact with energized wires.
- Install Bird Flight Diverters (BFD) in sections with presence of critical habitat triggering species. BFD Are crucial for protecting these birds, as they can significantly reduce the risk of fatal collisions and help conserve raptor populations. Raptors, with their powerful eyesight, are particularly vulnerable to collisions with power lines, especially when hunting near open areas or when flying at high speeds.
- Install line marking to increase the visibility of the line.
- Install line marking to increase the visibility of the transmission line. There are three general types of line marking devices: aerial marker spheres, spirals, and suspended devices. Aerial marker spheres, also known as aviation warning spheres, are used to make power lines and other overhead structures more visible to birds, reducing the risk of collisions, especially with raptors which are often large and powerful birds. These spheres are typically large, brightly colored (often orange or red/white), and placed at intervals along power lines or other structures. Raptors, being larger birds, are particularly vulnerable to collisions with power lines. Aerial markers can be crucial in protecting these birds.

- Spiral and suspended devices spin in the wind and reflect sunlight, creating a visual barrier that discourages birds from approaching spirals, and suspended devices.

Decommissioning Impacts on Avifauna

Avifauna within the surrounds of the activities may be disturbed by noise, vehicles, and human presence during decommissioning. The disturbance will be temporary and short-lived and the impact will be **low**.

Residual Impact

The impact significance is Moderate after mitigation measures during construction and Substantial post mitigation for operations (Table 7-28).

Table 7-28: Residual Impact Significance

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post-Mitigation)
Disturbance to avifauna species and degradation to environment during construction	Construction	Moderate	Low
Increase in bird mortality due to bird strikes during operation	Operation	Substantial	Moderate

7.3.2.8 Solid and Liquid Waste Impacts

Improper waste management procedures or lack of mitigation measures during construction, phase of the Project may result in adverse environmental and social impacts on: -

- Storm water quality and thus water quality in the water bodies in project areas
- Soil quality
- Surface water quality
- Ground water quality; and
- Ecological receptors or human health.

The different types of wastes and sources that are likely to be generated from the construction of the transmission line and sub-station are described below.

a) Recyclable and Reusable Waste

The types of recyclable and reusable wastes to be generated on site during the construction period include among others: -

Box 7-1: Recyclable and reusable waste

1. Waste metal
2. Waste plastic
3. Waste cables
4. Waste glass
5. Wastepaper (packaging material)
6. Clean containers, drums, bins etc.

b) Excavation Waste

The greatest volume of excavated material will arise from the construction activities of the Project during civil works associated with construction of the transmission lines. The excavated materials will be re-used immediately as back fill material.

c) Wastewater

Water will be required for the construction works, dust suppression, mixing of concrete and washing of construction equipment and in camp sites (if established by contractor) among others.

d) Hazardous Waste

The construction activities will generate hazardous wastes which may adversely impact on the local environment due to handling, storage, transport, and disposal. These include, oil, grease etc. During the construction period, waste oil will result from the maintenance of machines, equipment, and construction vehicles.

Impact Assessment

Direct and indirect disposal of waste oils to the receiving environment is likely to adversely impact on the environment and human health. Without mitigation measures, it is anticipated that there will be potential major to moderate adverse impacts during construction and moderate adverse impacts during the maintenance and operations periods. Wastewater if discharged indiscriminately into the environment, will lead to risks and impacts on water bodies, soil, vegetation, fisheries, and human health.

Table 7-29: Pre-Mitigation Impact Assessment

Impact		Waste generation and hazards during Construction			
Impact Nature	Negative	Positive		Neutral	
	Disposal of waste to the receiving environment is likely to adversely impact on the environment and human health.				
Impact Type	Direct	Indirect		Induced	
	Waste generated from the used materials during construction and operation activities that could cause land and groundwater contamination if spilled or not handled, stored and disposed of correctly.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is considered to be temporary for the duration of the construction phase.				
Impact Extent	Local	Regional		International	
	Impact limited to the Study Area				
Impact Scale	The impact is considered as Moderate scale since it is local to the construction area.				
Frequency	The frequency is considered to be occasional considering that the construction activities are localized.				
	Positive	Negligible	Small	Medium	Large
Impact	Waste generation and hazards during Operation				
Impact Magnitude	Based on the parameters above and considering the embedded measures, the magnitude is considered to be Moderate.				
Resource/Receptor Sensitivity	Low	Moderate		Substantial	
	The sensitivity of the of the potential receptors- land and ground water is low				
	Low	Moderate	Substantial		High

Impact	Considering the magnitude is small and sensitivity is high, the impact on the land and water resources during construction is considered to be of Moderate significance.

Mitigation

The following mitigation measures should be employed to reduce any impacts on associated with waste generation.

- A Waste Management Plan must be prepared prior to commencement of construction by the contractor (s).

The Contractor to prepare a Solid Waste Management Plan, which should contain:

- An inventory of the types and quantities of waste to be produced.
- The most appropriate waste management approach for each type of waste including details on (temporary) storage, transport and final destination of the waste.
- An assessment of any opportunities for reducing solid waste generation, in particular of hazardous and undesirable (persistent and non-reusable) types of wastes.
- The Contractor to maintain records of types, quantities, origin, (temporary) storage, transport and elimination/reuse of solid waste, and make these available to the works supervisor upon his request, as proof of proper waste management practices.
- Any waste including excess soil should be disposed of at designated/gazette sites.
- Excavated soils should be reused as much as possible as filling material and should be contained after excavation.
- Provisional material storage on site should be designed and undertaken in such a way as to ensure that soils and underground water are not polluted.
- Use licensed recycling companies to externally recycle, recover or dispose of waste.

Domestic non-hazardous waste produced at the camp as well as the small quantities of hazardous wastes (e.g., fluorescent lamps, detergents, clinical waste, spent lubricants and filters) will be taken off site and disposed at licensed landfill. This will include controls over prescribed routes, driver training, vehicle maintenance, speed restrictions, appropriate road safety signage, and vehicle loading and maintenance measures and vetting procedures. It also includes specification for community awareness and safety programs that will be respected and once the works are finished the access may/will be closed and restoration to the original condition will be undertaken.

Decommissioning Solid and Liquid Waste Impacts

Solid and liquid waste will be generated during this phase of the project and include plastic, cables, metal, transformers, capacitors, drywall, wood, glass, fasteners, wastewater etc. excavated materials will be re-used immediately as back fill material. Solid waste associated with transmission lines are largely re-used or recycled. To mitigate any residual impact, the waste management plan used during construction will be implemented.

Residual Impact

The impact significance is **Moderate** after mitigation measures during construction and Low post mitigation for operations (Table 7-30).

Table 7-30: Residual Impact Significance

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Poor waste disposal	Construction	Moderate	Low
Poor waste disposal	Operation	Low	Low

7.3.2.9 Restricted Access to Infrastructure and Services

The Project will use the existing infrastructure for activities such as transportation and waste disposal. The transportation of construction material and equipment will take place by trucks and through the existing road network during construction. Stringing activities will also require short-term road closures and will disrupt transit routes. Although road improvement and construction of access roads may lead to disruption of traffic during the construction phase, these improvements are expected to benefit the local communities in the long run during the operation phase. The potential increase in the risk of road accidents is addressed under community and occupational health and safety impacts section.

During construction, the Project is not considered to give rise to any significant impact associated the increased pressure on health care infrastructure in the study areas as the number of workers will be low/negligible. Similarly, the potential pressure on local sources of water has also been scoped out since the sources of water for construction and operating the campsite will be determined by the contractor and a water use plan will be required. No pressure on existing waste management infrastructure and services in the study area is expected either as the construction wastes associated with transmission lines are insignificant. However, wastes from the camp site could be significant and overburden the existing wastes disposal facilities in the area.

Baseline Conditions

Relevant baseline conditions that may influence the significance of potential impacts on infrastructures and services are summarized as follows:

- Road infrastructure and road safety are precarious along the Project line.
- Road conditions and lack of public transportation system are the main challenges as regards access to services such as health and education, as well as to job opportunities.
- Lack of infrastructure, poor maintenance, and long dry seasons are the main difficulties related to water access. Settlements in the Study Area do not have in-house running water.
- Households in the settlements of the Study Area do not have access to sanitation or sewage system, and most households use pit latrines/toilets.
- In the project area, most households burn or bury their waste. Only urban households have access to appropriate waste disposal.

Impact Assessment

Disruption to road traffic and transportation during the upgrade of existing access roads, access to tower sites, transport of equipment and material supply and stringing activities could result in impacts to quality of life, and if unmanaged, in health impacts for local populations (e.g. worsening of the sanitary situation, inability to reach healthcare infrastructure during an emergency due to road upgrading or traffic, etc.). Therefore, if

unmanaged, disruption to services might also result in community distrust and resentment towards the Project. This being said, the associated increased pressure and disruption of the existing road network and related traffic issues will be temporary and limited to the construction phase. MoEM commits to performing site reinstatement and rehabilitation including repairing any damage caused as part of the construction activities and reinstating existing access roads if needed. As described above, the impact magnitude is considered small, and receptor sensitivity is high resulting in an impact of moderate significance.

Table 7-31: Pre-Mitigation Impact Assessment

Impact	Damage/Access to Local Infrastructure and Services during Construction				
Impact Nature	Negative		Positive		Neutral
	Damage road infrastructure can lead to disruptions and reduced quality of life of communities in the Study Area.				
Impact Type	Direct		Indirect		Induced
	Increased pressure on road infrastructure is expected to occur as a result of direct utilization by the Project (road usage, transport of equipment, material, workers, water, waste, etc.).				
Impact Duration	Temporary		Short Term	Long Term	Permanent
	The impact is considered to be of temporary duration as it is not expected that transportation and road upgrades will be continuous throughout the construction phase.				
Impact Extent	Local		Regional		International
	Impact limited to the Study Area				
Impact Scale	The impact is considered as small scale since could result in temporary reductions in community well-being from loss of access to basic services before reinstatement.				
Frequency	The frequency is considered to be occasional considering that the traffic generated by the Project is expected to be low and localised and the building of new roads will be limited.				
	Positive	Low	Moderate	Substantial	High
Impact Magnitude	Based on the parameters above and considering the embedded measures in place to reinstate road networks, the magnitude is considered to be small.				
Resource/ Receptor Sensitivity	Low		Moderate		Substantial
	The sensitivity of the local communities is considered to be high as they depend on the road network to access healthcare and other services.				
Impact Significance	Low		Moderate	Substantial	High
	Considering the magnitude is small and sensitivity is high, the impact on community access to infrastructure during construction is considered to be of moderate significance.				

Operation Phase

Improvements to roads have the potential to positively impact on community access to education, employment, services, and road safety. Along the project route, communities in rural and remote areas are currently lacking in quality roads and infrastructure and they have the potential to be most positively impacted by infrastructure improvement. Communities benefiting from the upgrade and construction of new roads may also experience positive impacts such as enhanced access to markets for their local agricultural produce, and access to transportation and services (education, health, transport, etc.). As the Project is expected to as much as possible use mainly existing roads, these will require upgrading during the construction phase and maintenance during operations which result in a long-term positive impact for local communities.

Table 7-32: Pre-Mitigation Impact Assessment

Table 7-52: FTE Mitigation Impact Assessment				
Impact	Damage/access to local infrastructure and services during operations			
Impact Nature	Negative	Positive		Neutral
	Improvement of the local road network leading to improved access education, employment, healthcare and improved road safety for local communities in the Study Area.			
Impact Type	Direct	Indirect		Induced
	The improvement in access to service and in livelihoods and employment is a direct result of Project improvement, reinstatement and maintenance activities.			
Impact Duration	Temporary	Short Term	Long Term	Permanent
	The impact is considered to be of long-term duration throughout the operation phase.			
Impact Extent	Local	Regional		International
	Impact limited to the Study Area.			
Impact Scale	The impact is considered as Low scale considering the length of the transmission line route.			
Frequency	The frequency of the impact is continuous throughout the operation phase.			

Mitigation Measures

The following mitigation measures should be employed to reduce any impacts on local infrastructure access and/or damage:

- Methods will be implemented to maintain open, clear, and transparent communication with the local communities regarding the use of local infrastructures by the Project throughout the different phases.
- Engagement with the relevant authorities is recommended in order to avoid damage to common property and minimize access disruption to education and healthcare facilities.
- A Community Grievance Mechanism Plan will be developed and implemented by contractor (informed by project level GRM plan already developed).
- A Traffic Management Plan (informed by already developed TMP) shall be issued before earth movements and construction start in order to minimize traffic disruptions.
- Where temporary closure of road is required, alternative access to property will be ensured and local solutions including diversions will be implemented to ensure uninterrupted mobility.

Decommissioning Access to Infrastructure and Services

The transportation of decommissioned material and equipment will take place by trucks and through the existing road network. The exercise is not considered to give significant rise to pressure on existing infrastructure in the study area as the number of trucks will be low/negligible. The low number of workers are not also anticipated to strain the existing health infrastructure. The existing waste management infrastructure and services in the study area is not expected to suffer additional burden as decommissioning wastes associated with transmission lines are largely re-used or recycled. The impact is classified as **low**.

Residual Impacts

Considering the mitigation measures in place, the significance of traffic and road network disruption may be reduced to minor, while the impact from road network improvements in the operation phase is positive.

Table 7-33: Residual Impact Significance

Impact	Project Phase	Significance Mitigation)	(Pre- Residual Significance Mitigation)	Impact (Post
Disruption to traffic and transportation	Construction	Moderate	Low	
Improvement of the local road networks	Operation	Positive	Positive	

7.3.2.10 Air Navigation and Safety

For purposes of ensuring aircraft safety, the Somaliland Civil Aviation Authority (SCAA) is mandated to evaluate and approve aerial masts and other structural heights. The installations, like the power transmission towers, should not be erected in the vicinity of an aerodrome that may impact of aircraft operation being conducted safely. The impact to aircraft safety can be directly through collision, or indirectly through radar and radio interference. There are different heights and distance allowed depending on how far the building is from the runway and the approach path. The tower heights of the stainless-steel pylons are approximately 40m above ground level and none is on the flight path of any of the airports. The airport in Berbera is 5.8kms away from the transmission line whereas the airport in Hargeisa is 9kms away from the transmission line. International aviation guidelines require high voltage transmission lines to be at least 6kms away from airports.

Table 7-34: Impact Analysis Air Navigation and Safety

Impact	Air Navigation and Safety			
Impact Nature	Negative	Positive		Neutral
	Compromise on aircraft operation safety, directly through collision, or indirectly through radar and radio interference			
Impact Type	Direct	Indirect		Induced
	The height of the stainless-steel pylons can affect aircraft operation directly through collisions, from visual errors, or indirectly by radiations interfering with radar and radio			
Impact Duration	Temporary	Short Term	Long Term	Permanent
	The impact is considered to be of long-term duration throughout the 50- year operation phase.			
Impact Extent	Local	Regional		International
	Impact limited to the location of the specific tower			
Impact Scale	The impact is considered as medium scale considering the length of the Transmission Line route.			
Frequency	The frequency of the impact is continuous throughout the operation phase.			
Mitigation	The siting of the stainless-steel pylons, are not of adequate height, considering distances from the airports on its RoW to cause these impacts.			
Residual Impact	None			

7.3.2.11 Landscape and Visual Amenity Risks and Impacts

Visual Impacts refers mainly to the changes to the visual character of landscape views resulting from: obstruction of existing views; removal of screening elements thereby exposing viewers to unsightly views; the introduction of new elements into the views of the visual receptors and intrusion of foreign elements into the view shed of landscape features. The construction activities for the transmission lines will have an impact on the visual character of the landscape due to:

- Clearance of vegetation along the transmission line corridor, construction yards and

- access roads
- Presence of construction vehicles and equipment
- Worker presence and activity; and
- Dust emissions resulting from construction activities and traffic.

Table 7-35: Potential Impacts to Landscape and Visual Amenity

Construction Phase	Operation Phase
Presence of construction vehicles and work force	Presence of transmission lines and towers/monopoles Permanent clearance of vegetation

Baseline Conditions

The local settings of the landscape are mainly characterized by the presence of open space and cultivation areas.

Impact Assessment

Construction Phase

As per the current settings of the project area, the proposed transmission line will cause minimal change to people's existing views. Despite the direct and negative impact of additional construction vehicles on site, it will be temporary and local. The small magnitude on visual amenity and the low sensitivity of the receptors means the significance of this impact is assessed as negligible. Based on the analysis provided above, the visual impact and change of landscape will be of moderate significance.

Table 7-36. Pre-Mitigation Impact Assessment

Landscape and Visual Amenity During Construction					
Impact Nature	Negative	Positive	Neutral		
	Change in visual amenity				
Impact Type	Direct	Indirect	Induced		
	Impact is a result as a direct interaction between project activities and local views				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact duration will be temporary				
Impact Extent	Local	Regional	International		
	The impact will be limited to the immediate surroundings of the construction yards and access roads.				
Impact Scale	The impact is considered as moderate (local) scale.				
Frequency	Continuous				
Likelihood	Possible				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the above the impact magnitude is considered small.				
Resource/ Receptor Sensitivity	Low	Moderate	Substantial		
	The area has mainly modified environment with no relevant scenic views' locations				
Impact Significance	Low	Moderate	Substantial	High	
	Considering the impact magnitude is small and the sensitivity is low, the overall significance is considered to be Moderate.				

Operation Phase

Along the proposed alignment, only the few communities in close proximity to the corridor will be able to perceive the presence of the project features, being more sensitive to the visual intrusion. Moreover, the expected pylons type (not solid but lattice) are limiting their evidence in the landscape as the viewer moves further away from them. The visual absorption capacity of the landscape is enhanced by the existing infrastructure as well as by the local vegetation patches and local gentle topography. Based on the analysis provided above, the visual impact and change of landscape will be of *moderate* significance.

Table 7-37: Pre-Mitigation Impact Assessment

Impact	Landscape and Visual Amenity During Operations				
Impact Nature	Negative	Positive		Neutral	
	Change in visual character				
Impact Type	Direct	Indirect		Induced	
	Impact is as a result of a direct interaction between the project and surrounding residents and land users				
Impact Duration	Temporary	Short Term		Long Term	Permanent
	The impact duration will be permanent throughout the project life.				
Impact Extent	Local	Regional		International	
	The view shed experience is limited to few kilometres				
Impact Scale	The impact is considered as local scale. Visual impacts will not only impact people who live near the transmission line route, but also people who are travelling by the line daily.				
Frequency	Likely				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the above the impact magnitude is expected to be medium				
Resource/ Receptor Sensitivity	Low	Moderate		Substantial	
	The area has mainly modified environment with no relevant scenic views' locations				
Impact Significance	Low	Moderate	Substantial		High
	Considering the magnitude is medium and the sensitivity is low the overall significance is considered to be Moderate.				

Mitigation

The nature of the development (i.e., tall structures and a linear formation) does not allow many opportunities for complete screening. The objective of mitigation is to minimize visual scarring of the landscape and to enhance absorption of the development's permanent equipment and structure into the surrounding environment. Specific recommended measures during operation as best practices include:

- Any excavated or cut and fill areas will be landscaped and re-vegetated.
- No debris or waste materials will be left at the work sites, good housekeeping on site to avoid litter and minimise waste.
- Towers and structures should have a non-reflective finish.
- Night lighting of sites should be minimized within requirements of safety and efficiency.
- Ongoing rehabilitation of cleared areas to minimise visual scarring and maintenance clearing will be kept to the absolute minimum and should not extend beyond the corridor.

It is suggested to evaluate locations in proximity of very close sensitive receptors to determine whether installation of screening items such as vegetated areas with indigenous species will reduce visual impacts and install if warranted.

Residual Impact

Considering the nature of the construction activities, the foreseen mitigation measures are able to furtherly reduce the impacts avoiding an alteration of the view shed experience. For the operational phase, the nature of the project features is limiting the possibility to greatly reduce the potential impacts. There are, however, a number of sensitive visual receptors in proximity to the power line and the power line will intrude on their existing views. These visual receptors are mainly limited to residents with houses within 1km of the route. Mitigation measures are unlikely to reduce the visual impact of the power lines on these visual receptors but for they will grant the local scale of the residual impacts.

Table 7-38. Residual Impact Significance

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)	Impact (Post Mitigation)
Visual impact	Construction	Low	Low	

7.3.2.12 Workers' Health and Safety and Workers Management

The construction of the transmission lines is likely to attract workers from within the project area and outside of the project area. The total number of work force cannot be estimated at this point and will be provided by the contractor. The total work force is going to be skilled and unskilled and sourced from project locality and outside of locality including internationally depending on the skill sets desired. The workers required by the contractor may include among others: -

- a) Engineers-Skilled Experts (civil, mechanical, electrical) etc.
- b) Supervisors, Inspectors and Operators –Skilled Experts
- c) Technicians (inspectorate, welders, masons, steel fixers, drivers etc.)- –Skilled Experts; and
- d) Unskilled-flagmen, diggers, cleaning, security, mixing, watering, help team.

The construction activities will also entail engagement of contractors, sub-contractors and third-party entities which will form part of the supply chain. Workers' rights including occupational health and safety may be abused hence adverse impact and may include exposure to accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working conditions. These issues should be considered not only for those who are directly employed by the proponent but also its contractors (including sub-contractors) and within the supply chain. The Project could potentially lead to workforce-related social and health issues throughout the life cycle of the Project if worker management and rights do not meet Somaliland labour laws or international best practice. The potential for occupational health and safety incidents throughout the life cycle of the project is higher during construction phase.

Workers' rights including occupational health and safety need to be considered to avoid accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working conditions. These issues should be considered not only for those who are directly employed by MoEM but also its contractors (including sub-contractors) and within the supply chain. The Project could potentially lead to workforce-related social and health issues throughout the life cycle of the Project if worker management and rights do not meet Somaliland law or international best practice. Table 7-39 presents the potentially significant impacts associated with occupational health and safety and worker management during the construction and operation phases. The potential for occupational health and safety incidents throughout the life cycle of the project is higher during construction phase.

Table 7-39: Potential Impacts on Occupational Health and Safety and Worker Management

Construction Phase	Operation Phase
Impacts on workers' health and safety, in particular from road accidents, slip, and trip and falls hazards during tower erection and stringing activities, exposure to chemicals and inconsistent use of PPEs. Impacts on workers' rights from violations of labour laws in particular with respect to enforcement of health and safety measures by the employer such as the use of appropriate PPEs during construction of the transmission lines. Workers are likely to be exposed to work related risks during the construction phase of the project especially when erecting the transmission towers and lines. Typical activities for the construction of the transmission lines include clearance of the RoW in vegetated areas, excavation work, erecting the towers, working at height and stringing the transmission lines. The above activities could expose workers to injuries and even fatalities when for instance those working at height fall, towers collapse, objects fall on workers, electrocution etc. Similarly, the storage and disposal of hazardous waste and materials generated from the use of materials during the construction of transmission lines may also pose a hazard to the health of the workforce if not handled properly. Equipment and worker transport along the access roads to the pole positions may also result in road accidents in the absence of a proper traffic management plan or if traffic safety rules are not enforced. The often-poor conditions of the existing roads may also increase the risk of accidents.	Impacts on workers' health and safety in particular during maintenance of the transmission lines are from occupational hazards such as electrocution and EMF during line maintenance and the exposure to chemicals. Impacts on worker's rights from lack of enforcement of health and safety measures by the employer such as the use of appropriate PPEs during maintenance of the transmission lines.

Baseline Conditions

Relevant baseline conditions that may potentially influence impacts are summarized as follows:

1. Settlement level key informants reported that the distance to health centres from these settlements varies between 0 and 2 km.
2. Road infrastructure and road safety are precarious along the Project transmission line route.
3. Enforcement of health and safety laws and standards in Somaliland is expected to be limited, which contributes to high incidence of accidents on construction sites.

Impact Assessment

Construction

Worker's Health and Safety and Labour Rights

Typical activities for the construction of the transmission lines include clearance of the RoW in vegetated areas, excavation work, erecting the towers, working at height, and stringing the transmission lines. Considering that construction was identified as one of the sectors of employment (formal and informal) in Somaliland, the locally hired workforce may have some experience in traditional/basic construction activities such as excavation works. However, work practices and consideration for health and safety may fall short of international standards and best practice, such as the use of personal protective equipment (PPE), which will increase the severity of hazards to which the workforce are exposed. Similarly, the storage and disposal of hazardous waste and materials generated from the use of materials during the construction of transmission lines may also pose a hazard to the health of the workforce if not handled properly.

Equipment and worker transport along the access roads to the pole positions may also result in road accidents in the absence of a proper traffic management plan or if traffic safety rules are not enforced. The often-poor conditions of the existing roads may also increase the risk of accidents.

During construction, the direct interaction between the Project and the workforce if not managed properly, will result in negative impacts on the workers' working conditions and potentially permanent impacts on their health and safety. The impact is considered short-term and continuous over the construction phase resulting in a medium impact magnitude. Since contractors are expected to operate according to international standards and considering the level of prior training of the workforce, receptor sensitivity is considered medium. Therefore, the impact is of *moderate* significance.

Table 7-40: Pre-Mitigation Impact Assessment

Table 1: TOR 10 Mitigation Impact Assessment				
Impact	Workers Health and Safety and Rights during Construction			
Impact Nature	Negative	Positive		Neutral
	Poor planning, non-compliance with health and safety best practice and labour rights can result in injuries or fatalities.			
Impact Type	Direct	Indirect		Induced
	Resulting from a direct interaction between the Project (i.e. increased project traffic, working at height, stringing the transmission lines across the towers, open excavations, and demining) and the workforce.			
Impact Duration	Temporary	Short Term	Long Term	Permanent
	Injuries and fatalities could have permanent impacts on workers and their families.			
Impact Extent	Local	Regional		International
	The workforce will be primarily contracted from the project affected areas along the transmission line and other regions of Somalia.			
Impact Scale	As mentioned above the workers will be working on different sections of the line at different times. The impact scale is therefore moderate.			

Frequency	The frequency is considered to be infrequent as the workforce and drivers are expected to be trained and the employer is expected to enforce the use of PPEs and health and safety measures.				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the parameters above and considering the embedded measures in place the magnitude is considered to be medium.				
Resource/ Receptor Sensitivity	Low		Moderate		High
	The sensitivity of the receptors (workforce working along the transmission lines) is considered medium as some workers may not be aware of their rights.				
Impact Significance	Low		Moderate	Substantial	High
	Since the magnitude is considered medium and sensitivity is medium, the impact on workers' health and safety during construction activities is considered to be of moderate significance.				

Operations

Similar to the construction phase, the operation phase may also lead to occupational health and safety issues in particular with respect to maintenance of the transmission lines (risk of electrocution and exposure to electric and magnetic fields). With respect to exposure to EMF, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) considers that there are occupational circumstances where, with appropriate advice and training, it is reasonable for workers voluntarily and knowingly to experience transient effects such as retinal phosphenes and possible minor changes in some brain functions. These symptoms are not believed to result in long term or pathological health effects.

The project during its lifetime will be subject to local labour laws and international standards with respect to the responsibility of the employer to safeguard the health and safety of its employees. The Project is therefore expected to abide by these regulations and develop and implement appropriate health and safety measures covering the operations phase including the use of PPE by the workforce. Finally, all contractor contracts will include explicit reference to the need to abide by Somali law and standards and policies in relation to health and safety. Any health and safety and labour rights related impact during the operations phase will be limited to a small number of workers and will be permanent over the operation phase. The magnitude is therefore considered small. Receptor sensitivity is considered low as most workers will be permanent skilled workers. Therefore, the impact is of *moderate* significance.

Table 7-41. Pre-Mitigation Impact Assessment

Table 7-41: Pre-Mitigation Impact Assessment				
Impact	Workers Health and Safety and Rights During Operations			
Impact Nature	Negative		Positive	Neutral
	Poor planning, non-compliance with health and safety best practice and labour rights can result in injuries or fatalities.			
Impact Type	Direct		Indirect	Induced
	Resulting from a direct interaction between the Project (i.e. increased project traffic, working at height, stringing the transmission lines across the towers, open excavations) and the workforce.			
Impact Duration	Temporary	Short Term	Long Term	Permanent
	Injuries and fatalities could have permanent impacts on workers and their families.			
	Local		Regional	International

Impact Extent	The workforce will be primarily contracted from urban and rural centres within the regional state and other states in Somalia as well as from other countries for some higher skilled jobs.				
Impact Scale	The impact scale is considered small during operations as the workforce size will be reduced, and maintenance activities will be periodic.				
Frequency	The impact is considered to be infrequent since the operation activities will be limited to maintenance works. The workforce is expected to be trained, and the employer is expected to enforce the use of PPEs and health and safety measures. Lessons learned from the construction phase are expected to enhance the safety conditions and thus reducing the frequency of safety incidents during the operation and maintenance phase.				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the parameters above, and the embedded measures in place, the magnitude is considered moderate.				
Resource/ Receptor Sensitivity/Value/ Importance*	Low		Medium		High
	The sensitivity of the receptors is considered low as workers will be mostly skilled permanent employees.				
Impact Significance	Low		Moderate	Substantial	High
	Considering the magnitude is medium and sensitivity is low, the impact on workers' health and safety during operations activities is considered to be of Moderate significance.				

Mitigation Measures

The following mitigation measures shall be implemented during the construction phase to reduce any impacts on workers' health and safety and labour rights. MoEM shall develop and implement a Workers Health and Safety Management System covering all contractors and subcontractors including the following measures:

- MoEM shall require contractors to develop Human Resources Policy, which shall outline worker rights to be included in all contracts including restrictions on working hours in line with applicable ILO standards, compensation including consideration of overtime, holidays etc.
- MoEM shall implement Labor Management Procedures (LMP) already developed for the project
- MoEM shall require its contractors and subcontractors to put in place policies in line with national legislation and applicable international legislation and MoEM Code of Conduct and Policies.
- MoEM will establish contractual clauses to be embedded in the contracts of the contractors and all sub-contractors that require adherence to Somali law and international standards to be upheld related to worker rights and providing the contractor and MoEM with the right of audit.
- MoEM require that contractors prohibit the use of alcohol or drugs, which could adversely affect the ability the employee to perform the work safely or adversely affect the health and safety of other employees, community members or the environment.
- Pre-employment medical assessments shall be put in place as a workforce risk management tool to screen individuals for risk factors that may limit their ability to perform a job safely and effectively. Expected benefits of conducting a pre-employment medical assessment include a safer working environment, reduction in workplace injuries, minimised downtime, matching the capacity of the employee with the role, and overall recruitment cost and risk reduction.
- Contractors shall ensure that training on health and safety measures is provided to all construction workers prior to starting to work on the Project and that supervisors have

adequate experience to deliver on their responsibilities.

- Contractors shall implement regular health and safety checks and audits of Workers, EEP will implement sanctions in case of breaches of national standards and the Project's specific standards. Such audits to include workplace H&S; worker contracts, working hours, pay and conditions; housing and food standards.
- Contractors shall develop and implement a Workers Grievance Mechanism for the Project workforce including contractors and subcontractors.
- Contractors shall establish a procedure for the recording and analysis of incidents and lessons learned such that additional actions can be implemented to avoid or minimize occupational health and safety risks.
- Contractors shall ensure that facilities and work sites are designed and maintained such that robust barriers are in place to prevent accidents.
- Contractors shall ensure that its Code of Conduct is followed to regulate the performance and behaviour of all workers, including provision for disciplinary action for anti-social behaviour and non-compliance with health and safety regulations such as lack of use of PPE.
- Provision of condoms (male and female) for workers.
- Creating awareness on HIV/AIDS spread among workers and community.
- Contractors will ensure that WB Group EHS guidelines regarding the construction and management of worker accommodation and the provisions of medical facilities at worker accommodation are followed.
- Contractors will ensure that adequate clean water, adequate food, and access to medical care is provided to all workers on the worksite and at accommodation.
- Contractors shall develop and implement a Traffic Management Plan covering aspect such as vehicle safety, driver, and passenger behaviour, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations.
- Contractors shall develop a Waste Management Plan for the construction phase with clear guidelines for the safe storage and disposal of hazardous waste and handling of hazardous materials.
- Recruitment shall be undertaken in collaboration with local authorities and local agencies. Contractors will put in place measures to ensure no employee or job applicant is discriminated against on the basis of his or her gender, marital status, nationality, age, religion or sexual orientation
- Only allowing trained and certified workers to install, maintain, or repair electrical equipment.

During the operation phase, MoEM shall implement the following measures:

- The Workers' Health and Safety Management System shall be extended to the operation phase and adapted to address relevant aspects, including the following measures:
- Identification and provision of appropriate PPE, training and monitoring, as well as ongoing safety checks and safety audits.
- Prohibiting the use of alcohol or drugs, which could adversely affect the ability the employee to perform the work safely or adversely affect the health and safety of other employees, community members or the environment.

- Ensuring that training on health and safety measures is provided to all operation workers prior to starting to work on the Project.
- MEWR shall undertake compliance monitoring of labour rights. KPIs shall be developed around worker rights, discrimination and management, workforce grievance mechanism and monitoring of outcomes.
- Implementing a Workers Grievance Mechanism for the Project workforce.
- Establishing a procedure for the recording and analysis of lessons learned and implementation of additional actions to avoid or minimize occupational health and safety risks.
- MOEM shall develop a Waste Management Plan for the operation phase with clear guidelines for the safe storage and disposal of hazardous waste and handling of hazardous materials.
- MOEM shall put in place measures to ensure no employee or job applicant is discriminated against on the basis of his or her gender, marital status, nationality, age, religion or sexual orientation.
- Identification of potential exposure levels in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities.
- Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others.
- Establishment of criteria for use of 100 percent fall protection (typically when working over 2 meters above the working surface, but sometimes extended to 7meters, depending on the activity). The fall protection system should be appropriate for the tower structure and necessary movements, including ascent, descent, and moving from point to point.
- Installation of fixtures on tower components to facilitate the use of fall protection systems.
- Deactivating and properly grounding live power distribution lines before work is performed on, or in close proximity, to the lines.
- Ensuring that live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards.

Decommissioning Phase: Worker's Health and Safety and Labour Rights

Typical activities for the decommissioning of the transmission lines include excavation work, dismantling of the towers, working at height and un-stringing the transmission lines. During these activities, the use of personal protective equipment (PPE), will greatly manage the severity of hazards to which the workforce are exposed. The traffic management plan will also be used to manage road accidents. The impact is considered short-term and medium over the decommissioning phase. Since contractors are expected to operate according to international standards and are in possession of prior EHS training, the impact is of **moderate** significance.

Residual Impacts

The implementation of mitigation measures will contribute to reducing occupational health and safety risks and the risk of labour rights abuses significantly. However, the risk of

potential accidents still exists and may potentially lead to injuries or fatalities for the workforce during construction and operation. This risk will be short-term during the construction phase (18-24 months) and long-term during operations. With the implementation of mitigation measures the remaining impact significance is considered minor significance during construction and negligible during operation. In fact, during operations, knowledge and lessons learned in terms of health and safety and labour rights during the construction phase may extend to the operation phase and contribute to strengthening local knowledge and practices in Somaliland.

Table 7-42: Residual Impact Significance

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Impact Significance (Post Mitigation)
Worker health and safety and labour rights	Construction	Moderate	Low
Worker health and safety and labour rights	Operation	Moderate	Low

7.3.2.13 Community Health and Safety Impacts

The presence of the Project could affect the health, safety, and wellbeing of the communities along the transmission line route. Increased Project-related traffic, civil works for site preparation including site clearance and excavation work, change to the environment due to increased noise, decreased air quality, inappropriate waste handling or disposal, and accidental leaks and spills, and the presence of the Project workforce all present potential hazards for the health and safety of local communities. Similarly, communities and stakeholder concerns around the safety of the transmission lines once they are operational including exposure to electric and magnetic fields (EMF), also have the potential to affect communities.

Construction activities are likely to expose the local communities to health and safety related risks. Local community members could be exposed to accidents which could lead to injuries or fatalities. Collapsing of the towers, falling objects, road accidents caused by construction vehicles, exposure to hazardous wastes from the construction sites among others are potential community health and safety impacts. Further as discussed external workers could bring with them communicable diseases including sexually transmitted diseases (STDs) that could be passed on to local communities. Table 7-43 presents the potentially significant community health, safety and security impacts that may occur during the construction and operation phases.

Table 7-43. Potential Impacts on Community Health and Safety

Construction Phase	Operation Phase
Potential impacts on community safety, in particular road accidents, trespass on the sites, and demining activities potentially resulting in accidents leading to injuries or fatalities. Environmental health: changes to the environment due to increased noise and vibrations, decreased air quality and, inadequate management of waste. Impact from workers presence and potential interaction with local populations.	The operation of live power distribution lines and substations may also generate community health and safety risks such as dust, noise, electrocution, electromagnetic interference, visual amenity, and noise.

Baseline Conditions

Relevant baseline conditions that may potentially influence impacts are summarized as follows:

- Access to health services is limited throughout the transmission line route.
- The main health issues in the settlements of the Study Area are diarrhoea, respiratory problems, and urinary infections.
- Road infrastructure and road safety are precarious along the Project transmission line route.

Operations

Potential Health Impact from Exposure to Electromagnetic Fields

Electric and magnetic fields (EMF) are invisible lines of force emitted by and surrounding any electrical device such as power lines and electrical equipment. Electric fields are created by differences in voltage; the higher the voltage, the stronger the resulting electric field. Concerns over EMF health and safety risks are related to chronic (long term) health effects and acute (short term) effects. The potential impacts on community health and safety resulting from potential chronic and acute health effects caused by the transmission lines' EMF are assessed below.

Chronic effects relate to long term exposure to low magnetic fields and the potential impacts on health. Specifically, epidemiological studies indicated that long term exposure to 50-60 Hz magnetic fields might be associated with an increased risk of childhood leukaemia. There are also some concerns about possible increased risk of cancer from exposure to electromagnetic radiation from overhead transmission line. However, according the IFC EHS guidelines for electric power distribution, there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment. Nevertheless, while the evidence of adverse health risks is weak, it is still sufficient to warrant limited concern.

Similarly, with respect to acute health effects from EMF, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines notes that there are a number of well-established acute effects of exposure to low frequency EMFs on the nervous systems; these being a result of direct stimulation of nerve and muscle tissue and the induction of retinal phosphenes. These health effects are not believed to result in long term or pathological health effects.

Using a weight-of-evidence approach to evaluate this large body of research, the scientific consensus of numerous organizations is that no cause-and-effect relationship between EMF from any source and ill health has been established at the levels typically found in residential environments, even near to transmission lines. As a result, no scientific organizations have recommended standards to prevent long-term health effects (such as cancer), nor are there any standards in the U.S. or most other countries for limiting exposure to the levels of EMF typically encountered in people's everyday lives. Overall, no potential impacts are expected to occur when humans, animals, and plants are exposed to EMF. However, if household

within 100 meters of the line make a request, MoEM will monitor EMF levels within houses to verify they are below all recognized norms.

The development of the Project has been designed to comply with the *IFC EHS Guidelines for Electric Power Transmission and Distribution (April 30, 2007)* and the *ICNIRP Guidelines (2010)*. As such, routing of the transmission line has aimed to minimize exposure to the public in accordance with ICNIRP guidelines on public and occupational exposure. Based on the analysis provided above, the potential impact from EMF from chronic and acute exposure is of **low** significance.

Table 7-44: Pre-Mitigation Impact Assessment

Impact	EMF Chronic and Acute Health Effects				
Impact Nature	Negative		Positive		Neutral
	Negative chronic and acute health effects as a result of EMF exposure.				
Impact Type	Direct		Indirect		Induced
	The impact is a direct interaction between the transmission lines and surrounding residents and land users.				
Impact Duration	Temporary		Short Term	Long Term	Permanent
	The duration is permanent as the project life cycle is expected to last throughout the project life.				
Impact Extent	Local		Regional		International
	The impact is of local extent as it will be limited to the vicinity of the transmission line.				
Impact Scale	The impact scale is small considering the embedded measures in place to minimize exposure to the public in accordance with <i>ICNIRP guidelines on public and occupational exposure</i> and <i>IFC EHS Guidelines on Electric Power Transmission and Distribution</i> .				
Frequency	The occurrence of EMF is constant during the operation of the transmission lines; however, the risk of the chronic and acute health effects occurring is low.				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	The impact magnitude is considered small considering the embedded measures in place.				
Resource/ Receptor Sensitivity	Low		Moderate		High
	Receptor sensitivity is considered medium due to range of individuals in nearby settlements.				
Impact Significance	Low	Moderate	Substantial	High	
	The overall potential chronic and acute effects are considered low.				

Residual Impacts

The significance of the residual impacts on community health and safety after the implementation of mitigation measures is presented in **Table 7-45**.

Table 7-45: Residual Impact Significance

Impact	Project Phase	Significance (Pre-Mitigation)	Residual Significance (Post Mitigation)
Community Safety (Road Accidents, Site Trespass)	Construction	Moderate	Low
Environmental Health (Noise and Air)	Operation	Moderate	Low
Interaction with Project Workforce	Operation	Moderate	Low
EMF Health effects	Operation	Moderate	Low

Impact on Community Safety related to Road Traffic, Site Trespass Activities

During construction there will be an increase in traffic movements of heavy machinery and light vehicles in the road along the transmission line route and in access roads leading to the temporary tower site working areas during a period of 18-24 months. This will include water trucks, cement trucks, transport of construction material, excavation machinery, etc. which is expected to increase the risk of road traffic accidents and potential injuries or fatalities to other road users or pedestrians. The increase in movement of vehicles during the construction phase may result in greater disturbance and decreased wellbeing for those communities closest to the tower site working areas and along transportation routes and access roads.

It is assumed that the tower site working areas (40x50m each on average) will not be fenced during construction activities. The risk of trespass is highest when the tower sites are closest to settlements and agricultural areas with no electricity coverage, which increases the risk of accidental trespass at night. Trespassing on the temporary tower site working areas could result in accidents leading to injuries or even fatalities, especially due to the presence of large machinery, tower construction parts such as metal structures, and open excavations, which could at times be partly filled with water (e.g., open excavations for the erection of towers). Young people, elders and children are most at risk of being injured.

The impact is a direct result of interaction with the increased traffic associated with construction activities. The impact is temporary in nature and limited to the settlements in the Study Area and the surrounding road network. Contractors will also be required to operate according to best international practice. However, considering the potential risk posed to communities, the magnitude is considered medium. Receptor sensitivity is also rated as medium, resulting in moderate impact significance.

Table 7-46: Pre-Mitigation Impact Assessment

Impact Community Health and Safety Impacts				
Impact Nature	Negative	Positive		Neutral
	Increased traffic during the construction period may result in increased risk to road traffic accidents and the presence of unfenced tower site working areas near settlements may result in trespassing and potential injuries.			
Impact Type	Direct	Indirect		Induced
	Impact that results from a direct interaction between the Project (i.e. increased traffic, unfenced tower work sites, risk posed by demining activities) and the local population along the transmission lines and road users.			
Impact Duration	Temporary	Short Term	Long Term	Permanent
	The increased traffic effect and risks to injuries is temporary, as construction activities will take place in a sequential manner during the length of the construction period. However, although construction activities at the tower sites working areas will be sequential, access to these sites will be prohibited throughout the 18-24 months of construction, as machinery and equipment will be left at the sites in between team shifts from site to site until completion of the works.			
Impact Extent	Local	Regional		International
	Impact limited to the settlements in the Study Area			
Impact Scale	The impact is considered as medium scale since temporary tower sites will be under construction along the transmission line.			

Frequency	The frequency is considered to be occasional or one time at each temporary tower site over the duration of the construction phase.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the parameters above, the magnitude is considered to be medium considering the potential consequence of accidents.				
Resource/ Receptor Sensitivity	Low	Moderate		High	
	The sensitivity of the receptors (local population along the transmission lines and road users including vehicle users, pedestrians and cyclists) is considered medium, as contractors will ensure that construction activities are undertaken in compliance with international standards. In addition, the transmission lines will be built in mostly rural areas and peri-urban areas where previous transmission lines have been built in recent years, and dense traffic in these areas may not be unusual for the populations, which may also contribute to improving the overall				
Impact Significance	Low	Moderate	Substantial	High	
	Considering the magnitude and sensitivity are medium, the impact on the community safety during construction activities is considered to be of moderate significance.				

Impact on Environmental Health of Communities

During the construction phase (approximately 18-24 months), activities will result in changes to the physical environment, with the potential to affect the health and welfare of communities. There will be temporary increases in dust during the duration of the construction phase, which will be mostly localised to the temporary tower site working areas and access roads. These are likely to result in increased disturbance and decreased wellbeing especially for residents closest to construction site and along unpaved access roads. There are no impacts on local air quality over the long term and therefore unlikely to result in a recordable increase in respiratory diseases in the population.

Similarly, the construction of the transmission lines is likely to result in temporary increased noise levels for residents close to the temporary tower site working areas. The increase in noise is likely to result in disturbance and decreased wellbeing for those closest to the construction activities. However, this will be limited to construction hours and sleep disturbance is unlikely assuming construction work will be undertaken during daytime hours.

Project construction will also entail some temporary, localized, ground works that will generate vibrations. Depending on the soil characteristics and on the distance to the nearest building, these activities could produce vibrations for houses in the vicinity. Impacts could range from the level of temporary nuisance and disturbance, up to actual damage to buildings. It should be noted that the minimum allowed distance from a physical structure to the tower position is 10m.

Waste production as a result of the construction activities is unlikely to impact on the health of communities along the route since most of the waste will be placed in the appropriate covered waste containers, and transported periodically to licensed dumpsites, and therefore opportunities for communities to come into contact with waste will be minimal.

MoEM will reinstate and rehabilitate construction areas including repairing any damage caused as part of the construction activities.

The impacts on environmental health during construction are temporary in nature for the duration of the construction phase. Construction activities and associated vehicular traffic will take place in temporary tower working areas and dirt access roads along the transmission line and close to local settlements. Considering the temporary nature of the works and the sequential approach, the magnitude is considered medium.

Receptor sensitivity is also considered medium as receptors will include children, old people and others that may be susceptible to changes to environmental quality. However, it is noted that the transmission line crosses areas where previous transmission lines have been built in recent years, and related environmental changes might not be unusual for the populations, which may reduce the overall sensitivity of the populations. The impact significance is therefore considered moderate.

Table 7-47: Pre-Mitigation Impact Assessment

Table 7-47: EIS Mitigation Impact Assessment						
Impact	Environmental Health					
Impact Nature	Negative		Positive		Neutral	
	Construction activities have the potential to impact on environmental health which may translate into decreased localized air quality and increase in noise emission and associated disturbance.					
Impact Type	Direct		Indirect		Induced	
	Impacts that result from a direct interaction between the Project (i.e. air and noise emissions, vibrations, changes into visual environment and generation of waste) and the population along the transmission lines.					
Impact Duration	Temporary		Short Term	Long Term	Permanent	
	The effect is considered temporary since it is expected to be limited to the duration of construction activities at each of the temporary tower sites. Note however that the time between each stop may vary, and that machinery and equipment will be left at the sites in between team shifts. Access to these sites will therefore be prohibited during the 18-24 months of construction.					
Impact Extent	Local		Regional		International	
	Impact limited to the Study Area and surrounding access roads connecting to settlements located further away (500m area from the line)					
Impact Scale	The impact is considered medium. Although construction will take place in a phased manner at the different sites, there is the potential for air and noise emissions to extend beyond the immediate tower sites working areas and associated access roads.					
Frequency	The frequency is considered to be occasional or one time at each tower site and associated access roads throughout the 18-24 months construction phase.					
Impact Magnitude	Positive	Low	Moderate	Substantial	High	
	Based on the parameters above, the magnitude is considered to be medium.					
Resource/Receptor Sensitivity	Low		Moderate		High	
	Receptor sensitivity is considered medium as receptors may experience disturbance and decreased well-being. Also, although structures inside the 40m footprint corridor will be displaced to maintain security distances to the line, houses located further away may still experience some impacts related to noise and air quality. However, since the transmission line crosses areas where previous transmission lines have been built in recent years, related environmental changes might not be unusual for the populations, which may contribute to reducing the sensitivity of the local people.					
Impact Significance	Low		Moderate		Substantial	High
	Considering both the magnitude and receptor sensitivity are medium, the impact on the community health due to environmental changes during construction activities is considered of moderate significance.					

Potential Interactions with Project Workforce

Indirectly, results of the development activities might affect population growth. It is predicted that the following demographic processes will take place:

1. **In-migration:** People from other areas will move to the area in search of new opportunities. The opportunities may not be directly in the project; they could be in-coming to conduct business as a result of the project.
2. **Presence of temporary workers:** It is not expected that the area will experience substantial labor influx.

Without mitigation, the primary impact of in-migration will be an increase in population, physical expansion of project affected areas and informal development.

1. The potential for unplanned and uncontrolled growth could lead to issues surrounding safety, sanitation and service delivery.
2. Where in-migrants compete directly against local people, especially for unskilled jobs, it may result in tension, and possible aggression, between job seekers within the affected areas, and the country more widely.
3. In-migration can also lead to negative social change and an erosion of cultural values, as migrants bring in different cultural norms and values and attitudes to traditional leadership systems.
4. An influx of in-migrants is likely to lead to an increase in communicable diseases such as TB, HIV/AIDS and other sexually transmitted diseases, exacerbated by increased pressure on health care facilities and the possible introduction of new diseases.
5. Influx of in-migrants is likely to lead to the risk of GBV (SEA and SH).

The Project workforce may be housed in open or closed accommodation camps. Interaction with nearby communities is therefore very likely and could potentially lead to an increased transmission of communicable diseases and sexually transmitted diseases within these communities. This is a particular risk in relation to communities located close to worker camps where the potential for interaction is highest. The exact locations of the workers camps are not confirmed at this stage but are expected to be located near the town centres.

The profile of these diseases will be influenced by the existing diseases profile of communities along the route and the diseases profile of the countries workers are sourced from (in case of international workers). In addition, if opportunistic workers arrive in the area hoping to benefit from employment spin offs this could also impact on the transmission of communicable diseases. Considering that 85% of the workers will be sourced from urban and peri-urban centres and areas near the transmission line route, communicable diseases of concern are likely to include diarrhoea, respiratory infections, and typhoid fever. Children will be at particular risk of diarrhoeal diseases due to their sanitary behaviours, while the elderly will be at risk of more severe health outcomes as a result of their frailty.

The Somaliland Demographic Health Survey (SLDHS) 2020 reported that 80 percent of women aged 15-49 had heard about HIV/AIDS in Somaliland. Forty-nine percent of women aged 15-49 have negative attitudes towards people living with HIV; 64 percent of

women aged 15-49 have reported not buying fresh vegetables from a shopkeeper living with HIV. Since workers may live in open camps, prostitution may also be an issue considering the low levels of employment opportunities, and it is possible that some women in settlements close to the construction camps may resort to prostitution for short term economic gain. There is also a risk of increased pregnancies of young girls that could result in increased school dropouts in the settlements of the Study Area.

Based on the above, interaction between Project workforce and local communities in the Study Area is considered very likely during the construction phase. Receptor sensitivity is considered high as the low levels of employment opportunities might encourage prostitution and transmission of STIs and communicable diseases. This results in a moderate impact significance.

Table 7-48: Pre-Mitigation Impact Assessment

Impact	Interaction with Project Workforce					
Impact Nature	Negative		Positive		Neutral	
	The presence of Project Workforce will lead to interaction with the local communities which will potentially result in increased transmission of communicable diseases and sexually transmitted diseases.					
Impact Type	Direct		Indirect		Induced	
	Impacts that result from a direct interaction between the Project workforce and the population along the transmission lines.					
Impact Duration	Temporary	Short Term		Long Term	Permanent	
	The effect is considered short term as it is expected to last throughout the 18-24 months construction period in sequential manner along the transmission line and in the areas surrounding worker camps (if established).					
Impact Extent	Local		Regional		International	
	Impact limited to the Study Area and nearby urban centres.					
Impact Scale	Camps are open, workers will be free to access surrounding villages and settlements, and interaction is therefore very likely.					
Frequency	The frequency is considered to be continuous throughout the construction phase.					
Impact Magnitude	Positive	Low	Moderate	Substantial	High	
	Based on the parameters above, the magnitude is considered small since work forces is					
Resource/Receptor Sensitivity	Low	Moderate		High		
	Receptor sensitivity is considered high. The low levels of employment opportunities might encourage prostitution and transmission of STDs, and children and the elderly are considered particularly vulnerable to the transmission of communicable diseases.					
Impact Significance	Low	Moderate		Substantial		High
	Since impact magnitude is considered small and receptor sensitivity is high, the impact on community health due to interactions with the Project Workforce during construction activities is considered of moderate significance.					

Mitigation Measures

The following mitigation measures will be implemented during the construction phase to reduce any impacts on community health and safety. MoEM will develop and monitor the implementation of a Community Health and Safety Management Plan which will include the following measures:

- Ensure that all workers are housed in accommodation camps rather than in the local settlements in order to minimize interaction with local communities and related health

and safety impacts.

- Ensure all workers including contractors and subcontractors undergo pre-employment physical screening and regular health screening.
- Ensure any trucking companies employed to work on the Project will have policies around health screening of their workers in line with Project requirements.
- Ensure all workers including contractors and subcontractors receive education around transmission routes and symptoms of communicable diseases of concern and STIs.
- Undertake awareness creation among the communities on HIV/AIDS and other STIs.
- Provide access to health care for those injured by its activities.
- Ensure that work sites are fenced and that signs are put up around work fronts and construction sites advising people of the risks associated with trespass. When work fronts are less than 100 metres from a community or house, employ security guards from the local community to prevent trespass.
- Undertake a programme of stakeholder engagement and consultation to educate local communities of the risks of trespassing onto sites, the meaning of signs, and the dangers of playing on or near equipment or entering fenced areas. Special attention to be paid in primary and secondary schools along the transmission routes and in areas where towers will be built close to residential or school areas.

Contractor will develop Emergency Preparedness and Response Plan (EPRP) in cooperation with local emergency authorities and hospitals.

- MoEM will extend the Worker Code of Conduct to include guidelines on worker – community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process.
- MoEM will provide primary health care and first aid at construction camp sites to avoid pressure on local healthcare infrastructures.
- MoEM will implement a Community Grievance Mechanism.
- MoEM will develop and implement a Traffic Management Plan covering aspect such as vehicle safety, driver, and passenger behaviour, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations.

Decommissioning Phase: Community Health and Safety Impacts

Increased Project-related traffic for site decommissioning will cause change to the environment due to increased noise, decreased air quality, waste handling or disposal, accidental leaks and spills, and the presence of the Project workforce all present potential hazards for the health and safety of local communities. The community engagement plans; mechanisms and associated measures used during construction and operation will also be used in this phase.

7.3.2.14 Gender-Based Violence

An influx of in-migrants may also lead to Gender-Based Violence (GBV) (Sexual Exploitation and Abuse (SEA) and Workplace Sexual Harrassment (SEA) in the workplace, although the project is not expected to have a large influx of workers, the in-migration may increase the demand for sex work or the risk of forced early marriage in a community where marriage to an employed man is seen as the best livelihood strategy for

an adolescent girl. Furthermore, higher wages for workers in a community can lead to an increase in transactional sex.

The risk of incidents of sex between laborers and minors, even when it is not transactional, can also increase. The Project may create changes in the project affected communities and can cause shifts in power dynamics between the community members and within households. Male jealousy, a key driver of GBV, can be triggered by labor influx on a project when workers are believed to be interacting with community women. Hence, abusive behavior can occur not only between project-related staff and those living in and around the project site, but also within the homes of those affected by the project.

Potential resettlement for civil works may equally render women vulnerable to GBV. Projects with a large influx of workers may increase the demand for sex work-even increase the risk for trafficking of women for the purposes of sex work-or the risk of forced early marriage in a community where marriage to an employed man is seen as the best livelihood strategy for an adolescent girl. Furthermore, higher wages for workers in a community can lead to an increase in transactional sex. The risk of incidents of sexual activity between laborers and minors, even when it is not transactional, can also increase.

Table 7-49: Pre-Mitigation Impact Assessment

Impact		Gender Based Violence/SEA/SH			
Impact Nature	Negative		Positive		Neutral
	The presence of Project Workforce will lead to interaction with the local communities which will potentially result in GBV/SEA/SH incidences				
Impact Type	Direct		Indirect		Induced
	Impacts that result from a direct interaction between the Project workforce and the population along the transmission lines.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The effect is considered short term as it is expected to last throughout the 18-24 months construction period in sequential manner along the transmission line and in the areas surrounding worker camps (if established).				
Impact Extent	Local		Regional		International
	Impact limited to the Study Area.				
Impact Scale	Camps are open, workers will be free to access surrounding villages and settlements, and interaction is therefore very likely.				
Frequency	The frequency is considered to be continuous throughout the construction phase.				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the parameters above, the magnitude is considered small since work forces is medium.				
Resource/Receptor Sensitivity	Low		Medium		Substantial
	Receptor sensitivity is considered high. The low levels of employment opportunities might encourage GBV/SEA/SH by project workers to local community members.				
Impact Significance	Low	Moderate	Substantial	High	
	Since impact magnitude is considered medium and receptor sensitivity is high, the impact on community health due to interactions with the Project Workforce during construction activities is considered of substantial significance.				

Mitigation Measures

The following mitigation measures will be implemented during the pre-construction, construction, operation, and decommissioning phases to mitigate the risk of GBV-SEA/SH.

- MoEM will extend the Worker Code of Conduct to include guidelines on worker-community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process.
- Community sensitization including disseminating information on GBV (SEA and SH) risks and management protocols.
- Implementing a GBV-SEA/SH management plan to mitigate and respond to GBV cases, including a GRM that is sensitive and confidential.

7.3.2.15 Social Maladies

Crime, Commercial Sex Work and Other Nuisances from Growth

The lack of general employment opportunities in the AoI and the subjective expectation that the Project will support employment opportunities and economic development, has the potential to create social disharmony especially towards the Project, if these expectations are not realised. This may result in negative perceptions of well-being within communities or sections in the communities who may not directly or indirectly benefit from the Project.

Although a proportion of the Project workforce will be recruited from the local communities during the construction phase, this will only provide employment for a period of 24 months. While this will be the period in which the local communities can benefit the most from direct employment; the skill sets and experience in the community will limit their potential for employment in senior roles. In the operations phase, there will be a smaller workforce, that requires a small number of local workers to be utilised in semiskilled and unskilled roles. Therefore, while local communities will benefit from local employment, employment opportunities are of short duration and will be markedly reduced in the operational phase. The benefits derived from this will likely be outweighed by potential negative impacts.

Employment of community members for a short period, with a resultant alteration from subsistence livelihood to earning a paid wage. This may change traditional practices, especially in men who may not want to return to subsistence livelihoods once the employment opportunities cease. Development of a cash economy that may erode community cohesion and traditional bonds, which are an essential element in mutual help structures and local culture. Project induced in-migration (PIIM) may also influence these traditional structures and also create supply and demand of products and services with escalating inflation, especially during construction. Increased financial gains obtained by men from Project employment may not necessarily translate into benefits for other members of the household and may increase the incidence of social ills amongst local workforce members (e.g. substance abuse, transactional sex and commercial sex work) and result in an increase in gender-based domestic violence in AoI communities. As a result of predominantly male employment in unskilled labour positions, marginalisation of women may lead to an increase in transactional or commercial sex as a means to support

and augment livelihoods. The impacts related to social maladies will be further exacerbated by PIIM and the erosion of existing social structures.

The impact has negative direction, moderate consequence over the short term, regional distribution with a peak during construction. As the likelihood of this impact is probable, it concludes as an impact with **Moderate** (negative) significance during both construction and operations and requires specific mitigation throughout the project life. The results in a residual rating during construction of Minor (negative), reducing to Negligible significance for operations, if programmes and policies are successfully implemented and maintained.

Table 7-50: Pre-Mitigation Impact Assessment

Impact	Social Maladies				
Impact Nature	Negative		Positive		Neutral
	The presence of Project Workforce will lead to interaction with the local communities which will potentially result increased incidence of social maladies				
Impact Type	Direct		Indirect		Induced
	Impacts that result from a direct interaction between the Project workforce and the population along the transmission lines.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The effect is considered short term as it is expected to last throughout the 18-24 months construction period in sequential manner along the transmission line and in the areas surrounding worker camps (if established).				
Impact Extent	Local		Regional		International
	Impact limited to the Study Area and nearby urban centres.				
Impact Scale	Camps are open, workers will be free to access surrounding villages and settlements, and interaction is therefore very likely.				
Frequency	The frequency is considered to be continuous throughout the construction phase.				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the parameters above, the magnitude is considered small since work forces is medium.				
Resource/Receptor Sensitivity	Low		Moderate		Substantial
	Receptor sensitivity is considered high. The low levels of employment opportunities might encourage interaction between project workers to local community members.				
Impact Significance	Low	Moderate	Substantial	High	
	Since impact magnitude is considered medium and receptor sensitivity is high, the impact on community health due to interactions with the Project Workforce during construction activities is considered of moderate significance.				

Mitigation Measures

- During the construction phase, EAPP-PIU, MoEM and Contractor will develop and implement awareness and education programmes with a focus on the local workforce, covering social conduct (e.g. gender-based violence, drug and alcohol misuse), financial management and basic workplace wellness programmes that are culturally acceptable.

7.3.2.16 Security and Use of Armed Security Personell

The use of government personell to provide security to the workers as a mitigation measure could exercebate the security risks to workers. Some of the threats due to insecurity along the project transmission line include:

- Banditry or roadside attacks targeting workers during transit of equipment and material to project sites.
- Risks arising from the use of security personnel, potentially exacerbating tensions with the local communities.
- Risks associated with armed conflicts, including government and non-government forces, and the potential threat of staff kidnapping.
- Gender based violence and sexual exploitation affecting women and girls in project areas, posing a security concern.

Based on the above, interaction between armed security workforce, workers and local communities in the AoI is considered likely during the construction phase. Receptor sensitivity is considered high due to the high volatility of the security situation around the project transmission line route. This results in high impact significance.

Table 7-51: Pre-Mitigation Impact Assessment

Impact	Interaction with Project Workforce				
Impact Nature	Negative		Positive		Neutral
	The presence of armed security personell will lead to interaction with the workers and local communities which will potentially result insecurity threats.				
Impact Type	Direct		Indirect		Induced
	Impacts that result from a direct interaction between the armed security, workers and the population along the transmission lines.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The effect is considered short term as it is expected to last throughout the 18-24 months construction period in sequential manner along the transmission line and in the areas surrounding worker camps (if established).				
Impact Extent	Local		Regional		International
	Impact limited to the Study Area and nearby urban centres.				
Impact Scale	Workers will need to access surrounding villages and settlements during construction and interaction is therefore very likely.				
Frequency	The frequency is considered to be continuous throughout the construction phase.				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the parameters above, the magnitude is considered large since work forces project is near security hotspots.				
Resource/Receptor Sensitivity	Low		Moderate		High
	Receptor sensitivity is considered high.				
Impact Significance	Low	Moderate	Substantial		High
	Since impact magnitude is considered large and receptor sensitivity is high, the impact is considered of high significance.				

Mitigation Measures

- Develop and implement a stand-alone Security Risk Assessment and Management Plan (SRAMP). See annex E on SRAMP developed for the project.

- Conduct regular trainings and security awareness programs for project workers.
- Ensure functionality of grievance redress mechanism.
- Conduct regular meetings with staff members.
- Train security personnel on the project's Code of Conduct (CoC) and ensure that contracted security personnel sign the CoC.
- The SRAMP should be made available to all staff and appropriate training conducted.

7.3.2.17 Violence Against Children

The recruitment of children under the age of 18 during the construction of the transmission line and sub- station is a potential risk and considered Violence Against Children (VAC). Based on current conditions in the sector it is assessed that the risk of child or forced labor is low and already managed through national legislation and the proponent's corporate requirement.

Table 7-52: Pre-Mitigation Impact Assessment

Impact	Child Labour				
Impact Nature	Negative		Positive		Neutral
	The low levels of employment opportunities and literacy levels may encourage child labour.				
Impact Type	Direct		Indirect		Induced
	Impacts that result from a direct interaction between the Project workforce and the population along the transmission lines.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The effect is considered short term as it is expected to last throughout the 18-24 months construction period in sequential manner along the transmission line and in the areas surrounding worker camps (if established).				
Impact Extent	Local		Regional		International
	Impact limited to the Study Area and nearby urban centres.				
Impact Scale	Camps are open, workers will be free to access surrounding villages and settlements, and interaction is therefore very likely.				
Frequency	The frequency is considered to be continuous throughout the construction phase.				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the parameters above, the negligible is considered low.				
Resource/Receptor Sensitivity	Low		Moderate		High
	Receptor sensitivity is considered low.				
Impact Significance	Low	Moderate	Substantial		High
	Since impact magnitude is considered negligible and receptor sensitivity is low, the impact on child labour during construction activities is considered of low significance.				

Mitigation Measures

The following mitigation measures will be implemented during the construction phase to reduce any impacts on VAC.

- MoEM will extend the Worker Code of Conduct to include guidelines on worker – community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process.
- Preparing and implementing a child protection plan

- Employing persons aged 18+ years (in accordance with the labour laws of Somaliland).

7.3.2.18 Archaeology and Cultural Heritage Impacts

Baseline assessments have not identified cultural heritage sites along the proposed transmission line AoI and thus no valuable tangible cultural heritage structures and resources are likely to be impacted by the project. However, 2.5km away from the transmission line, there is a pre-historic site called Laas Gee which could be affected by activities of contractors especially when establishing material sites, access routes and workers' camp. Such activities if directed towards the location of the pre-historic site could lead to adverse impacts on the site due to frequent interaction.

Further, there are no graves or cemeteries identified during the ESIA study along the transmission line and this will be further confirmed by the asset inventory study to be undertaken during the RAP preparation. During the construction activities there will be the need to improve access to some of the areas for vehicle. The removal of vegetation and opening of road accesses might uncover cultural sites which can only be removed by the appropriate governmental structures and consultation with the traditional authorities. The potential impacts are likely to be temporary and short term and most of these can be avoided during the vegetation removal process. Based on the baseline data it is not expected that the planned activities will result in negative impacts over the existent cultural and archaeological sites. In terms of embedded controls, during the construction phase of the proposed transmission line project the contractor will apply the chance finds procedures as recommended by ESS 8.

Baseline Conditions

There are no cultural heritage and archaeological sites crossed by the project. The identified archeological and cultural heritage sites are located further away from the proposed transmission line route and thus are unlikely to be affected by the proposed project. There are also no graves along the proposed transmission line.

Impact Assessment

Pre-Construction Phase

This phase includes design related activities, compensation, and relocation of Project Affected Households due to loss of land, structure, and other assets. The design activities and loss of land and other assets will not lead to any archeological or cultural heritage impacts.

Construction Phase

During the construction activities there will be the need to improve access to some of the presently remote areas for vehicles and establishment of camps as well as in some inhabited areas. The removal of vegetation and opening of road accesses might uncover illegal grave sites which can only be removed by the appropriate governmental structures and consultation with the traditional authorities. The potential impacts are likely to be temporary and short term and most of these can be avoided during the vegetation removal process.

Based on the baseline data it is not expected that the planned activities will result in negative impacts over the existent cultural and archaeological sites. In terms of embedded controls, during the construction phase of the proposed transmission line project the contractor will apply the chance finding procedures as recommended by ESS 8.

This direct impact is temporary, since the impacts will be evident during the vegetation removal and installation of the infrastructure. As there are no grave sites identified within the transmission line RoW the likelihood of these impacts is low. The potential impact, in case illegal grave sites are identified during the vegetation removal process, is direct and negative. The extent of the impact is presented is restricted to the Project RoW and therefore local in nature. The magnitude of the impact is considered to be negligible.

Based on the analysis provided above, the impact of the project on cultural sites, will be a low negative impact pre-mitigation (Table 7-53).

Table 7-53: Pre-Mitigation Impact Assessment

Impact	Cultural Heritage during Construction				
Impact Nature	Negative	Positive	Neutral		
	Disturbance to grave sites during vegetation removal and construction activities				
Impact Type	Direct	Indirect	Induced		
	Impact is as a result of a direct interaction between the project (i.e. construction activities) and potential cultural sites (e.g. grave sites) along the transmission line				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The effect is considered temporary as grave sites would be identified during the vegetation removal activities				
Impact Extent	Local	Regional	International		
	Impact is limited to AoI				
Impact Scale	The impact is considered to be of negligible scale.				
Frequency	Once off				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
Resource/Receptor Sensitivity/Value/Importance*	Low	Moderate	High		
	The receptors can be identified in the early stages of the process (e.g. vegetation removal and opening accesses). The sensitivity is considered low.				
Impact Significance	Low	Moderate	Substantial	High	
	Considering the impact magnitude is negligible and the sensitivity is low; the overall significance is considered to be of negligible significance.				

Operation Phase

During the operational phase there are not expected potential impacts on the cultural heritage as a result of the existence of the transmission line. Table 7-54 reflects the non-applicability of the significance of impacts on cultural heritage during the operation of the transmission line.

Table 7-54. Pre-Mitigation Impact Assessment

Impact	Cultural Heritage during Operations		
Impact Nature	Negative	Positive	Neutral

	There are no expected impacts during operation				
Impact Type	Direct	Indirect	Induced		
	N/A				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	N/A				
Impact Extent	Local	Regional	International		
	N/A				
Impact Scale	The impact is considered to be of negligible scale.				
Frequency	N/A				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
Resource/ Receptor Sensitivity/Value/ Importance*	Low	Medium	High		
	N/A				
Impact Significance	Low	Moderate	Substantial	High	

Mitigation

The following standard mitigation measures will be employed:

- Consult community leaders when any community issue arises in order to engage traditional forms of community leadership.
- Work with local community representatives to develop cultural awareness materials (that will cover key issues including the location and importance of all local cultural sites and other cultural sensitivities (graves).
- Should construction activity be required in proximity to existing graves, develop and implement working protocols in consultation with local traditional leaders.
- Do not remove any cultural heritage including graves without prior consultation to the communities and fulfilling the legal requirements. Any removal of cultural heritage should be conducted by the best available techniques.
- Establish a grievance procedure to ensure community concerns are addressed.
- Develop a chance find procedure which will detail the appropriate course of action that must be followed for any relevant cultural heritage discoveries.

Residual Impact

The impact significance is negligible after mitigation measures during construction and no impacts are expected during operations (Table 7-55). With the proposed mitigation measures, particularly the development of chance finding procedures the residual negative impacts on cultural resources are assessed to be of a low magnitude.

Table 7-55: Residual Impact Significance

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Damage of grave sites considered important by the local communities	Construction	Low	Low

7.3.2.19 Unplanned Events

The following section presents the assessment of impacts resulting from unplanned or non-routine events and those which are a result of accidents. These are different to impacts that would reasonably be predicted to occur in the normal course of activities (including the application of in-built control measures) during construction and operations. Unplanned and accidental events have the potential to occur during Project activities and therefore the evaluation of impacts for unplanned and accidental event takes into account the likelihood of the event occurring into the impact magnitude. Likelihood is determined as unlikely, possible, or likely based in professional judgement and quantitative information (statistical frequency) where available. Given the nature of Project activities, unplanned and accidental events relate to potential accidental spills of equipment fuel and oils and vehicle traffic accidents. If unplanned and accidental events did occur, there would be effects on the biophysical and social environment. The risks of unplanned and accidental events are described in this section.

Potential Impacts to Soil and Surface Water from Spill Events

During construction there is the potential for spills of fuels and oils during construction activities, fuelling, maintenance of machinery and vehicles. Spills could occur in a number of locations along the transmission line RoW footprints. Spills have the potential to affect terrestrial environments and could lead to the deterioration of soil, water and sediment quality. This could lead to knock on effects for flora and fauna and local community users.

Impact Assessment

If hazardous materials such as fuel were to be released to the soil and surface water resources, this would be limited to the local extent, depending on the volume spilt and rate of spillage. Within the Project AoI there are surface water resources such as streams which could be impacted if the spill were to occur within proximity of the resource.

Likelihood

Incidental spills of fuels are infrequent but do occur, most frequently due to malfunction of handling systems, poor practice of workers and force majeure. Spills are most likely to occur during refilling and transportation of substances. Large releases of hazardous materials are rare, and it is considered unlikely that a spill would occur of emergency scale.

Significance of Impacts

For impacts to soils, the spatial scale is considered to be local. The impact could be long term and is a direct negative impact. The overall magnitude is considered to be medium. There are areas along the transmission RoW which are used for cultivation and therefore the sensitivity is considered of medium sensitivity. This results in a potential negative impact of Moderate significance (Table 7-56 below).

Table 7-56: Potential Impacts From Spillages

Construction Phase	Operation Phase
Soil and surface water degradation due to fuel spills during construction activities (refuelling, maintenance machinery)	Soil and surface water degradation as a result fuel spills due to maintenance activities of the transmission lines.

For surface water, the impact of the spill would be short to medium term as the release of fuel or oil is likely to be a discrete (i.e.: non-continuous) event and the effects on water quality naturally mitigated through dilution and natural attenuation. The magnitude of the impact is considered medium, and the potential impact is therefore of Moderate significance (Table 7-57).

Table 7-57: Pre-Mitigation Impact Assessment

Impact	Accidental Fuel Spills on Soils				
Impact Nature	Negative		Positive	Neutral	
	Reduction in local soil quality as a result of spillage during maintenance of machinery, improper storage of hazardous materials, spillage during transfers of fuel and general construction activities.				
Impact Type	Direct	Indirect		Induced	
	Impact is a result as a direct interaction between project activities soil resources along the RoW areas				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is long term due to time for remediation or natural attenuation expected for contaminated soils				
Impact Extent	Local	Regional		International	
	The impact will be limited to the AoI				
Impact Scale	The impact is considered as medium scale. If a spill occurs, it will be locally– usually at a construction site – and not along the whole of the transmission line.				
Frequency	Not Applicable				
Likelihood	Possible				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the above the impact magnitude is considered medium				
Resource/ Receptor Sensitivity	Low	Moderate		High	
	While some areas along the RoW are in urban areas other sections include cultivated areas and therefore the significance is medium.				
Impact Significance	Low	Moderate	Substantial	High	
	Considering the impact magnitude is medium and the sensitivity is medium the overall significance is considered to be moderate.				

Mitigations

The following management measures will be implemented in the Project's ESMP:

- The Project will develop a detailed Emergency Preparedness and Response Plan (EPRP) which includes community notifications of any significant spills that have the potential to affect communities. The Project will maintain spill clean-up and response capability adequate for addressing spills during all phases of the Project. All spills will be immediately contained and cleaned up. Contaminated areas will be remediated, and post remediation verification will be carried out (involving sampling of water and/or soil).

- Refuelling of equipment and vehicles will be carried out in designated areas on hard standing ground to prevent seepage of any spillages to ground. Collection systems will be installed in these areas to manage any spills, fuels will be collected and either reused, treated by incineration, or removed by an authorised local contractor. Drip trays must be used when refuelling and servicing vehicles or equipment, where it is not on a hardstanding surface.
- Hazardous material storage will be on hard standing and impermeable surface and the bulk storage facility will be bunded. The Project will restrict storage and handling of hazardous materials and fuels to bunded areas of sufficient capacity to contain a release.
- Hydrocarbon spill clean-up kits shall be available at all locations where refuelling or maintenance of vehicles and equipment is done, and responsible people shall be trained in the use thereof.

Residual Impact

The impacts on soils are considered Minor post mitigation, largely because parts of the transmission line occur in cultivated areas and spills of hazardous substances here are likely to have a greater impact than spills in unutilized areas. Based on the surface water context, impacts on surface water will be of Minor significance post mitigation.

Table 7-58: Residual Impact Significance

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Reduction in local soil quality	Construction and Operation	Moderate	Low
Reduction in surface water quality	Construction and Operation	Moderate	Low

Potential Impacts to Community Health and Safety

During the transmission line construction and operation phases, unplanned events with the potential to negatively affect human population could occur. Table 7-59 presents the potentially significant unplanned events that may occur during the construction and operation phases.

Impact Assessment

Stringing activity around the wires and other electrical units can be a potential hazard if proper planning is not followed. The assumption that local workers at times are not accustomed to using personal protective equipment (PPE) should be taken in consideration, i.e. their attitude to avoid PPE may result in accident/hazard. During operation, there is a possibility of lines or towers/parts of the tower failing and causing injuries and/or fatalities. Additionally, during the operation phase, contact with the transmission line can result in electrocution.

Embedded Controls

The following embedded controls are considered as part of the assessment:

- Contractor team will follow the method statement for overhead stringing; the activities will be managed by experienced Supervisors.

- Implementation of design standards (built in safety), the line hardware used on the overhead transmission lines is rated or designed higher than the conductor ultimate tensile strength and the conductor is only pulled to 20% of its ultimate tensile strength.

The potential impacts are all considered unlikely in that they are not likely to occur during the lifetime of the Project. The significance of the impact associated with stringing activities is summarised in Table 7-59. This is considered a negative event that could lead to permanent impacts if there are injuries and fatalities. The overall impact is considered of Moderate significance.

Table 7-59: Potential Impacts on Community Health and Safety

Construction Phase	Operation Phase
Risks during stringing activities.	Dielectric oil release that have the potential to ignite, create fire or explosion and could lead to fatalities. Potential disaster resulting in a transmission line snapping, transmission tower/pylon collapse.

In terms of the impact related to UXO exposure to the communities, it is considered a negative event that could lead to permanent impacts if there are injuries and fatalities. The overall impact is considered of Moderate significance if unmitigated (Table 7-60).

Table 7-60: Pre-Mitigation Impact Assessment

Table 1: Environmental Impact Assessment					
Impact	Risks during Stringing Activities				
Impact Nature	Negative	Positive			Neutral
	Inadequate planning of stringing activities has the potential to impact occupational and community health.				
Impact Type	Direct	Indirect		Induced	
	The community health and welfare of workers and population around the stringing activities could be directly impacted.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	Potential impacts are considered to be permanent as they could lead in injuries and fatalities.				
Impact Extent	Local	Regional		International	
	The impact will have a localised extent limited to the transmission lines footprint.				
Impact Scale	The impact is considered as medium scale covering the length of the transmission lines.				
Likelihood	Unlikely because it is not likely to occur during the lifetime of the project.				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the above, the event is considered to have a moderate magnitude.				
Resource/ Receptor Sensitivity	Low	Moderate		High	
	Sensitivity of receptor considered as Medium.				
Impact Significance	Low	Moderate	Substantial	High	
	Considering the magnitude is medium as well as the sensitivity, the impact on the community health and welfare is considered to be of moderate significance.				

Table 7-61 summarizes the potential impact associated with transmission line snapping or pylon collapse. The negative impact is a direct impact, which while regional in its extent, could lead to permanent impacts and therefore has a large magnitude. The risk is influenced

by poor foundation quality, tower member theft, material corrosion due to poor coating and poor quality or damaged fittings exposing the system to failure. The receptor sensitivity is considered Low as there are no households (residential or business structures) within the transmission line RoW. This is therefore considered as a Moderate to Low significant impact, which is unlikely to occur during the lifetime of the Project. In the rural areas, due to the fact that the transmission line routing was mostly designed far from the existing communities the receptor sensitivity is considered low but with moderate significance.

Table 7-61: Pre-Mitigation Impact Assessment

Impact	Risks during Stringing Activities				
Impact Nature	Negative	Positive		Neutral	
	Injuries or fatalities to community members or workforce.				
Impact Type	Direct	Indirect		Induced	
	The community health and welfare of workers and population around the construction areas could be directly impacted.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	Potential impacts are considered to be permanent as they could lead in injuries and fatalities.				
Impact Extent	Local	Regional		International	
	The impact will have a localised extent limited to the transmission lines footprint.				
Impact Scale	The impact is considered as medium scale covering the length of the transmission lines.				
Likelihood	Possible given the high incident of UXOs in the region.				
Impact Magnitude	Positive	Low	Moderate	Substantial	High
	Based on the potential for fatalities, the event is considered to have a large magnitude.				
Resource/ Receptor Sensitivity	Low	Moderate		High	
	Sensitivity of receptor considered as Medium.				
Impact Significance	Low	Moderate	Substantial		High
	Considering the risk of fatalities. the impact on the community health and welfare (and workforce) is considered to be of Moderate significance if unmitigated.				

Mitigations

The following mitigation measures will be employed to reduce any impacts resulting from a potential unplanned event:

- Stringing activities near wires and other electrical utilities will be done after proper shutdown of the line/utilities with prior information and permission.
- Making sure that temporary soil stockpiles are safely stored, with controlled access.
- An Emergency Prevention and Response Plan (EPRP) will be developed according to international industry standards and best practices.
- The EPRP will be developed in consultation with the competent authorities, emergency service and administrations along the transmission routes.
- Based on consultations with relevant stakeholders, MoEM will investigate the capacity of statutory local emergency response providers to participate in emergency response activities.
- Personnel will be trained on how to respond to unplanned events.
- Periodic audits will be performed in order to ensure the safeguards are in place.

- Risks to general public during operation will be reduced by public awareness and education and physical measures by attaching an appropriate warning sign on all faces of the tower.
- Once the stringing work is complete, notices and permanent anti-climbing devices will be installed on the tower (in particular in lattice towers). The operational start date for electricity transmission and safety implications will be publicized locally in advance.
- In addition, the risk of the transmission line spanning, or pylon collapse can be mitigated through complying with design specifications, installing anti-theft devices, conducting material quality inspection and compliance, and following MoEM installation procedures.

Table 7-62: Pre-Mitigation Impact Assessment

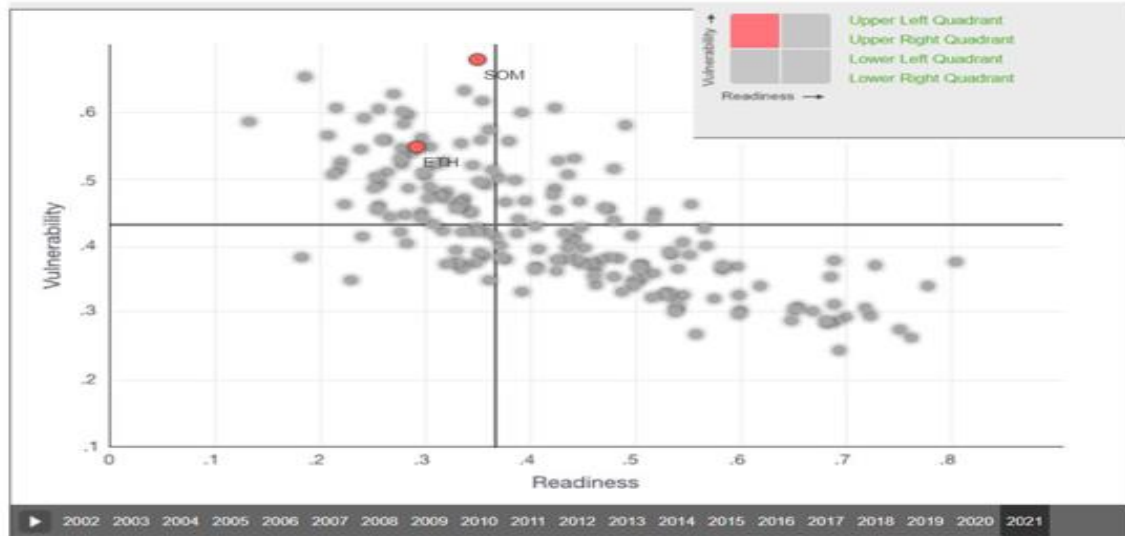
Table 7-62: Pre-Integration Impact Assessment						
Impact	Transmission line collapse					
	Negative		Positive		Neutral	
Impact Nature	An unplanned event leading to the snapping of the transmission lines or collapse of transmission towers or parts of it has the potential to impact on community health and welfare.					
	Construction and operation		Moderate		Substantial	
Impact Type	Direct		Indirect		Induced	
	The community health and welfare of population around the transmission lines could be directly impacted.					
Impact Duration	Temporary		Short Term	Long Term	Permanent	
	Impacts on community health and wellbeing are considered to be permanent as they could lead in injuries and fatalities.					
Impact Extent	Local		Regional		International	
	The impact will have a localized extent limited to the areas surrounding the transmission lines – more acute close to urban and peri/urban areas					
Impact Scale	The impact is considered as medium scale.					
	Unlikely because the event is not likely to occur during the lifetime of the project.					
Impact Magnitude	Positive	Low	Moderate	Substantial	High	
	Based on the above, the event is considered to have a large magnitude.					
Resource/ Receptor Sensitivity	Low		Moderate		High	
	Sensitivity of receptor considered as moderate, considering that significant portions of the transmission lines routes do not cross any settlement areas.					
Impact Significance	Low		Moderate		Substantial	High
	Considering the magnitude is moderate and the sensitivity moderate, the impact on the community health and welfare in case of transmission line snapping or transmission tower/pylon collapse is considered to be of moderate significance in the urban areas with crowded settlements and moderate significance in the rural areas. It should be noted that majority of the transmission line does not cross urban areas.					

7.3.2.20 Climate Risks and Vulnerabilities

Based on Köppen-Geiger climate classification system, the project area covers areas in Somaliland, which are highly susceptible to climate change. Vulnerability to climate change is the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes (IPCC, 2007). Systems vulnerability is a function of its exposure, sensitivity and adaptive capacity (McCarthy et al., 2001). With regard to its vulnerability to climate change Somalia is

ranked as 187th with an overall score of 33.8. and overall vulnerability score is much less than half (50). Figure 7-1 shows that Somaliland is placed in the upper-left quadrant of ND-GAIN matrix based on its high vulnerability and low readiness scores. Countries with high level of vulnerability to climate change but a low level of readiness are placed in the upper left of the quadrant (Figure 7-1). Somaliland has a great need for investment and innovation to improve readiness and great urgency for adaption action.

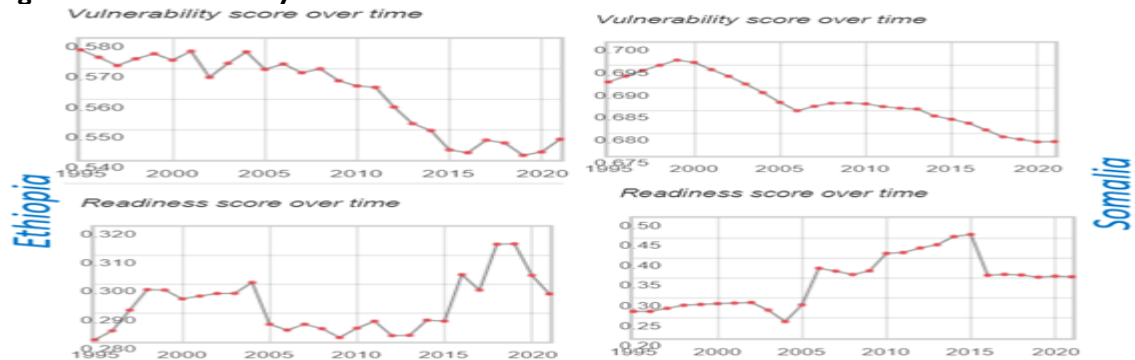
Figure 7-1. Vulnerability and Readiness Scores of Ethiopia and Somalia in 2021



Source: <https://gain.nd.edu/our-work/country-index/>).

The vulnerability score is high, and readiness is low (Figure 7-2). Somaliland is the most vulnerable country and 122nd most ready country. In such cases, adaptation to climate change could be the most challenging task.

Figure 7-2. Vulnerability and Readiness Score of Somaliland



Source : <https://gain.nd.edu/our-work/country-index/>).

Sensitivity to Project Relevant Hazards

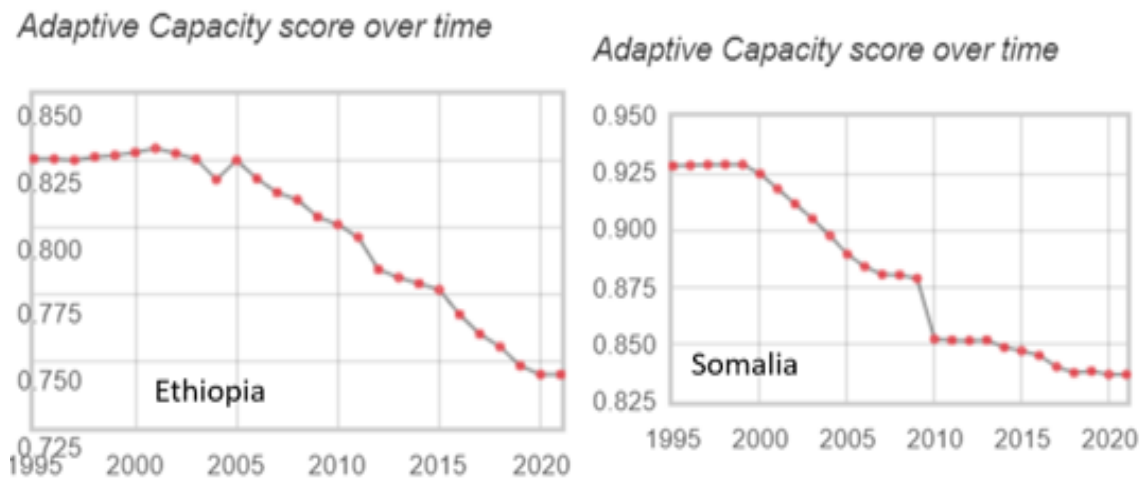
Sensitivity describes how much warmer the planet will get if the amount of greenhouse gases in the atmosphere doubles (<https://climate.mit.edu/explainers/climate-sensitivity>). The global climate Sensitivity ranges from 2 °C-5 °C⁷. Transmission lines are sensitive to climate change. Table 7-63 gives climate related hazards on transmission line.

Table 7-63. Climate Related Hazards on Transmission Line.

Hazard	Impacts on Transmission line
Drought and Heat waves	■ Drought increases damages by dust ■ High temperature damages control systems through loss of information and communication technology services or reduce efficiency and quality of services ■ Damages to equipment due to high electricity demand during hot days or operating at maximum carrying capacity of the transmission lines under increased temperature damages equipment ■ Increased temperature reduces current rating and increases the occurrence of sagging
Tropical cyclone and flood	■ Weakening towers ■ Induce a collapse of towers due to high wind speed and heavy rainfall ■ Power failure systems
Dust storms and wind erosion	■ Weakening towers and eventually leading to tower collapses ■ Dusts on transmission cables trigger sparks resulting in fire incidents ■ Dusts can cause corrosion and power loss
Wildfire	■ Damages transmission lines and their components ■ Induces power blackout

Adaptive Capacity

Adaptive capacity refers to the ability of a system to adjust to climate stimuli and their effects including climate variability and extremes to moderate potential damages and cope with the consequences (<https://archive.ipcc.ch/ipccreports/tar/wg2/index.php>). Enhancement of adaptive capacity reduces climate change vulnerabilities. The climate change adaptive capacity scores of Somaliland are given in Figure 7-3. Climate change adaptive capacity scores were high during mid-1990s. But there is a rapid decline as of 2005 and 2000 in Somaliland.

Figure 7-3. Climate Change Adaptive Capacity Scores of Somaliland

Source : <https://gain.nd.edu/our-work/country-index>).

Climate Risks

Heat wave events and hazard risks

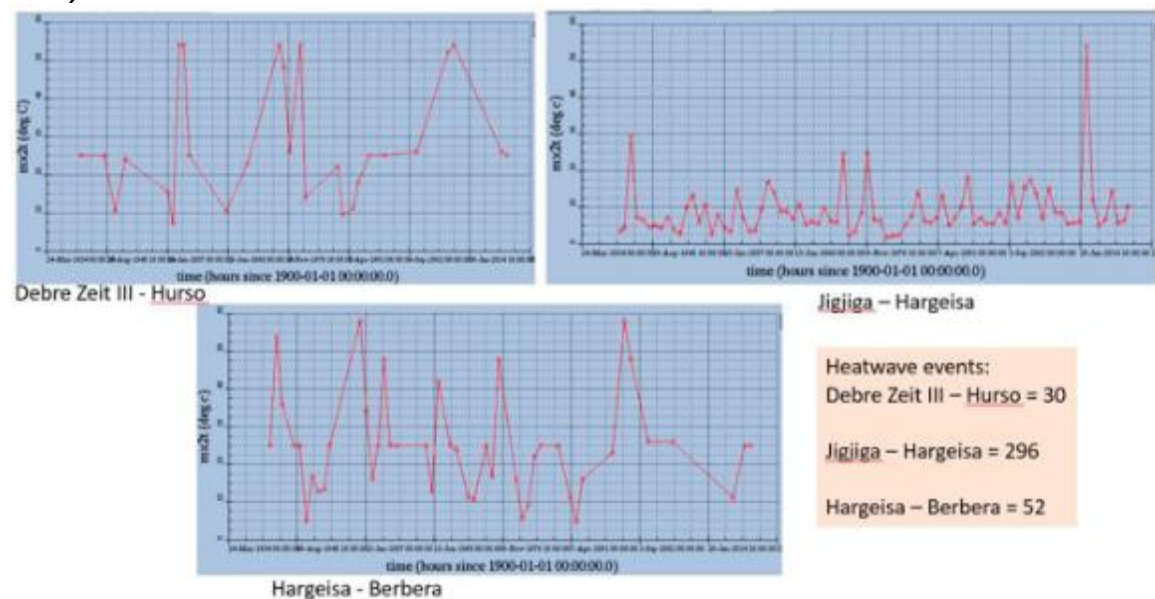
Heat wave events

ERA5 hourly data on single levels from 1940 to present was used to compute the number of heat events in the project area. Heat wave is the condition in which there are three consecutive days with temperature above 25°C. Copernicus Climate Change Service (C3S), where the ERA5 for heat wave computation is derived for this study, characterizes heat wave as sustained extreme heat and it is defined based on daily maximum air temperature (Tmax) and two percentile thresholds (T1 & T2) (Meehl and Tebaldi (2004). For a recognition of heat wave, the following conditions should be fulfilled.

- Tmax is above T1 for at least 3 consecutive days.
- The average Tmax is above T1 over the entire period.
- The daily Tmax must be above T2 every day of the period. T1 is 97.5 percentile and T2 is 81st percentile (Meehl and Tebaldi, 2004).

To show the nature of heat wave of the project area, Figure 7-4 shows heat wave events for the month of February for transmission line. The number of the sum of yearly heat wave events for February is 30, 296 and 52 for Hargeisa-Berbera, respectively. But heat wave events for February have shown a continuous trend of the increased frequency of heat wave events towards the present. Generally, there is an apparent trend that heat wave events and duration are increasing in the project area due to global warming. This increase heat wave events adversely affect transmission line.

Figure 7-4. Heat Wave Events in Project Area For February Based on ERA5 Data (1940 – 2023).



Heat Wave Hazard Risks

Heat wave hazard risk of the project area was also extracted from ETH-Global-VITO-20 and 20 years return period depicted. Extreme heat hazard was classified based on

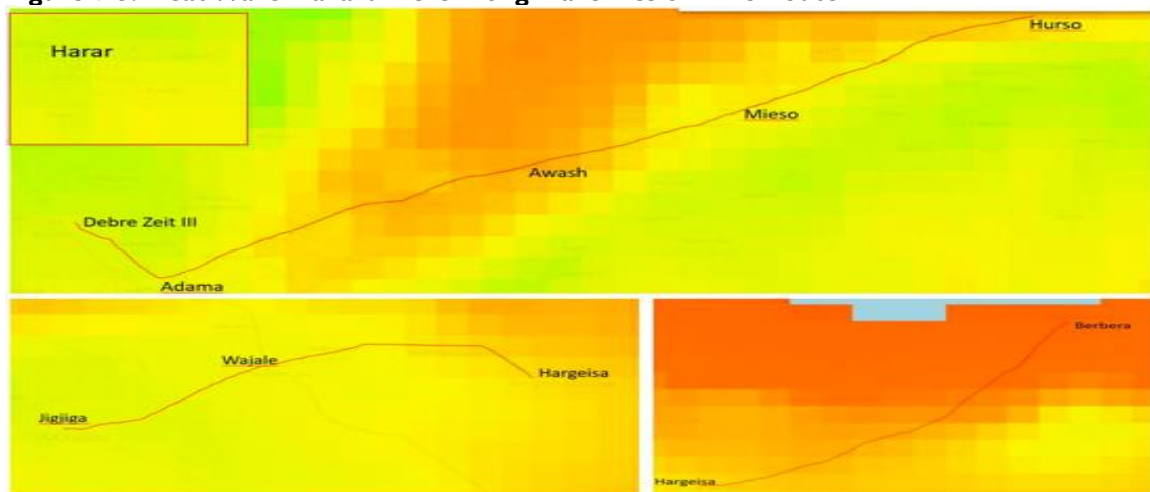
universally accepted heat stress indicator, i.e., the Wet Bulb Global Temperature (WBGT, given in °C). The widely used WBGT thresholds are used in this assignment, i.e., 28 °C – 32 °C. This range categorizes heat stress risks. Table 7-64 gives details of the classes of WBGT and their heat stress intensity.

Table 7-64. Classes of WBGT and Heat Stress Intensity

Color code	WBGT class	Heat stress intensity
	WBGT < 28 °C	Slight/low
	WBGT from 28 °C – 32 °C	Moderate/high
	WBGT > 32 °C	Severe/very high

The Hargeisa-Berbera block, areas are exposed to slight/low heat wave hazard risk but those close to Hargeisa will face moderate/high heat wave hazard risks (Figure 7-5). But the situation between Hargeisa and Berbera is different. That is, the Hargeisa-Berbera block of the project is exposed to moderate/high around Hargeisa area and severe/very high heat wave hazard risk for most of its length until Berbera (Figure 7-6).

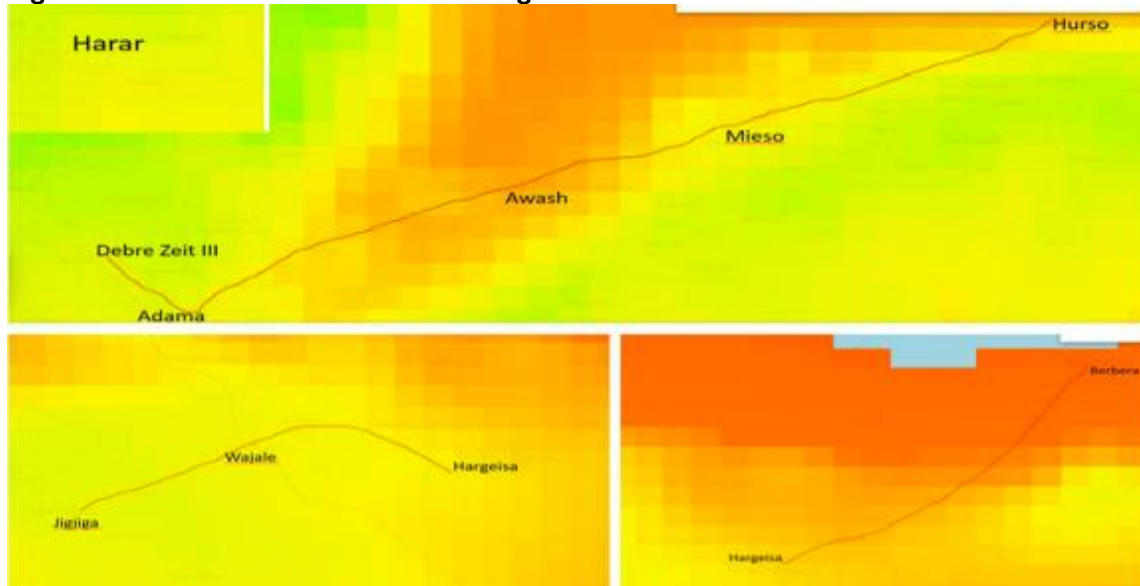
Figure 7-5. Heat Wave Hazard Risks Along Transmission Line Route



(source: <https://www.geonode-gfdrrlab.org/>; VITO Global Heat Model for 20 years return period).

Heat wave hazard risks of the project area for 100 years return period is given in Figure 7-6. Although the conditions of heat wave hazard risk did not show any significant change, there is a tendency for an increase in the intensity of heat wave hazard risk for Hargeisa-Berbera block of the project and an expansion of heat wave hazard risk. For 100 years period of return that the areas around Hargeisa are exposed high heat wave hazard risks.

Figure 7-6. Heat Wave Hazard Risks Along Transmission Line Route



Source: <https://www.geonode-gfdrrlab.org/>; VITO Global Heat Model for 100 years return period).

Landslide

Landslide is a situation where part of the natural slope is unable to support its own weight. It is a downhill movement of soil, rock or vegetation. It is also a natural phenomenon that has occurred in different parts of the world leading to failures of power transmission networks. This movement can be slow or fast leading to the destruction of key infrastructure (e.g., electrical) and properties located on its ways. Landslide usually occur at steep slopes, but it may also occur in areas with low relief and slope. Gravity is the fundamental force in landslide events, but landslide occurs due to the following reasons. These are:

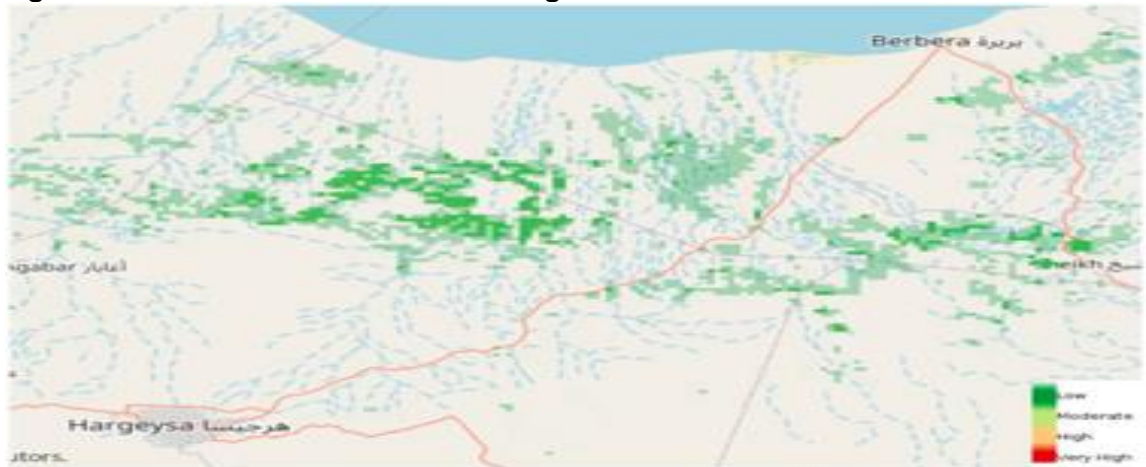
- Weakness in composition of materials, geological structure of rocks or soil formation
- Heavy rainfall
- Earthquakes or
- Changes in groundwater levels

Power system is one of the largest key infrastructures that stretches across thousands of kms of diverse topographic and geological features. As a result, power systems (power transmission lines and substations) are subjected to natural hazards in addition to the apparent global climate change. In view of the critical challenges posed by natural hazards to power systems, recent studies have focused on the resilience of this system (Wang et al., 2016; Caraka et al., 202; Mohammed et al., 2019). The resilience of power systems is measured by its ability to anticipate, absorb or adapt or rapidly recover from disruptive events. The Global Rainfall-Triggered Landslide Hazard Map (https://www.geonode-gfdrrlab.org/layers/rftl_aa_mean_1980_2018:hazard:rftl_aa_mean_1980_2018) presents a quantitative representation of landslide hazard. This component is the mean annual rainfall-triggered landslide hazard assessment for the period 1980-2018. Raster values represent the modelled average annual frequency of significant rainfall-triggered landslides

per sq. km. For this assignment, this resource has been used to provide qualitative information on the landslide hazards of the project area. Rainfall triggered landslide potential hazard of the along the transmission line route is given in Figure 7-7. The majority of the areas of the power transmission line are characterized as having no landslide potential hazard. But there are some places where the rainfall triggered landslide potential hazards were recorded. (https://www.geonodegfdrrlab.org/layers/rftl_aa_mean_1980_2018:hazard:rftl_aa_mean_1980_2018). These places are shown by red circles on the map.

Rainfall triggered landslide potential hazard of the project area shows a Nonvalue of occurrence. But there are two places in the Hargeisa-Berbera area where the rainfall triggered landslide potential hazard is low. Therefore, rainfall triggered landslide potential hazard has no effect on the line.

Figure 7-7. Landslide Hazard Potential Along Transmission Line Route

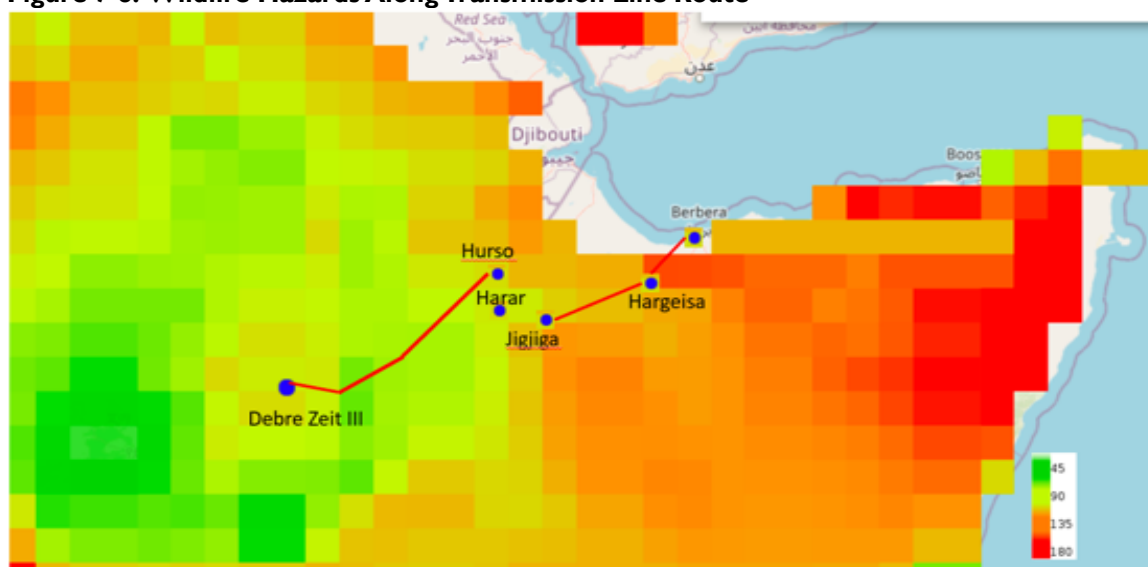


Source: <https://www.geonodegfdrrlab.org/layers/rftl-aa-mean-1980-2018:hazard:rftl-aa-mean-1980-2018>.

Wildfire

The WF-Global-CSIRO-30 is a global database for wildfire hazards. It is a statistical modelling of extreme values of 30 years fire weather climatology. Wildfire hazard with a burning index and color code of the project area is given in Figure 7-8. The transmission line from Hargeisa-Berbera crosses areas with high wildfire hazard rating where all fires are essentially serious. In this case, fire starts and spread quickly. Noteworthy is the area around Berbera, which is not affected by wildfire because its large portion is almost devoid of vegetation (fire fuel). Generally, wildfire hazard adversely affects Hargeisa and Hargeisa-Berbera blocks of the project. The most wildfire prone areas, to be considered in the engineering design of the project, are between 9.576972 N, 44.070770 E (Hargeisa) and 10.197016 N, 44.863156 (Xabaalo tumaalood).

Figure 7-8. Wildfire Hazards Along Transmission Line Route



(source : <https://www.geonode-gfdrrlab.org/>).

Table 7-65 gives the description of Burning Index (BI) and associated color code for wildfire hazard rating. Burning Index is a measure of fire intensity. BI combines the Spread Component and Energy Release Component to relate to the contribution of fire behavior to the effort of containing a fire. BI has no units, but in general, it is 10 times the flame length of a fire. The US Forest Service interpretation of BI clarifies the links between BI scales and wildfire behaviour and management. These links are as follows.

- BI < 40 is characterized by a flame length of 1.2m and this type of fire can be managed by persons using hand tool.
- BI 40 –80: the flame length ranges from 1.2m-2.4m and it cannot be managed by hand tools. Equipment such as dozers, pumpers and retardants are required.
- BI 80 –110: the flame length ranges from 2.4m-3.4m and fires present great challenges to control.
- BI >110: the flame length is greater than 3.4m and controlling is a challenging task.

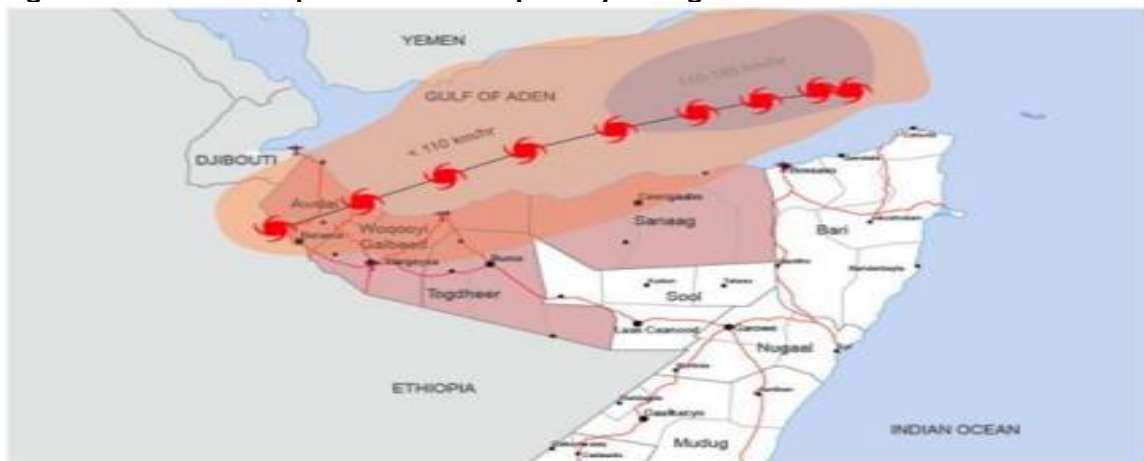
Table 7-65. Description of Burning Index and color code of wildfire hazard rating

45			Fuels do not ignite readily from small firebrands although a more intense heat source, such as lightning, may start fires in duff or light fuels. Fires can start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low.
90	Low		
135	Moderate		All fine dead fuels ignite readily and fires start easily from most causes. Fires start easily from all causes and, immediately after ignition, spread rapidly and increase quickly in intensity.
180	High		Fires start quickly, spread furiously, and burn intensely. All fires are potentially serious.

Heavy rainfall, sudden flash floods triggered by tropical cyclone

Tropical cyclone is an extreme weather event adversely affecting power system. It is an infrequent event in the project area. However, a tropical cyclone Sagar has occurred in 2018 (Figure 7-9) and has affected part of the Somaliland including Berbera town. It has developed in the Gulf of Aden on May, intensified and has reached Somaliland on May 18, 2018. This tropical cyclone has induced high rainfall and flash flood in Berbera town. In Somaliland, the sudden flash floods and strong winds washed away houses and livestock. The intensity of the storm that stroke areas between Hargeisa and Berbera was classified as tropical storm (Saffir-Simpson hurricane wind scale: <https://www.nhc.noaa.gov/aboutsshws.php>) with the wind speed of 63-118km/hr. Details of areas prone to potential adverse impacts by tropical cyclone are given below.

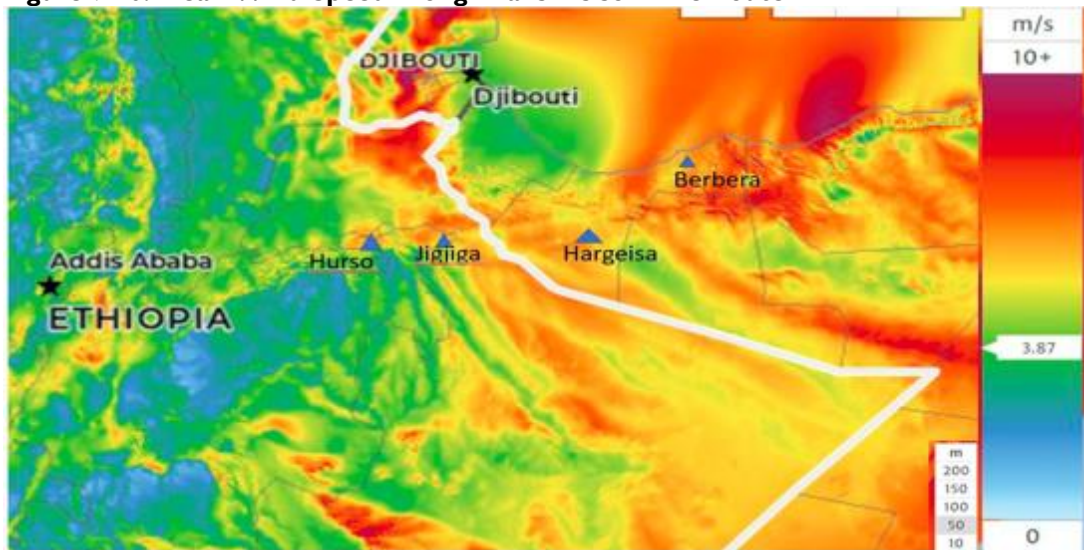
Figure 7-9. Path and Impact Areas of Tropical Cycle Sagar in 2018



(source : www.humanitarianresponse.info-OCHA).

Rare cyclone events such as tropical cyclone Sagar may pose challenges to power transmission line and substation in certain sections of the project. The historical trend in mean daily maximum temperature and near surface temperature show an increasing trend under SSP2 4.5 and SSP5 8.5, the frequency of occurrence of this rare tropical cyclone is anticipated to increase in the future. This causes damages to towers and substations. Hardening of the towers based on their distance to the coast could be considered as an option for cyclone preparedness strategy. Such strategy includes raising the substation above the flood level and use of strong waterproof materials. For power transmission line, further re-enforcement of towers is required. Although Sagar cyclone triggered heavy rainfall from Hargeisa-Berbera, re-enforcing transmission tower foundations would be an adaptation option for protection against potential damages. Figure 7-10 gives the mean wind speed of the project area. The mean wind speed at Jigjiga-Hargeisa is 6.78 m/s while it is 6.27 m/s at Berbera.

Figure 7-10. Mean Wind Speed Along Transmisison Line Route



Source: <https://globalwindatlas.info/en/area/Ethiopia>).

The summary table below gives key information on the climate risks of the project. These climate risks have exhibited adverse impacts on the project components (transmission line, towers). Landslide, tropical cyclone and wildfire affected different locations of the project area. The maximum temperature for 2080 under SSP2 4.5 highly deviates from the mean for the same scenario. Besides, the maximum temperature for 2080 for SSP5 8.5 is higher than that of SSP2 4.5 (Table 7-66).

Table 7-66. Climate Risks of Project with Information on their Specific Locations

Description	Minimum temperature in 2080 in °C		Mean temperature in 2080 in °C		Maximum temperature in 2080 in °C		Location of potential landslide hazard ²⁵		Location potential tropical cyclone ²⁶	Location of potential wildfire hazard
	SSP2 4.5	SSP5 8.5	SSP2 4.5	SSP5 8.5	SSP2 4.5	SSP5 8.5				
Debre Zeit-Hurso bloc	21.88	23.41	22.64	29.21	28.9	9.52	Adama stretch	P1= 8.548580 39.206032 P2= 8.553667 39.315460	None	None
							Welenchiti stretch	P1= 8.664501 39.478872 P2= 8.727235 39.560030		
							Beseka stretch	P1= 8.784017 39.650993 P2= 8.847147 39.736330		
Jigjiga-Hargeisa bloc	31.85	34.18	33.01	43.37	42.44	44.30	No areas prone to rainfall triggered landslide		Very low risk but heavy rainfall and flooding	Moderate risk
Hargeisa-Berbera	24.05	30.88	24.75	30.88	30.24	31.52	Buur Dhubbato areas	P1= 9.7228794 44.414635 P2= 9.731402 44.422574 P2= 10.434754	High risk with damaging effects P1=9.576972 4.070770	High risk with damaging effects P1= 9.576972 44.070770 P2= 10221898

²⁵ The assessment of landslide potential hazards has considered that the new transmission line of the Ethiopia-Somalia will be mainly located on the left-hand side of the main road from Debre Zeit III-Berbera. Besides, distance to the main road and expert knowledge of the landscape features of the project area were considered as well.

²⁶ This is a rare and infrequent event

							Darbudqu stretch	44.998438 P1= 9.861655 44.565933 P2= 9.931423 44.676876		
							Lafa Ruug stretch	P1= 10.006696 44.772433 P2= 10.137993 44.829455		
							Xabaalo tumsslood area	P1= 10.197016 44.863156 P2= 10.215423 44.886324		

Source: Feasibility Report

Climate Risk on the Project Components

Transmission lines are sensitive to climate change. Table 7-67 gives climate related hazards on transmission line and substations. The following qualitative risk rating was used.

Table 7-67. Climate Risk Assessment of Transmission Line

Hazards	Impacts on Transmission line	Risk rating
Drought and Heat waves	■ Drought increases damages by dust ■ High temperature damages control systems through loss of information and communication technology services or reduce efficiency and quality of services ■ Damages to equipment due to high electricity demand during hot days or operating at maximum carrying capacity of the transmission lines under increased temperature damages equipment ■ Increased temperature reduces current rating and increase the occurrence of sagging	<i>RED</i>
Tropical cyclone and flood ²⁷	■ Weakening towers ■ Induce a collapse of towers due to high wind speed and heavy rainfall ■ Power system failures	<i>YELLOW</i>
Wildfire ²⁸	■ Damages of transmission line components leading to power blackout	<i>YELLOW</i>
Landslides ²⁹	■ The assessment shows low risks of landslides in the project area	<i>GREEN</i>

Climate Adaptation Options

Climate risks related to the Ethiopia-Somalia power systems interconnections (the northern line) are described above. These risks trigger robust climate risk adaption options. Each option is described below.

²⁷ It occurs rarely. But if it happens the impact is devastating resulting in flash floods that lead to displacements of communities and damages of key infrastructure including power system.

²⁸ Only some section between Hargeisa and Berbera exhibits high risk for wildfire

²⁹ Landslides are low in the project area based on the current assessment

Engineering Design

A robust engineering design ensures either the avoidance or minimization of the adverse impacts of climate-related risks of the project. Table 7-68 gives adaptation options.

Table 7-68. Adaptation Options

Climate risks	Adaptation options
Drought and heat wave	■ Ensure that materials are enhanced for tolerance to high temperature ■ Installation of high temperature tolerant or resilient insulating and conducting materials for transmission line ■ Installation of cooling systems for substations to avoid damages due to high temperature ■ Ensure that the ICT components and electricity metering are certified for high temperature tolerance (resilience) ■ Establish a system for early fire warning to take preventive actions
Tropical cyclone and flood	■ Construct flood-resilient pile foundation for transmission line in areas prone to tropical cyclone induced flash flood ■ To ensure the safety of substations, construct retaining wall to avoid damage of a substation from flash flood ■ Establish contingency fund for post disaster actions (rehabilitation and restoration) ■ Construct tower foundations and substation well above the recorded flood height (level)
Wildfire	■ Ensure that the transmission line Right-of-Way (RoW) is free of vegetation (or any live or dead fuels) to avoid wildfire incidents ■ Establish a system where the vegetations of the RoW are regularly monitored and recorded
Landslides	■ Although landslide risks are low, ensure to establish a robust drainage system in the areas around the tower foundations ■ Establish a slope protection data/information on slope in the design for tower foundations

Capacity Building Measures

The establishment of early warning systems for the climate-related risks is an enabling factor to either avoid or minimize damages of transmission line and substations. Capacity building is an important component to ensure that the above adaptation options are implemented on time and early warning systems are effectively integrated into the operations of the Ethiopia-Somalia power systems interconnections. These capacity building measures should focus on training staff who are able to analyze climate data, forecast climate-related risks and recommend and execute appropriate adaptation options.

Strengthening Meteorological Monitoring Capacity

Building a meteorological monitoring capacity is an important source for monitoring short-term (daily weather conditions) and long-term climate conditions. The spatial distribution of the existing weather stations is scattered and provide a coarse information for the project. Development of a system that addresses the number of weather stations per a certain distance to the transmission line and substation is needed to ensure the climate resilience of the Ethiopia-Somalia power system intercon

7.3.2.21 Cumulative Impacts

Due to the inherent uncertainties in the nature of cumulative impacts, the CIA has by necessity been performed in a qualitative manner but still provides useful context for determining the significance of the Project's contribution to the overall impacts. Because all of Project predicted residual adverse impacts are of Low or Moderate significance, only a high-level CIA has been carried out, on the basis that the potential significant cumulative effects is low. Upon assessment of the project impacts, the cumulative impact assessment will focus impacts on atmospheric air quality, noise levels, water quality and use.

7.3.2.21.1 Air Quality

It is expected that air quality will be impacted due to cumulative impacts of additional machines and vehicles along the project RoW. The only source for air pollution from the transmission line construction shall be the excavation which shall be carried out during benching and foundation work. However, with only about 9mx9m area to be excavated, the amount of dust generated will be minimal. The other sources of air contaminants will be from the additional worker camps where wood and kerosene may be the main fuel for cooking and heating, especially since these camps will be located away from access roads and LPG or electricity will not be readily available. The net impact of the Project on Air Quality is **Low** and **transient**, because air pollution will be generated at the sporadically spread worker camps and along the highway and will be limited to the pre-construction and construction period.

7.3.2.21.2 Noise Impacts

It is expected that the noise levels will be impacted due to cumulative impacts of additional construction machines, vehicles and general construction activities along the RoW given the noise levels of the machines used. The net impact of the Project on noise levels is **Low** and **transient**, because noise will be generated at the construction sites of the stainless-steel pylons away from residential areas (settlements) and will be limited to the pre-construction and construction period.

7.3.2.21.3 Impacts on Climate

The OHL construction and operation will not have tangible carbon footprint and is very unlikely to be significantly affected by any manifestation of climate change. At the same time, if compared with no-project alternative that implies additional biomass fuel required to fill in the gap of under-supply to customers OHL during the period of its economic life will lead to reduction in emissions.

7.3.2.21.4 Water Resources Demand

Although the number of construction workers are expected to vary throughout the project period, two cases were considered; the first case considered 100 workers being the peak number of construction workers estimated from the ESIA report while the second case considered 552 people based on the correlates from a similar project that was undertaken in Djibouti³⁰. The Djibouti study estimated about 400 workers for the construction of a 197km long high voltage powerline, using the proportions, the Wajaale-Hargeisa-Berbera

³⁰ ³⁰ Dr Jean Alexandre Gassani, Assessment of water resource management for the Djibouti transmission line project

high voltage powerline that is 271.6km long will require about 552 people. The case with the highest number of people; being the worst-case scenario was considered for this project in the computation of the water demand for the construction workers. Using 150l/day as the adopted per capita water consumption for each worker as a cumulative quantity for domestic use, drinking, cleaning equipment and watering the camp. The total water demand for the workers was computed to be 15m³/day which translated to a cumulative demand of 10,800m³ for the entire of construction (two-year) period. The total water for the construction for the pylons during the two-year period was computed to be 14,259m³ i.e. 19.8 m³/day. From the water balance analysis above, it was shown that the available borehole sources cannot meet the project water demand and will result in water deficit. The net impacts of the project activities on water resources is expected to be positive as the project is expected to invest in water sources and handover to the local community after completion of the project.

8 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

This chapter presents the assessment of the issues likely to arise as a result of implementation of the proposed project and possible mitigation measures. For each issue, the analysis is based on its nature, the predicted impact, extent, duration, intensity and probability, and the stakeholders and/or values affected. In accordance with best practice, the analysis includes issues relating to the project's environmental and social sustainability.

8.1 Mitigation Measures

Mitigation Hierarchy for the Planned Project Activities

The ESIA has applied the mitigation hierarchy as per the requirement of the World bank Environment and Social framework to propose measures to manage the environment and social risks of the proposed transmission line. The caption below highlights some of the measures applied

Anticipate and Avoid

The project considered different routes for the transmission line and chose the option with the least environment and social risks; the project also undertook water resource assessment which indicated that the community was already experiencing water deficit and the use of the existing water sources by the project was dropped from options.

Minimize or Reduce

Some of the minimization measures proposed under this project is clearing vegetation only on the ROW of the transmission line

Mitigate:

If an impact cannot be abated on-site, then measures can be implemented off-site an example of this would be to install anti perching devices on the transmission line.

Compensate or Offset

Some impacts involve unacceptable damage to a resource, e.g., agricultural land during transmission line construction. Repair essentially involves restoration and re-instatement type measures.

8.2 Pre-Construction

The majority of mitigation measures and in particular mitigations to protect and enhance the physical environment are most effectively incorporated during the design phase. There are five key elements:

- Development of sustainable designs with the lowest possible environmental impact within the constraints of the project funding and the socio-economic setting.
- Incorporate the recommendations and requirements of the ESMP to be an integral part of the Bidding and Contract Documents thereby building in enforceable measures to protect the environmental and social matters throughout the construction phase.
- Development of stakeholder engagement plan or procedures
- Provide adequate grievance redress procedures to address the concerns of local people and stakeholders to ensure satisfactory resolution of any grievance arising from the

project.

- Ensure adequate and fair compensation for involuntary resettlement for any party suffering inconvenience, financial or loss of livelihood due to being moved to accommodate the works, principally the construction of the transmission line.

For each of the identified impacts, mitigation measures have been suggested in accordance with a general rule defining mitigation criteria as:

1. Avoidance of major impacts: major impacts are generally considered unacceptable, ones that would endure in the long-term or extend over a large area;
2. Reduction of major and moderate impacts to as low as reasonably practicable (ALARP) by planning, designing and controlling mitigation measures. This implies that mitigation measures will be applied until the limitations of cost effectiveness and practical application have been reached. The limitations are established by international practice;
3. Implementation of good practices for impacts rated as minor, in order to ensure that impacts are managed within good reason.

There will only be localized short-term impacts during construction due to the implementation of the civil works. Impacts have been addressed at the design stage by choosing engineering solutions that, as far as is possible, minimize the impacts during construction and operational phase. The impacts which could not be eliminated by the design, mostly impacts during construction, will be reduced, or eliminated by mitigation and monitoring measures specified in the ESMP. These construction related impacts can be mitigated by (i) the contractors' work practices, especially those related to maintenance of access, methods of trench excavation, the storage of construction materials and cleanliness of the work sites; (ii) cooperation by the local authorities with the contractor in terms of traffic management and use of public space and utilities; (iii) project management's strict enforcement of the correct construction practices and standards; (iv) the incorporation of the mitigation measures identified in the ESIA into the bid documents and specifications; (v) public awareness including liaison at ward level shortly in advance of work in each work location; and (vi) close monitoring of the contractor's implementation of the required mitigation measures. Environmental impacts and proposed mitigation measures during project pre-construction, construction, operation, and decommissioning phases are described in the following sections.

8.3 Environmental and Social Management Plan

The ESIA includes an ESMP which details the mitigation measures, environmental monitoring activities, institutional responsibilities, and environmental management capacity building. The relevant ESMP provisions are to be included in bid documents for contractors. During construction, the project management team will closely monitor the works contractors' environmental performance and overall ESMP implementation.

Table 8-1. Environmental and Social Management Plan-Pre-Construction Phase

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBILITY
Pre-Construction Phase			
Land Acquisition and Involuntary Displacement	-Permanent and temporary loss of assets (land, structures, and crops), livelihoods and household income as a result of temporary land take. Approximately 220 structures will be affected. -Displacement of physical structures and physical resettlement. Acquisition of land for contractor facilities and workers camps.	Preparation and implementation of the RAP, including any livelihoods restoration measures, as applicable. ■ Avoiding or minimizing the number of towers sites working areas in agricultural areas or areas of community resources. ■ Minimizing clearance of maintenance road as in some cases clearance may not be necessary since other access roads are available. ■ Minimizing as far as possible tree cut-off and tree trimming in the temporary tower sites working areas. MoEM-PIU and contractors will ensure that land for contractor facilities, and workers camps is acquired in line with the provisions of the RPF. In addition, contractors will ensure that all agreements regarding land acquisition for their facilities and restoration after use are entered with the respective communities and adhered to by the contractor.	MoEM

Table 8-2. Environmental and Social Management Plan-Construction Phase

IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	COST/USD	RESPONSIBILITY
Construction Air Pollution Impacts	Impact on sensitive receptors Impact on workers' health and safety	■ Develop a Dust Management Plan; ■ Record all dust and air quality complaints, identify cause(s), take appropriate measures ■ Liaise with local communities to forewarn of potentially dusty activities; ■ Undertake monitoring close to dusty activities, noting that this may be daily visual inspections, or passive/active monitoring	3,000,000	Contractor

	Impact on community health and safety	■ Undertake inspections to ensure compliance with the Dust Management Plan; ■ Plan potentially dusty activities so that these are located as far from receptors as feasible		
	Impact on flora and fauna	■ Erect solid screens if feasible around stockpiles and concrete batching; ■ Avoid run off of mud and water and maintain drains in a clean state; ■ Remove dusty materials from site as soon as possible if not being re-used. If being re-used, cover or vegetate if possible; ■ Impose speed limits on haul routes and in construction compounds to reduce dust generation; ■ Minimise drop heights when loading stockpiles or transferring materials; and ■ Avoid waste or vegetation burning.		
		For traffic on unpaved roads: ■ Undertake watering to attenuate dust near sensitive receptors. The duration and frequency of this should be set out in the Dust Management Plan and will consider water availability and any stakeholder grievances; and ■ On unpaved roads in use for more than 1 month, consider use of surface and sealants to reduce the use of water and water trucks. Use of lignin-based sealants recommended due to low environmental toxicity.	50,000	Contractor
		For earthworks: ■ Revegetate exposed areas as soon as feasible ■ Revegetate or cover stockpiles if feasible; ■ Expose the minimum area required for the works and undertake; and exposure on a staged basis to minimise dust blow	5,000	Contractor
		For track out: ■ Where track out is onto paved roads, use wet road cleaning methods to remove dirt and mud build up; ■ Avoid dry sweeping of large areas; and ■ Where feasible, undertake wheel washing and vehicle clean down prior to accessing public roads.	20,000	Contractor
Noise and Vibration Impacts	Impact on sensitive receptors	■ Siting noisy plant and equipment as far away as possible from NSRs, and use of barriers (e.g. site huts, acoustic sheds or partitions) to reduce the level of construction noise at receptors wherever practicable;	1,500	Contractor
	Impact on workers' health and safety	■ Where practicable noisy equipment will be orientated to face away from the nearest NSRs;		
	Impact on community health and safety	■ Working hours for significant noise generating construction work (including works required to upgrade existing access roads or create new ones), will be daytime only;		
		■ Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units, will be used, where practicable;		
	Impact on fauna	■ Where practicable, stationary equipment will be located in an acoustically treated enclosure ■ For machines with fitted enclosures, doors and door seals will be checked to ensure		

		they are in good working order; also, that the doors close properly against the seals; ■ Throttle settings will be reduced, and equipment and plant turned off, when not being used; ■ Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked; and ■ Fitting of mufflers or silencers of the type recommended by manufacturers.		
Soil Erosion and Contamination	Impacts on water quality (sediment run-off/contamination) leading to deterioration of quality.	■ Vegetation clearing, and topsoil disturbance will be minimized. ■ Contour temporary and permanent access roads/laydown areas so as to minimise surface water runoff and erosion; ■ Sheet erosion of soil shall be prevented where necessary through the use of sandbags, diversion berms, culverts, or other physical means. ■ Topsoil shall be stockpiled separate from subsoil. Stockpiles shall not exceed 2 m height, shall be located away from drainage lines, shall be protected from rain and wind erosion, and shall not be contaminated. Wherever possible construction work will take place during the dry season.	4,180	Contractor
	Deteriorated water quality will impact on fauna if consumed.	■ Topsoil shall be evenly spread across the cleared areas when reinstated. ■ Accelerated erosion from storm events during construction shall be minimised through managing storm water runoff (e.g. velocity control measures).		Contractor
	Deteriorated water quality will impact on community health if consumed.	■ Soil backfilled into excavations shall be replaced in the order of removal in order to preserve the soil profile. Material (e.g. fuel or chemicals).		
	Land degradation. Loss of soil fertility	■ Spread mulch generated from indigenous cleared vegetation across exposed soils after construction.		
Water Quality and Quantity (Surface and Ground Water)	Impacts on water quality (sediment run-off/contamination) leading to deterioration of quality.	■ Activities shall be conducted >100m away from water bodies, except where crossings are required.	10,200	Contractor
	Deteriorated water quality will impact on fauna if consumed.	■ All wastewater which may be contaminated with oily substances must be managed in accordance with an appropriate waste management plan and no hydrocarbon-contaminated water may be discharged to the environment.		
	Deteriorated water quality will impact on community health if consumed.	■ Domestic wastewater shall be treated and disposed of in accordance with an approved waste management plan. ■ Park vehicles preferably on paved platforms		
Impact on Flora	Loss of biodiversity.	■ Avoidance of impacts should be prioritized. Where impact avoidance is not possible, existing indigenous vegetation must be kept intact, where possible. Vegetation will be removed only as necessary.	7,000	Contractor
		■ Rivers, watercourses and other water bodies shall be kept clear of felled trees, vegetation cuttings and organic waste and debris from clearing;		
		■ Alien invasive vegetation should be avoided and removed immediately and disposed of properly, at a licensed waste disposal facility as necessary;		

		■ There should be no deviation from the access road position without prior discussions with the authorities. ■ Firewood collection by the project's employees should be strictly forbidden. ■ Rehabilitation of temporary construction sites and pioneer camps (if needed) should be done as swiftly as possible and always with suitable native grasses and other plants – construction of new camps is unlikely to happen; ■ Materials (e.g. pylons and cables) and equipment should not be delivered to the site prematurely, as this could result in need for laydown or storage areas and additional areas being cleared or affected unnecessarily; and ■ Whenever possible, all damaged areas shall be reinstated and rehabilitated upon completion of the contract to as near pre-construction conditions as possible		
Impact on Fauna	-Disturbance due to noise, vibrations, and vehicle presence.	■ All areas disturbed by construction activities shall be landscaped and rehabilitated. ■ Speed of project vehicles should be controlled at a maximum limit of 40 km/h to minimise roadkill. ■ No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct) ■ Guidance shall be given to all staff that they are not allowed to harm any animals during any routine maintenance of the project's infrastructure.	1,200	Contractor
Impact on Avi-Fauna	-Disturbance due to noise, vibrations, and vehicle presence.	■ No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct) ■ Guidance shall be given to all staff that they are not allowed to harm any animals during any routine maintenance of the project's infrastructure.		
Solid and Liquid Waste	-Impact on storm water quality and thus water quality in the water bodies in project areas -Impact on soil quality -Impact on surface water quality; -Impact on ground water quality; and -Impact on ecological receptors or human health	■ The Contractor should prepare a Solid Waste Management Plan ■ Implement waste segregation at source ■ Apply the 4R (Refuse, Reduce, Reuse, Recycle) ■ Provide waste collection receptacles at appropriate sites ■ Dispose wastes in designated waste disposal sites	50,000	Contractor
Access to Infrastructure and Services	-Disruption of transit routes -Disruption of normal traffic operations	■ Methods will be implemented to maintain open, clear, and transparent communication with the local communities regarding the use of local infrastructures by the Project throughout the different phases. ■ Engagement with the relevant authorities is recommended in order to avoid damage	2,000	Contractor

	-Wastes from the camp site could be significant and overburden the existing wastes disposal facilities in the area	to common property and minimize access disruption to education and healthcare facilities. ■ Community Grievance Mechanism will be implemented. ■ A Traffic Management Plan shall be issued before earth movements and construction start in order to minimize traffic disruptions. ■ Where temporary closure of road is required, alternative access to property will be ensured and local solutions including diversions will be implemented to ensure uninterrupted mobility.		
Air Navigation and Safety	Air collision	■ Installations, like the power transmission towers, should not be erected in the vicinity of an aerodrome. ■ Conform to the heights and distance allowed by Civil Aviation Agency ■ The airport in Berbera is 5.8kms away from the transmission line whereas the airport in Hargeisa is 9kms away from the transmission line. International aviation guidelines require EHV transmission lines to be at least 6kms away from airports.	N/A	Design Engineer
Landscape & Visual amenities risks	-Impacts on aesthetics of the surroundings with the possibility to affect the neighbouring residents.	■ Any excavated or cut and fill areas will be landscaped and revegetated; ■ No debris or waste materials will be left at the work sites, good housekeeping on site to avoid litter and minimise waste ■ Towers and structures should have a non-reflective finish; ■ Night lighting of sites should be minimized within requirements of safety and efficiency. ■ Ongoing rehabilitation of cleared areas to minimise visual scarring and maintenance clearing will be kept to the absolute minimum and should not extend beyond the corridor;	1,000	Contractor
Worker's Health and Safety and Workers Management	-Workers are likely to be exposed to work related risks during the construction phase of the project.	■ MoEM-PIU will develop a Human Resources Policy, which will outline worker rights to be included in all contracts including restrictions on working hours in line with applicable ILO standards, compensation including consideration of overtime, holidays etc. ■ MoEM-PIU will require its contractors and subcontractors to put in place policies in line with national legislation and applicable international legislation and MoEM-PIU Code of Conduct and Policies. ■ MoEM-PIU will establish contractual clauses to be embedded in the contracts of the contractors and sub-contractors that require adherence to Somaliland law and international standards to be upheld related to worker rights and providing the contractor and MoEM-PIU with the right of audit. ■ Pre-employment medical assessments will be put in place as a workforce risk management tool to screen individuals for risk factors that may limit their ability to perform a job safely and effectively. Expected benefits of conducting a pre-employment medical assessment include a safer working environment, reduction in workplace injuries, minimised downtime, matching the capacity of the employee with the role, and overall recruitment cost and risk reduction. ■ MoEM-PIU will ensure that training on health and safety measures is provided to	30,000	Contractor

		all construction workers prior to starting to work on the Project and that supervisors have adequate experience to deliver on their responsibilities. ■ MoEM-PIU will implement regular health and safety checks and audits of Workers, contractors and subcontractors and implementing sanctions in case of breaches of nationals. ■ MoEM-PIU will implement a Workers Grievance Mechanism for the Project workforce including contractors and subcontractor's standards and the Project's specific standards. Such audits to include workplace H&S; worker contracts, working hours, pay and conditions; housing and food standards. ■ MoEM-PIU will establish a procedure for the recording and analysis of incidents and lessons learned such that additional actions can be implemented to avoid or minimize occupational health and safety risks. ■ MoEM-PIU will ensure that facilities and work sites are designed and maintained such that robust barriers are in place to prevent accidents. ■ MoEM-PIU will ensure that its Code of Conduct is followed to regulate the performance and behaviour of all workers, including provision for disciplinary action for anti-social behaviour and non-compliance with health and safety regulations such as lack of use of PPE. ■ MoEM-PIU will ensure that adequate clean water, adequate food and access to medical care is provided to all workers on the worksite and at accommodation. ■ MoEM-PIU will provide condoms (male and female to workers)		
Community Health and Safety Impacts	-Increased noise decreased air quality, inappropriate waste handling or disposal, and accidental leaks and spills, debris and movement of heavy equipment may pose a safety risk to the public. -Potential impacts on community safety, in particular road accidents, trespass on the sites, and demining activities potentially resulting in accidents leading to injuries or fatalities. -Environmental health: changes to the environment	Develop and monitor the implementation of a Community Health and Safety Management Plan which will include the following measures: ■ Ensure that all workers are housed in accommodation camps rather than in the local settlements in order to minimize interaction with local communities and related health and safety impacts. ■ Ensure any trucking companies employed to work on the Project will have policies around health screening of their workers in line with Project requirements. ■ Ensure all workers including contractors and subcontractors receive education around transmission routes and symptoms of communicable diseases of concern and STIs. ■ Undertake community awareness on HIV/AIDS and other STIs ■ Provide access to health care for those injured by its activities. ■ Ensure that work sites are fenced and that signs are put up around work fronts and construction sites advising people of the risks associated with trespass. When work fronts are less than 100 metres from a community or house, employ security guards from the local community to prevent trespass. ■ Undertake a programme of stakeholder engagement and consultation to educate local communities of the risks of trespassing onto sites, the meaning of signs, and the dangers of playing on or near equipment or entering fenced areas. Special attention to be paid in primary and secondary schools along the transmission routes	10,000	Contractor

	due to increased noise and vibrations, decreased air quality and, inadequate management of waste. -Impact from workers presence and potential interaction with local populations	and in areas where towers will be built close to residential or school areas. ■ MoEM-PIU will develop Emergency Response Plans (ERPs) in cooperation with local emergency authorities and hospitals. ■ MoEM-PIU will extend the Worker Code of Conduct to include guidelines on worker –community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process. ■ MoEM-PIU will provide primary health care and first aid at construction camp sites to avoid pressure on local healthcare infrastructures. ■ MoEM-PIU will implement a Community Grievance Mechanism. ■ MoEM-PIU will develop and implement a Traffic Management Plan covering aspect such as vehicle safety, driver and passenger behaviour, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations ■ Develop and implement Labour Influx Management Plan		
		■ Ensure that all workers are housed in accommodation camps rather than in the local settlements in order to minimize interaction with local communities and related health and safety impacts. ■ Ensure all workers including contractors and subcontractors undergo pre-employment physical screening and regular health screening. ■ Ensure any trucking companies employed to work on the Project will have policies around health screening of their workers in line with Project requirements. ■ Ensure all workers including contractors and subcontractors receive education around transmission routes and symptoms of communicable diseases of concern and STIs. ■ Undertake awareness creation among the communities on HIV/AIDS and other STIs. ■ Provide access to health care for those injured by its activities. ■ Ensure that work sites are fenced and that signs are put up around work fronts and construction sites advising people of the risks associated with trespass. When work fronts are less than 100 metres from a community or house, employ security guards from the local community to prevent trespass. ■ Undertake a programme of stakeholder engagement and consultation to educate local communities of the risks of trespassing onto sites, the meaning of signs, and the dangers of playing on or near equipment or entering fenced areas. Special attention to be paid in primary and secondary schools along the transmission routes and in areas where towers will be built close to residential or school areas.		
Gender-Based Violence (SEA and SH) and other	Sexual exploitation and Abuse (SEA) of community members by project workers	■ Implement the projects GBV, SEA/SH Action Plan ■ Extend the Worker Code of Conduct to include guidelines on worker –community interactions and will provide training on the worker code of conduct to all	30,000	Contractor

forms of GBV at the community/family level.	and sexual harassment amongst workers (SH). Other forms of Gender-based violence e.g., (Forced early marriages, transactional sex, domestic violence).	employees including contractors and subcontractors as part of the induction process. The workers code of conduct will be signed by all with physical presence on site and in the project area. Where other forms of GBV are reported to the project, establish a link between MoEM-PIU activities or operations with, GBV cases at the community/family level such as domestic violence. This is to ensure that all GBV cases at the community/family level and resulting from or exacerbated by project operations are managed effectively.		
Social Maladies	Crime, commercial sex work and other nuisances from growth	Contractor to develop and implement awareness and education programmes with a focus on the local workforce, covering social conduct (e.g. gender-based violence, drug and alcohol misuse), financial management and basic workplace wellness programmes that are culturally acceptable.		
Security and Use of Armed Personnel	Loss of life, property, trauma	- Develop and implement a stand-alone Security Risk Assessment and Management Plan (SRAMP). See annex E on SRAMP developed for the project. - Conduct regular trainings and security awareness programs for project workers. - Ensure functionality of grievance redress mechanism. - Conduct regular meetings with staff members. - Train security personnel on the project's Code of Conduct (CoC) and ensure that contracted security personnel sign the CoC.	500,000	Contractor
Violation Against Children	-Violation of children rights by contractor and labour force on site (e.g., child labour, sexual relations with minors etc.)	- MoEM-PIU will extend the Worker Code of Conduct to include guidelines on worker –community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process. - Employing persons aged 18+ years	2,000	Contractor
Archaeology and Cultural Heritage Impacts	-Restriction to access cultural sites. -Destruction of cultural sites during construction or operations	- Consult community when any community issue arises to engage traditional forms of community leadership. Develop stakeholder engagement procedures to guide consultations. - Avoid damage to, relocation of or restricting access to physical, cultural resources. - Work with local community representatives to develop cultural awareness materials (that will cover key issues including the location and importance of all local cultural sites and other cultural sensitivities (graves). - Should construction activity be required in proximity to existing graves, develop and implement working protocols in consultation with local traditional leaders. Develop stakeholder engagement procedures to guide consultations. - Do not remove any cultural heritage including graves without prior consultation to the communities and fulfilling the legal requirements. - Any removal of cultural heritage should be conducted by the best available techniques. - Establish a grievance procedure to ensure community concerns are addressed. - Develop a chance find procedure which will detail the appropriate course of action that must be followed for any relevant cultural heritage discoveries.	50,000	Contractor

Exclusion of Vulnerable individuals and households e.g., the elderly, female-headed households, the poor, single women, PWD etc.	Exclusion from accessing project benefits and opportunities, and non-participation in stakeholder engagement sessions.	■ The project will provide targeted interventions to vulnerable individuals and households to enable them to participate in the project effectively and access project benefits and opportunities.	Refer to benefits sharing plan	MoEM/EAPP
Unplanned Events	-Impacts to soil and surface water from spill events	■ Develop a detailed Emergency Preparedness and Response Plan which includes community notifications of any significant spills that have the potential to affect communities. ■ Refueling of equipment and vehicles will be carried out in designated areas on hard standing ground to prevent seepage of any spillages to ground. ■ Hazardous material storage will be on hard standing and impermeable surface and the bulk storage facility will be bunded. ■ Hydrocarbon spill clean-up kits shall be available at all locations where refuelling or maintenance of vehicles and equipment is done, and responsible people shall be trained in the use thereof.	50,000	Contractor

Table 8-3. Environmental and Social Management Plan- Operation and Maintenance Phase

PHASE/ IMPACT TYPE	POTENTIAL IMPACT	MITIGATION MEASURES	Cost/USD	RESPONSIBILITY
Air pollution Impacts	-Impact on sensitive receptors -Impact on workers' health and safety -Impact on community health and safety -Impact on flora and fauna	■ Develop a Dust Management Plan; ■ Record all dust and air quality complaints, identify cause(s), take appropriate measures ■ Liaise with local communities to forewarn of potentially dusty activities; ■ Undertake monitoring close to dusty activities, noting that this may be daily visual inspections, or passive/active monitoring ■ Undertake inspections to ensure compliance with the Dust Management Plan; ■ Plan potentially dusty activities so that these are located as far from receptors as feasible ■ Erect solid screens if feasible around stockpiles and concrete batching; ■ Avoid run off of mud and water and maintain drains in a clean state; ■ Remove dusty materials from site as soon as possible if not being re-used. If being re-used, cover or vegetate if possible; ■ Impose speed limits on haul routes and in construction compounds to reduce dust generation; ■ Minimise drop heights when loading stockpiles or transferring materials; and ■ Avoid waste or vegetation burning. <u>For traffic on unpaved roads:</u> ■ Undertake watering to attenuate dust near sensitive receptors. The duration and frequency of this should be set out in the Dust Management Plan and will consider water availability and any stakeholder grievances;	Operation Costs	MoEM

		<u>For earthworks:</u> ■ Revegetate exposed areas as soon as feasible ■ Revegetate or cover stockpiles if feasible; ■ Expose the minimum area required for the works and undertake; and exposure on a staged basis to minimise dust blow <u>For track out:</u> ■ Where track out is onto paved roads, use wet road cleaning methods to remove dirt and mud build up; ■ Avoid dry sweeping of large areas; and ■ Where feasible, undertake wheel washing and vehicle clean down prior to accessing public roads.		
Noise Emissions and Vibration Impacts		■ Siting noisy plant and equipment as far away as possible from NSRs, and use of barriers (e.g. site huts, acoustic sheds or partitions) to reduce the level of construction noise at receptors wherever practicable; ■ Where practicable noisy equipment will be orientated to face away from the nearest NSRs; ■ Working hours for significant noise generating work (including works required to upgrade existing access roads or create new ones), will be daytime only; ■ Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units, will be used, where practicable; ■ Where practicable, stationary equipment will be located in an acoustically treated enclosure ■ For machines with fitted enclosures, doors and door seals will be checked to ensure they are in good working order; also, that the doors close properly against the seals; ■ Throttle settings will be reduced, and equipment and plant turned off, when not being used; ■ Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked; and ■ Fitting of mufflers or silencers of the type recommended by manufacturers.	Operation Costs	MoEM
Soil erosion and contamination impacts	-Minimal or no soil erosion	■ Vegetation clearing, and topsoil disturbance will be minimized. ■ Contour temporary and permanent access roads/laydown areas so as to minimise surface water runoff and erosion; ■ Sheet erosion of soil shall be prevented where necessary through the use of sandbags, diversion berms, culverts, or other physical means. ■ Topsoil shall be stockpiled separate from subsoil. Stockpiles shall not exceed 2 m height, shall be located away from drainage lines, shall be protected from rain and wind erosion, and shall not be contaminated. Wherever possible construction work will take place during the dry season. ■ Topsoil shall be evenly spread across the cleared areas when reinstated. ■ Accelerated erosion from storm events during construction shall be minimised through managing storm water runoff (e.g. velocity control measures).	Operation Costs	MoEM

		■ Soil backfilled into excavations shall be replaced in the order of removal in order to preserve the soil profile. Material (e.g. fuel or chemicals). ■ Spread mulch generated from indigenous cleared vegetation across exposed soils after construction		
Surface Water Quality Impacts	-Minimal or no water pollution	■ Activities shall be conducted >100m away from water bodies, except where crossings are required. ■ All wastewater which may be contaminated with oily substances must be managed in accordance with an appropriate waste management plan and no hydrocarbon-contaminated water may be discharged to the environment. ■ Domestic wastewater shall be treated and disposed of in accordance with an approved waste management plan. Park vehicles preferably on paved platforms	Operation Costs	MoEM
Impact on Flora	-Impact on flora and vegetation.	■ Avoidance of impacts should be prioritized. Where impact avoidance is not possible, existing indigenous vegetation must be kept intact, where possible. Vegetation will be removed only as absolutely necessary. ■ Rivers, watercourses and other water bodies shall be kept clear of felled trees, vegetation cuttings and organic waste and debris from clearing; ■ Alien invasive vegetation should be removed immediately and disposed of properly, at a licensed waste disposal facility as necessary; ■ There should be no deviation from the access road position without prior discussions with the authorities; ■ Materials (e.g., pylons and cables) and equipment should not be delivered to the site prematurely, as this could result in need for laydown or storage areas and additional areas being cleared or affected unnecessarily; and ■ Whenever possible, all damaged areas shall be reinstated and rehabilitated upon completion of the contract to as near pre-construction conditions as possible		MoEM
B6. Impact on Fauna	-Disturbance due to noise, vibrations, and vehicle presence.	■ All areas disturbed by maintenance activities shall be landscaped and rehabilitated. ■ Vegetation that does not grow high enough to cause interference with the overhead power lines, or cause a fire hazard, should not be trimmed or cut unless it is growing in the road access area ■ Guidance shall be given to all staff that they are not allowed to harm any animals during any routine maintenance of the project's infrastructure.	Operation Costs	MoEM
B7. Impact on Avifauna	-Direct strike with the transmission line and pylons (bird collision) and by electrocution	■ Install high-visibility markers to make the lines more visible to birds, to reduce the risk of collision; ■ Where feasible and safe, provide artificial bird-safe perches and nesting platforms placed at a safe distance from the energized parts of transmission infrastructure	Operation Costs	MoEM

	-Change of avian flight patterns for some species	■ Cross-arms, insulators and other parts of the power lines constructed such that there is no space for birds to perch where they can come into contact with energised wires ■ Undertake regular (at least annual) monitoring of the transmission line for evidence of birds nesting on the pylons. In the event of nesting, anti-perch and nest devices will be installed to discourage birds from regularly visiting these structures. These will be replaced when necessary; ■ No hunting by Project personnel is to be tolerated under any circumstances (this measure should be a part of worker codes of conduct)		
Solid and Liquid Waste Impacts	-Minimal or no solid or liquid waste	■ Implement Solid Waste Management Plan, as described in this report.	Operation Costs	MoEM
Worker's Health and Safety and Workers Management	-Potential impacts to workers health and safety -Respect for labour rights during operation	Develop and implement a Worker's Health and Safety Management System covering all contractors and subcontractors including the following measures: ■ HR Policy in line with Local labour laws and ILO standards ○ Training on H&S Risks ○ H&S Audits for workers ○ Workers Grievance Mechanism ○ Incident and Accident Reporting ■ Code of conduct to regulate behaviour		
Community Health and Safety Impacts	-Exposure to Electromagnetic Fields	MoEM-PIU will develop and monitor the implementation of a Community Health and Safety Management Plan which will include the following measures: ■ Undertake a programme of stakeholder engagement and consultation to educate local communities of the risks of trespassing onto sites, the meaning of signs, and the dangers of playing on or near equipment or entering fenced areas. Special attention to be paid in primary and secondary schools along the transmission routes and in areas where towers will be built close to residential or school areas. ■ MoEM-PIU will develop Emergency Response Plans (ERPs) in cooperation with local emergency authorities and hospitals.	Operation Costs	MoEM
Gender-based violence (SEA/SH) and other forms of GBV at the community/family level	-Sexual exploitation and abuse of community members by project workers (SEA) and sexual harassment amongst workers (SH). Other forms of Gender-based violence e.g., (Forced early marriages, transactional sex and domestic violence	■ MoEM-PIU will extend the Worker Code of Conduct to include guidelines on worker–community interactions and will provide training on the worker code of conduct to all employees including contractors and subcontractors as part of the induction process. ■ Implement the SEA/SH Action Plan. ■ Extend the Worker Code of Conduct to include guidelines on worker–community interactions and will provide training on the worker code of conduct to all employees including contractors and sub-contractors as part of the induction process. The employees code of conduct will be signed by all those with physical presence on site and in the project area. ■ Where other forms of GBV are reported to the project, establish a link between	Operation Costs	MoEM

		MoEM-PIU activities or operations with, GBV cases at the community level such as domestic violence. This is to ensure that all GBV cases at the community/family level and resulting from or exacerbated by project operations are managed effectively		

8.3.1 Environmental and Social Monitoring Program

The environmental, social and health baseline defined background environmental, social and health conditions highlighting critical issues and sensitive components, whereas the impact assessment identified the components likely to experience fundamental negative changes due to project stressors. Based on the baseline and impact assessment outcomes, environmental, social and health monitoring activities to be carried out during the whole life of the Project have been identified. The basis and guidelines for the monitoring activities will be defined at every stage of the Project cycle. Monitoring will have the following purposes:

- Provide an unbiased account of environmental and socio-economic management performance. Compliance with the environmental permit issued by ESIA and any applicable contractual obligations under the agreement with MoEM.
- Provide reference to evaluate the effectiveness and to improve the implementation of environmental management plans in an effort to minimize the significant negative impacts.

Table 8-4. Environment and Social Monitoring Indicators

IMPACT TYPE	MITIGATION MEASURES	MONITORING INDICATORS	METHODS	FREQUENCY	RESPONSIBILITY
Land Acquisition and Involuntary Displacement	Refer to 7.3.1.1	- RAP Report cleared by Bank and borrower - Number of PAPs receiving compensation - Number of restored livelihoods - Number of unlawful forced evictions associated with the project % of displaced persons associated with the project who are satisfied with the resettlement/compensation process % of displaced persons associated with the project whose standard of living has improved/deteriorated post-settlement - Number of lodged grievances associated with resettlement - The level and extent to which affected communities are involved in the planning, implementation, and monitoring of resettlement. - Number of PAPs provided with timely and adequate compensation for land and other assets lost due to resettlement	Throughout pre-construction phase (prior to construction)	Throughout pre-construction phase (prior to construction)	MoEM
Construction Air Pollution Impacts	Refer to 7.3.2.1	- Availability of Air Pollution Mitigation plan (as part of C-ESMP) - Levels concentration of Particulate Matter (PM2.5, PM10), sulfur dioxide (SO2), nitrogen oxides (NOx), carbon monoxide (CO), and volatile organic compounds (VOCs) in the air/recorded (measured) - Number of respiratory incidences recorded (by workers and communities) - Number of complaints from community (noise related) - Changes in vegetation (color, health) - Ambient Air Quality Measurement Reports - Levels of soil, water pollution by emission and deposit - Project activities meeting acceptable air emission standards based on government/international/Bank standards - Frequency of machine tune ups including oil changes, belt changes, spark plug changes, lubrication	Measurements using Sound Level Meters/Dosimeters:	Quarterly	Contractor
Noise and Vibration Impacts	Refer to 7.3.2.2	- Availability of Air Pollution Mitigation plan (as part of C-ESMP) - Levels of noise recorded (ambient) - Ambient Noise Quality Measurement Reports - Number of complaints from community (noise related) - Project activities meeting acceptable noise emission standards based on government/international/Bank standards - Frequency of machine tune ups including oil changes, belt changes, spark plug changes, lubrication	Measurements using Sound Level Meters/Dosimeters:	Quarterly	Contractor

Soil Erosion and Contamination	Refer to 7.3.2.3	- Area affected according to degree and type of erosion - Erosion index (sediment production) - Changes in soil depth - Presence of exposed rock or roots, - Formation of gullies or rills. - Levels of pollutants in water and soil - Impact on vegetation and wildlife - Sediment deposition - Changes in landscape feature	- Visual Assessments - Laboratory Analysis - Vegetation cover monitoring - Soil moisture monitoring	Quarterly	Contractor
Water Quality and Quantity (Surface and Ground Water)	Refer to 7.3.2.4	- Water quality of individual sample testing based on temperature, colour, Ph, turbidity, discharge volume, amount of oil/grease - Water quality accumulation temperature, colour, Ph, discharge volume, oils/grease over time - Volume of water consumed per month/day/time period	- Vegetation mapping - Laboratory Analysis	Quarterly	Contractor
Impact on Flora	Refer to 7.3.2.5	- Extent and condition of areas identified as containing or likely to have high levels of biodiversity or provide environmental services which may be affected (positive/negative) by the project % of protected area that may be impacted/threatened by the project - Changes in biomass - Changes in plant health and diversity - Extent of vegetation clearance - Relative abundance (i.e. encounter rate) of anthropogenic threats % of affected area re-vegetated;	- Transect and quadrat sampling - Point-centered quarter method - Vegetation mapping	Quarterly	Contractor
Impact on Fauna	Refer to 7.3.2.6	- Extent and condition of areas identified as containing or likely to have high levels of biodiversity or provide environmental services which may be affected (positive/negative) by the project % of protected area that may be impacted/threatened by the project - Relative abundance (i.e. encounter rate) of anthropogenic threats	- Transect Surveys - Sign Surveys - Camera Trapping - Track Counts - Capture-Mark-Recapture - Point Counts - Acoustic Monitoring	Quarterly	Contractor
Impact on Avi-Fauna	Refer to 7.3.2.7	- Changes in species diversity - Changes in species abundance/density - Changes in migratory patterns/routes/timings/stop overs - Number of collision/mortalities	- Point Counts: - Transect Surveys - Mist Nettings - Vantage Point Surveys - Acoustic Monitoring	Annually	Contractor

Solid and Liquid Waste	Refer to 7.3.2.8	- Availability of Integrated Waste Management Plan as part of C-ESMP - Quantity of solid/liquid waste produced/month - Quantity of organic/inorganic waste produced/month - Amount of mixed MSW collected (kg/resident): - Proportion of different waste materials (e.g., plastics, paper, organic waste) - Source-separated waste collection rates - Capture rates for specific waste streams, - Impurity rates in separately collected waste - Amount of waste sent to different disposal or recovery facilities. - Number of Incidents-(spills, leaks, or other incidents that could lead to liquid waste pollution). - Public Health: Impact on public health related to water contamination (complaints received).	- Waste Audits: - Waste Tracking Systems: - Waste disposal facility monitoring(landfills)	Monthly	Contractor
Denial of Access to Infrastructure and Services	Refer to 7.3.2.9	- Distance to water sources, time spent collecting water, and water quality testing results. - Number of households with access to improved sanitation, the availability of public toilets, and the effectiveness of waste management systems. - Access to electricity grids, energy costs, and the use of alternative energy sources. - Distance to the nearest health center, availability of doctors and nurses, and the cost of healthcare services. - Travel time to key destinations, availability of public transport, and the cost of transportation. - Distance to the nearest school, the availability of teachers, and the cost of education. - Availability of internet access, mobile phone coverage, and the cost of communication services.	- Community Consultations - Household Surveys - Facility Audits - Geographic Information Systems (GIS)	Quarterly	Contractor
Air Navigation and Safety	Refer to 7.3.2.10	- Distance between airfield and transmission line - Height of the transmission line - Air navigation safety attributes on transmission line - Incidents and Near-Misses - Safety Suggestions and Hazard Reporting - Inspections and Observations	- Aviation Safety Assessments - Process-based Observations - Incident Data Collection - Trend Analysis - Safety Culture Assessment	Continuousl y	Design Engineer

Landscape & Visual amenities risks	Refer to 7.3.2.11	- Physical changes in vegetation cover - Physical changes associated with landform alteration - Changes in visual perception (visibility of development; viewpoint integrity) - Changes in scenic quality; lighting impacts; property values; public perception	- Field Surveys - Photographic Records - Remote Sensing - Public Perception Surveys - Tracking property values in the surrounding area.	Annually	Contractor
Worker's Health and Safety and Workers Management	Refer to 7.3.2.12	- Injury and Illness Rates - Rate of accident severity - Effectiveness of hazard identification and control - Measure exposure levels to hazardous substances - Number of Health and Safety Training - Number of emergency response drills conducted - Number of First Aid incidents - Effectiveness Incident Reporting System - Level of worker satisfaction with safety measures - Level of Compliance with Labor Laws (number of non-compliances identified) - Rate of implementation of Fair Labor Practices - Effectiveness of Worker Grievance Mechanism - Level of Community Engagement - Rate of Worker Turnover and Absenteeism - Availability of Training and Development Opportunities	- Workplace Inspections - Accident/Incident Investigation: - Hazard Assessment: - PPE Audits	Monthly	Contractor
Community Health and Safety Impacts	Refer to 7.3.2.13	- Level of Community Engagement - Frequency of community meetings and participation rates: - Number of Disease Incidence reported: - Water Quality: Number of reported cases of water contamination related illnesses - Air Quality-Number of reported cases of respiratory illnesses - Percentage of households with access to clean drinking water. - Accident and Injury Rates- Number of traffic accidents per month on roads near the project site: - Changes in household income levels in project-affected areas: - Number of Security Incidents: - Number of emergencies occurring	- Health Facility Assessments - Disease Surveillance - Surveys and Interviews - Incident Reporting Participatory Data Collection: - Environmental Monitoring - Geospatial Analysis	Quarterly	Contractor

Gender-Based Violence (SEA and SH) and other forms of GBV at the community/family level.	■ Refer to 7.3.2.14	■ Existence and implementation of a GBV/SEA/SH policy, action plan, or code of conduct. ■ Number of regular training and capacity building for staff and stakeholders on GBV/SEA/SH prevention and response. ■ Number of reported GBV/SEA/SH incidents. ■ Timeliness and effectiveness of response to reported incidents. ■ Percentage of reported cases investigated and addressed. ■ Access to survivor support services (medical, psychosocial, legal). ■ Changes in community norms and attitudes related to GBV/SEA/SH. ■ Reduced incidence of GBV/SEA/SH in project-affected communities. ■ Increased awareness and knowledge of GBV/SEA/SH among project staff and stakeholders. ■ Strengthened collaboration among different stakeholders (government, NGOs, community). ■ Reduced prevalence of GBV/SEA/SH in the long term. ■ Improved access to justice for GBV/SEA/SH survivors. ■ Empowerment of women and girls in affected communities. ■ Positive changes in social norms and attitudes related to GBV/SEA/SH.	■ Surveys ■ Interviews ■ Focus Group Discussions ■ Document Review	Quarterly	Contractor
Social Maladies	■ Refer to 7.3.2.15	■ Prevalence of diseases related to the project (e.g., waterborne diseases, respiratory illnesses), incidence of accidents and injuries, and access to healthcare services. ■ Changes in employment rates, income levels, access to resources (land, water), and patterns of economic activity. ■ Tracking the specific impacts on women, children, the elderly, and other vulnerable groups.	■ Socioeconomic Surveys ■ Community Mapping ■ Institutional Analysis ■ Household Surveys ■ Key Informant Interviews ■ Focus Group Discussions ■ Community Consultations ■ Participatory Rural Appraisal (PRA) ■ Community Monitoring Groups	Quarterly	Contractor

Security and Use of Armed Security Personnel	■ Refer to 7.3.2.16	■ Number and types of security incidents ■ Incident response time ■ Incident resolution time ■ Number of reported incidents ■ Severity of incidents ■ Compliance with security protocols ■ Use of personal protective equipment (PPE) ■ Correct use of security equipment: Compliance with weapon handling procedures ■ Training hours and frequency: Performance on training assessments ■ Perception of security in the community ■ Community engagement with security personnel ■ Effectiveness of communication systems ■ Frequency and accuracy of reporting ■ Frequency and effectiveness of drills ■ Availability of emergency equipment ■ Effectiveness of emergency response plans:	■ Surveys and Interviews ■ Observation ■ Review of Documentation ■ Stakeholder Engagement	Quarterly	Contractor
Violation Against Children	■ Refer to 7.3.2.17	■ Number of children employed in project-related activities, disaggregated by age, gender, and type of work ■ Number of children displaced due to project activities ■ Number of reported cases of physical or sexual violence against children in project-affected communities ■ Number of children accessing education, healthcare, and other essential services in project-affected communities, disaggregated by age, gender, and type of service ■ Number of reported cases of community conflict or social tension in project-affected communities ■ Number of children accessing mental health and psychosocial support services in project-affected communities	■ Surveys and Interviews ■ Review of Documentation ■ Stakeholder Engagement	Quarterly	Contractor
Archaeology and Cultural Heritage	■ Refer to 7.3.2.18	■ Physical damage to sites ■ Encroachment: ■ Changes in Setting	■ Satellite Imagery ■ Spatial Risk Assessment ■ Regular site visits ■ GPS surveys ■ Community consultations ■ Recording chance finds	Annually	Contractor

Exclusion of Vulnerable individuals and households	■ Refer to 7.3.2.19	■ Tracking the specific impacts on women, children, the elderly, and other vulnerable groups. ■ Household demographics ■ Access to basic services (healthcare, education) ■ Level of economic stability ■ Level of access to social safety nets ■ Strength of social networks and support systems ■ Housing Conditions	■ Socioeconomic Surveys ■ Community Mapping ■ Institutional Analysis ■ Household Surveys ■ Key Informant Interviews ■ Focus Group Discussions ■ Community Consultations ■ Participatory Rural Appraisal ■ Community Monitoring Groups	Continuous	MoEM/EAPP
Unplanned Events	■ Refer to 7.3.2.20	■ Existence of Emergency Preparedness and Response Plan ■ Air Quality: Concentrations of specific pollutants (e.g., particulate matter, sulfur dioxide) exceeding established limits. ■ Water Quality: Changes in water quality parameters (e.g., pH, dissolved oxygen, turbidity) beyond acceptable ranges. ■ Noise Levels: Exceedance of noise standards or complaints from affected communities. ■ Biodiversity: Decline in population of key species or habitat loss. ■ Community Health and Safety: Increased incidence of accidents, illnesses, or social unrest. ■ Cultural Heritage: Damage to or loss of cultural heritage sites.	■ Early Warning Systems ■ Feedback Mechanisms ■ Geospatial Technologies	Continuous	Contractor

9 INSTITUTIONAL ARRANGEMENTS FOR ESMP IMPLEMENTATION

9.1.1.1 EAPP Project Implementation Unit

The EAPP secretariat has established a Project Implementation Unit (EAPP-PIU), headed by a Project Manager and dedicated staff, which include a social specialist and environmental specialist. The 2 specialists will provide safeguards support to the project including ensuring that implementation of the project is in accordance with applicable ESSs and ESMP and will oversight the MoEM-PIU project management team to achieve the same.

9.1.1.2 MoEM Project Implementation Unit

The Project will be implemented by MoEM-PIU. The PIU will require a qualified Social Safeguards Specialist to focus specifically on GBV (SEA/SH) impacts likely to occur because of the project and to support the Contractor Social Safeguards Specialist to develop and implement the GBV Management Plan. The core functions of the team will be to coordinate and facilitate oversight for technical, environmental, and social safeguards, health and safety and social risks supervision. The MoEM-PIU will be accountable to EAPP-PIU in terms of environmental and social oversight. MoEM-PIU will report to EAPP-PIU who supervise the performance on environmental and social implementation of the project by MoEM-PIU.

9.1.1.2.1 Reporting

Throughout the project, MoEM-PIU and EAPP-PIU will keep regulatory authorities, World Bank and other relevant stakeholders informed of the project performance with respect to HSE matters.

9.1.1.2.2 Compliance Evaluations and Audits

Identifying potential impacts, hazards and risks is an important part of the ESMP. Equally important is the investigation of ‘near miss’ or accidents/incidents so that valuable lessons and information can be learnt and used to prevent similar or more serious occurrences in the future. MoEM and EAPP-PIU shall require all contractors to operate in accordance with the established Project Standards and evaluate compliance with these standards periodically. The evaluation shall be documented, and the contractor is required to take action to respond to any non-compliances that are identified. Non-compliance may be sudden and temporary, or it may persist for long periods. It may result from deficiencies or gaps in the ESMP itself, failures in plant or equipment, or from human error. Noncompliance can be reported directly by those in control of activities or found through inspections and audits of activities. Investigations should fully establish the root causes including failures in the ESMP. Investigations enable the planning of corrective action including measures for:

- Restoring compliance as quickly as possible;
- Preventing any recurrence;
- Evaluating and mitigating any resultant adverse HSE effects;
- Assessing the effectiveness of the above measures.

MoEM-PIU and EAPP-PIU shall also require the contractor to audit the effectiveness of their own EHS Management Systems at periodic intervals, using established and appropriate audit processes, to verify that the system aligns with Project standards, has been properly implemented and maintained, and is effective in meeting the policies and objectives that MoEM-PIU and EAPP-PIU has defined for the Project with the contractor. Records of the audit will be provided to MoEM-PIU and EAPP-PIU. The contractor shall establish inspection and auditing procedures aligning with MoEM and EAPP-PIU requirement. With respect to communities and social management, MoEM-PIU and EAPP-PIU will carry out regular reviews to assess the extent to which E&S management and community relations at the Project align with MoEM-PIU and EAPP-PIU project policies, strategic objectives, and Project commitments.

9.1.1.2.3 Training and Awareness

MoEM-PIU will identify, plan, monitor, and record training needs for personnel whose work may have a significant adverse impact upon the environment or social/health conditions. The project recognises that it is important that employees at each relevant function and level are aware of the project's environmental and social/health policy; potential impacts of their activities; and roles and responsibilities in achieving conformance with the policy and procedures.

Training and awareness (raising) therefore forms a key element of both EHS/operational control and the expediting of this framework ESMP. Key staff will, therefore, be appropriately trained in key areas of EHS management and operational control with core skills and competencies being validated on an on-going basis.

The identification of training and awareness requirements and expediting of the identified training/awareness events will be the responsibility of the MoEM Human Resources Manager. The HSE Manager, in cooperation with the Department Managers, shall coordinate people to attend their designated HSE training and monitor attendance in the HSE Training Matrix. As part of the training all employees shall be made aware of:

- The importance of conformity with the HSE Guidelines, Protocols, Standards, Procedures and the requirements of the Project ESMP.
- The significant HSE hazards and associated risks and potential impacts associated with their work, and the HSE benefits of improved personal performance.
- Their roles and responsibilities in achieving conformity with the requirements of the Project ESMP.
- The potential consequences of departure from specified procedures.

Specific knowledge or skill gaps that are identified for any person through the application of the competency assessment process can be met through either formal training or structured learning and development in the workplace. Training to close competency deficiencies may be coordinated by the HR Department or by the respective Department (e.g., on-the-job training). Subcontractors engaged during the pre-operations phase of the development will be responsible for the training and awareness of their staff. As a minimum it is expected that this will cover the environmental and social setting within

which the work is carried out; the potential environmental and social impacts of their work activities; the management and mitigation measures to address these; and the existence of, and importance of complying with, the Project ESMP.

9.1.1.2.4 Communication

MoEM-PIU and EAPP-PIU will maintain a formal procedure for communications with the relevant authorities through its Stakeholder Engagement Plan (SEP). The HSE Manager is responsible for communication of EHS issues to and from relevant authorities. This is coordinated with the project's Communications and External Relations Manager. The Project Manager will be kept informed of such communications. Pertinent information arising from such interactions will be communicated to subcontractors through the EHS Manager.

Whereas it is anticipated that the subcontractor EHS staff may interact with representatives from regulatory authorities on an informal, day-to-day basis regarding routine matters, the HSE Manager shall be the point of contact for formal communications. The HSE Manager will be responsible for communicating any pertinent information arising from such discussions to appropriate subcontractor through the technical department.

Internal communication is used to ensure that all persons are aware of the:

- HSE risks posed by their work activities & the controls to minimize these risks.
- Emergency response procedures that are in place.
- Lateral learning points arising from incident investigations.
- MoEM uses several mechanisms to communicate to employees, recognizing at all times the possible cultural differences that exist. These include meetings, workshops, forums, presentations, phone, e-mail, and noticeboards.

9.1.1.2.5 Documentation and Document Control

MoEM and EAPP-PIU will control HSE documentation, including management plans; associated procedures; and checklists, forms and reports, through a formal procedure. This document control procedure describes the processes that the project will employ for official communication of both hardcopy and electronic documents. In addition, it describes the requirement for electronic filing and posting and for assignment of a document tracking and control numbers (including revision codes).

During operations, the HSE Manager will be responsible for maintaining a master listing of applicable EHS documents and making sure that this list is communicated to the appropriate parties. The EHS Manager will be responsible for providing notice to the affected parties of changes or revisions to documents, for issuing revised copies and for checking that the information is communicated within that party's organisation appropriately. Subcontractors will be required to develop a system for maintaining and controlling their own EHS documentation and describe these systems in their respective EHS plans.

9.1.1.2.6 _Operational Control

Each potentially significant impact identified in the ESIA will have an operational control associated with it that specifies appropriate procedures, work instructions, best management practices, roles, responsibilities, authorities, monitoring, measurement and record keeping for avoiding or reducing impacts. It is the responsibility of the Department Managers to develop and implement operational control documents (e.g., Operating Manuals & Procedures). These should always be in place for HSE Critical Activities. It is also important that Procedures include measures aimed at improving HSE performance or managing HSE risk, in addition to controlling activities and tasks. It is the responsibility of Contractors to develop and implement operational & activity control documents (i.e., Standards, Procedures & Work Instructions) for all HSE-Critical Activities which they undertake on behalf of the Company. Where relevant, these Procedures must, as a minimum, meet the performance criteria defined in MoEM-PIU and EAPP-PIU's HSE Standards.

9.1.1.2.7 Implementation and Monitoring

Continual examination by MoEM-PIU and EAPP-PIU of the performance of the ESMP as well as actual performance against HSE targets, are necessary to gauge whether progress is being made towards the strategic HSE objectives of the Company. Full implementation of the ESMP means that people are doing as directed by the Management System at all levels.

In order to comply with Good International Industry Practice (GIIP) and MoEM HSE policy, effective implementation involves:

- Setting performance targets and key performance indicators (KPIs);
- Monitoring to measure performance against targets;
- Keeping performance monitoring records;
- Addressing non-compliance and ensuring that corrective action is taken;
- Reacting to incidents to make sure that they are reported and investigated.

9.1.1.2.8 Monitoring and Measurement

Monitoring will be conducted to ensure compliance with regulatory requirements as well as to evaluate the effectiveness of operational controls and other measures intended to mitigate potential impacts. With respect to the impacts identified in the ESIA, MoEM-PIU and EAPP-PIU will develop a number of programs to monitor the effectiveness of the mitigation measures. The Environmental and Social monitoring plans have been defined and will describe what effect is to be measured and the frequency. The monitoring programs shall:

- Identify the information to be obtained;
- Define the required accuracy of the results;
- Specify the monitoring methods and identify monitoring locations;
- Specify the frequency of measurement;
- Define roles and responsibilities for monitoring.

9.1.1.3 Project Supervision Engineer/Consultant

The Project Supervision Engineer will be required to recruit a qualified Environmental and Social Expert who will be charged with the responsibilities of supervision, review of site reports, preparation of monthly progress reports, prepare and issue appropriate instructions to the Contractor and monitor ESMP implementation.

9.1.1.4 Contractor

The Contractor will ensure that the established mitigation measures are integrated and implemented throughout the project works as per the C-ESMP. The Contractor will internalize the ESMP/C-ESMP, prepare monthly progress reports and implement instructions issued by the Supervision Consultant. The Contractor, therefore, will engage qualified Environmentalist (ensure compliance to ESMP and C-ESMPs) and Social Specialist (ensure compliance to social aspects of the ESMP and C-ESMPs) and Community Liason Officer (link between community and contractor) on full time basis to interpret the C-ESMP and advice on the implementation of the same, as well to the counterpart personnel for the supervision expert.

9.1.1.5 MoERD and MoECC

The agencies responsible for environmental compliance in Somaliland (MOERD) will further ensure that the ESMP is implemented as part of their mandate, functions, and responsibilities. MOERD will undertake surveillance on the project implementation and review compliance performance based on the supervision monitoring reports. The MoECC established a department of EIA which conducts the review, approval, and monitoring of the compliance with ESMP implementation, and global performance and environmental safeguard standards. The department has 4 technical staff actively operating under this department. The ministry and department is understaffed and has limited capacity to execute its functions effectively and requires capacity enhancement in terms of additional staff and training in environmental and social assessment and management. MoECC has a total of four staff with an environmental background and are responsible for coordinating EIA process. However, considering the developmental projects implementing by the ministry in energy and mining sectors, the number is very limited, thus requiring additional environmental consultants/specialists to be engaged. There is need to increase the capacity of the existing staff in environmental compliance with EIA standards through training.

9.1.2 Construction Environment and Social Management Plan

For an effective integration of environmental and social safeguards into the project implementation the Contractor will need to adopt this ESMP and prepare a comprehensive Construction Environment and Social Management Plan (C-ESMP) that will provide the key reference point for compliance. The environmental supervision will also adopt the C-ESMP. C-ESMP is an upgraded ESMP illustrating realities of the project works to be prepared by the Contractor. The Contractor is expected to finalize the Work Plan and upon approval, list the works items and for each item present practical actions that will be undertaken to realize achievement of the ESMP. The actions on works items should address environmental and social aspects associated with the works and in line with guidelines from the ESMP. Based on these ESMP outline, the Contractor will be instructed

to develop a C-ESMP for each component of the project and submit these plans to the MoEM and EAPP-PIU.

9.1.2.1 Specific Construction Environmental Management Plans

The ESMP has identified C-ESMPs that will be prepared by the procured contractor prior to construction commencing on all transmission line and sub-station. The C-ESMPs proposed are intended to be 'live' documents and therefore shall be regularly updated. The following plans will be established through engagement with MoEM-PIU and EAPP-PIU.

MoEM-PIU and EAPP-PIU will delegate certain responsibility but retain oversight and supervision role to construction contractor (s) and supervising engineer (s) as specified in this ESIA/ESMP section that highlights the roles of the contractors. During this phase MoEM-PIU and EAPP-PIU will manage its supervising engineers (s) and contractors to ensure that this C-ESMP is implemented and monitored effectively through contractual mechanisms regular direct oversight. As a contractual requirement, the contractors will be required to demonstrate compliance of their activities against the ESMP. This includes providing resources to ensure compliance of next tier contractors and a process for emergency stop-work orders in response to monitoring triggers. Contractors will be responsible for performing all work:

- In compliance with relevant national and international EHS legislation and regulations, and with other requirements to which the Project subscribes.
- In conformance with the Project ESMP, and related management plans for specific aspects; and
- In accordance with contractual technical and quality specifications.

The Project's ESMP as contained in this ESIA and related documentation will be the main contractual documentation to which the contractor(s) will be bound. Contractors will be required to develop their own C-ESMPs which show how they will comply with these environmental and social requirements.

In this way, the ESMP will be implemented and controlled using both MoEM and EAPP-PIU and the contractor management systems. The contractor management systems will therefore:

- Provide the framework that regulates their activities;
- Define responsibilities and reporting relationships for expediting, mitigation and monitoring actions detailed in the ESMP; and
- Specify the mechanisms for inspecting and auditing to ensure that the agreed actions are implemented.

Contractor (s) will be required to self-monitor against their C-ESMPs and compliance with these plans will be routinely monitored by MoEM-PIU and EAPP-PIU directly or by third parties. Contractors will be required to submit regular reports of monitoring activities, and the Project will review these on a regular basis. MoEM-PIU and EAPP-PIU is ultimately responsible for the management and supervision of all Project activities and will have

principal responsibility for implementing this ESMP and the mitigation measures. Below is a list of the plans that contractor (s) will develop prior to commencement of works.

9.1.2.1.1 Traffic Management Plan

A Traffic Management Plan (TMP), to be developed by contractor and guided by project level TMP already developed will set out the necessary site-specific requirements to be implemented by the project to mitigate potential risks and/or avoid negative factors to the environment, workers, and adjacent community with regards to the traffic during the phases of construction and operations. It shall be developed in compliance with the requirements of Somaliland regulations and relevant international standards. The TMP shall describe expected project related traffic at each phase, including: 1) sources of traffic, 2) types of vehicles, 3) abnormal loads, 4) and offsite traffic and routes. It shall also provide a brief understanding of the conditions of existing road infrastructure potentially impacted by the project. The TMP should include management measures to control traffic safety at the site and along routes used by the project. It will also detail who will be responsible for implementing these controls. The implementation of these measures shall be verified on an on-going basis.

In particular, the TMP shall define management measures for the following aspects:

- Traffic management/journey management,
- Vehicle breakdown response,
- Vehicle and equipment maintenance and inspections programme,
- Hours of operation,
- Traffic accident contingency,
- Environmental management (noise, pollution, debris),
- Social and community management (including communications).

The TMP shall also define the following key aspects associated to the TMP:

- Roles and responsibilities for implementation of the TMP
- Project driver training requirements with respect to road safety and environment.
- Speed limits and methods of enforcement
- Means to inform the community of traffic risks
- Vehicle equipment
- Vehicle maintenance and refuelling locations
- Inspection, auditing and reporting; and
- Driver competency.

Additionally, the TMP will consider the accumulated increase in traffic and road use derived from the potential development of nearby projects at the same period of time, enhancing the development of a common TMP for the different projects involved.

9.1.2.1.2 Water Management Plan

The overall objective of the Water Management Plan which will be guided by the Water Resources Assessment study report (Annex H) prepared as part of this ESIA is to ensure an adequate management of water resource and minimize the risks associated with water resource selection and consumption for the Project activities. Water will be used and disposed of in a manner consistent with Somaliland legislation and where appropriate,

international good practices. Objectives of this Water Management Plan can be summarized as follows:

- Ensure compliance with local legislation/permitting regulations and industry best standards, developing necessary management practices;
- Describe methods for assessing and protecting water uses and resources that may be impacted by project activities or operations (e.g. drinking uses, ground water for agricultural irrigation, other users that are not beneficiaries to the project, etc.);
- Apply sustainable criteria to identify opportunities for water savings and define objectives and targets, which should be continuously revised and updated to prevent fluctuations in surface or groundwater levels;
- Identify appropriate activities and indicators to incorporate into the monitoring program to control the water used;
- Define the responsible parties required to ensure the achievement of each objective and identify their required trainings in water management.

9.1.2.1.3 Pollution Prevention and Control Plan

The Pollution Prevention and Control Plan (PPCP) will be developed by the contractor as part of Emergency Preparedness and Response Plan (EPRP). The plan will be produced following relevant Somaliland legal requirements and best practices and will include provisions for the training of all workers and procedures related to communications to stakeholders and community improvement opportunities like workers and public awareness plans regarding pollution prevention and environment protection.

Typically, a PPCP covers the following elements:

- General measures to be followed on site during the construction phase. General measures will include housekeeping, good material handling practices and inspection procedures.
- Prevention of accidental spills through the application of a series of actions and measures to prevent leakages and spills and to enable effective response to unplanned releases of liquids, such as fuels, oils and chemicals.

Product Specific Practices will be adopted for the following:

- Petroleum products: vehicles and construction equipment will be monitored for leaks and receive regular preventive maintenance to reduce the potential for leakage. Petroleum products will be stored in tightly sealed containers that are clearly labelled;
- Paints: containers will be tightly sealed and properly stored when not required for use. All excess paint materials will be properly disposed of according to manufacturer's instructions.

9.1.2.1.4 Air Emission Management Plan

An air emissions management plan for project activities will be implemented, including the definition of the Project air pollutant emission sources and the management measures to be applied for the control, and if feasible, the reduction of emissions. The plan will include appropriate monitoring methods and frequencies to show compliance with national legislation.

9.1.2.1.5 Noise Emission Management Plan

A noise emissions management plan for project activities will be implemented, including the definition of the Project noise emission sources and the management measures to be applied for the control, and if feasible, the reduction of noise emissions. The plan will include appropriate monitoring methods and frequencies to show compliance with national legislation.

9.1.2.1.6 Waste Management Plan

The contractor shall develop and implement a Waste Management Plan (WMP) guided by project level WMP already developed which defines how wastes, including solid and liquid waste, will be reduced, re-used, collected, managed, recycled and disposed of in an appropriate manner and in accordance with national legislation and good international practice. The WMP will provide the basis for all the waste management arrangements and act as a central point of reference for how wastes will be managed by the Project. The WMP will cover the following aspects:

- Purpose/Objectives – of the Plan
- Context – legal requirements and general principles
- Roles and Responsibilities – of different staff and contractors
- Waste Arising (Types and quantities of key waste streams and Waste classification – local/international) per defined period (e.g. month, year)
- Waste Minimisation
- Waste Storage and On-site Handling (including segregation of different waste types)
- Reuse and Recycling
- Waste Collection and Transfer
- Final Treatment and Disposal (taking into account the waste acceptance criteria provided by the final treatment and disposal facilities selected)
- Waste Tracking, Data Management and Reporting
- Communications/Community Liaison

9.1.2.1.7 Hazardous Materials Management Plan

The contractor shall develop and implement a hazardous wastes management plan guided by the Waste Management Plan (WMP) already developed. The hazardous materials management plan should include measures to manage the risks associated with the production, handling, storage, and use of hazardous materials. Measures may include:

- Develop Standard Operating Procedures (SOPs) for the management of secondary containment structures, including integrity inspections and the removal of any accumulated fluid, such as rainfall, to ensure that the containment capacity.
- Provide secondary containment for fuel storage tanks and for the temporary storage of other fluids such as lubricating oils and hydraulic fluids which is at least 110% of the largest container or 25% of the total volumes of fuel and fluids stored (whichever is greater).
- Develop procedures for transfer and handling of fuels and chemicals and the response to spills including use of spill kits.
- Provide training on transfer and handling of fuels and chemicals and the response to spills for workers involved in the handling of fuels and chemicals.
- Provide any specific personal protective equipment (PPE) required to respond to an emergency and training on its use.

- Provide spill kits, portable spill containment and clean up equipment on site in areas where fuel and chemical handling takes place.
- Identify training requirements for personnel handling hazardous materials.

9.1.2.1.8 Sediment and Storm Water Management

A sediment and storm water management plan will be developed and implemented to avoid and minimise soil erosion as well as the spread of contaminated material from stormwater runoff during construction. The Plan will take into consideration the mitigation measures included in this ESIA and comply with statutory requirements and best practices. Stormwater management will be undertaken in accordance with national legislation and IFC General EHS guidelines for wastewater and ambient water quality (IFC, 2007: 28-29) where practicable.

9.1.2.1.9 Workers and Community Grievance Mechanism

The Workers and Community Grievance Mechanism describes the process, roles and responsibilities for registering, investigating, resolving and remedying workers, communities and other local stakeholders' grievances received. The Grievance Mechanism describes the different stages of the process that each grievance follows:

- Grievance reception
- Grievance acknowledgment
- Grievance assessment and assigning
- Grievance investigation
- Grievance resolution proposal
- Grievance follow up and close-out

9.1.2.1.10 Workers Management Plan

The Workers Management Plan will be developed (informed by already developed LMP) to address potential risks to worker rights and labour standards by summarizing expectations and procedures to maintain quality working conditions and activities, including accommodation facilities. The Workers MP will include a detailed labour rights assessment to better understand labour welfare and associated social risks. This assessment will look at the labour rights and welfare for expatriate workforce in practice. The specific objectives of the Workers Management Plan will refer to the following:

- Promote the fair treatment, non-discrimination, and equal opportunity of workers
- Establish, maintain, and improve the worker-management relationship;
- Promote compliance with national employment and labour laws;
- Protect workers, including vulnerable categories of workers such as migrant workers, workers engaged by third parties, and workers in the client's supply chain;
- All expat workers employed should be under equivalent contractual terms and condition terms of workers carrying out similar work;
- Promote safe and healthy working conditions, and the health of workers, also in relation to workers' accommodation camp and housing requirements;
- Establish a formal workers grievance mechanism; and
- Ensure avoidance of child labour and forced labour.

9.1.2.1.11 Occupational Health and Safety Plan

The Occupational Health and Safety Plan (OHSP) will be developed (informed by already developed project level LMP) to protect workers against adverse health and safety risks, providing measures and actions to be implemented to avoid or mitigate potential adverse. Occupational Health and Safety impacts that may arise from project related activities, such as potential injuries or accidents. The OHSP shall comply with the national minimum requirements. This management system will be enforced throughout the Project including all contractors and subcontractors. It will include aspects such as regular training and monitoring. An effective OHSP will support MoEM and Contractors in:

- Avoiding or minimizing risk to and impacts on the OHS of employees and contractor's employees working in the project.
- Defining measures to manage OHS risks to employees and contractors' employees.
- Ensuring compliance with national legislation and international good practices.

9.1.2.1.12 Community Health and Safety Management Plan

Worker-community interactions and increased pressure on health resources may expose communities to risks and impacts arising from temporary or permanent changes in population. The objectives of the Community Health and Safety Management Plan (CHMP) will be to outline potential impacts and describe how these should be avoided, mitigated, managed, and monitored. The specific objectives of the CHMP are the following:

- To establish effective mechanisms for protecting the health and safety of nearby communities from any Project-related health risks;
- To undertake a health facilities capacity/need assessment;
- To assign roles and responsibilities for all actions;
- To define documentation, and monitoring procedures;
- To determine timescales for implementation; and
- To establish a schedule for periodic review and update of the plan.

The plan will inform the ERP with respect to viable scenarios in case of emergencies. This assessment will be conducted prior to start of construction activities in order to gain a better understanding of the adequacy of health facilities to address industrial emergencies during Project operations.

10 CONCLUSIONS

This report presents a comprehensive environmental and social impact assessment for the proposed HV 400kV double circuit transmission line and proposed measures for mitigating the adverse impacts while enhancing the positive ones during the phases of pre-construction, construction, operation, and maintenance and decommissioning. An evaluation of the possible alternatives for the project activities was also performed.

The following conclusions have been arrived at regarding the proposed EHV 400kV double circuit transmission line. The anticipated benefits of the construction and operation and maintenance of the Project are immense. The project will provide a reliable supply of electricity to the region and the national grid, which comes along with many benefits. For the project components, which are suggested to be maintained and those where alternatives were provided, an evaluation of the positive and negative impacts was performed, and an ESMP drawn. All negative impacts can be mitigated following the ESMP. The negative impacts identified in this ESIA during the planning, construction, operation and decommissioning phase of the project, including waste generation, air pollution, noise pollution, occupational health and safety impacts, community health and safety impacts, traffic, labour influx and gender impacts will be limited to the transmission line ROW/wayleaves and can be mitigated using the measures proposed in the ESMP as well as the preparation and implementation of C-ESMPs including but not limited to:-

- Health and Safety Plan
- Local Recruitment Plan
- Grievances Management Mechanism
- Waste Management Plan
- Contractors Code of Conduct, specific provisions for VAC, SEA and SH
- HIV/AIDS Prevention Strategy
- Traffic Management Plan
- Campsite Management Plan
- Water Use Plan
- Emergency Preparedness and Response Plan
- Labour influx Management Plan

Other plans to aid the implementation of the safe project implementation will be included as the project continues. The adverse impacts on the physical and natural environment will be “in sum total,” not significant, and can be handled through the provided mitigation measures. There are incremental costs required to achieve these. The contractor will be legally bound to implement this ESMP and any subsequent C-ESMP that will be developed during the construction process. This obligation will be explicitly stated in the ToR, bidding documents and the final executed contract. Based on the immense project benefits of the energy transmission, which have been stated above, and the identified negative impacts which can be mitigated in the proposed ESMP.

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ATTENDANCE SHEET

STAKEHOLDER CONSULTATION

Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia and Somaliland “Northern Interconnector-Wajaale-Berbera”

Stakeholder Ministry of Energy & Minerals (MoEM)

Date: 10/ Jan-2024[illegible]

STAKEHOLDER CONSULTATION

Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia and Somaliland “Northern Interconnector-Wajaale-Berbera”

Stakeholder Gdaley District Municipality

Date: 14 Jan-2024

[illegible]

EMC CONSULTANTS LIMITED

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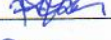
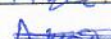
STAKEHOLDER CONSULTATION

Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

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1	muhammed yonis	4268147	
2	xawa Bare Jama	0634162097	
3	Keesi cise Ibrahim	0633381353	
3	intaleg caydalo dahi		
4	canab. Cali c/bah	0634947295	
5	Amma caba gater	0634613619	
6	muhammed majid cali	0634695331	
7	fedimo cabdi yonis	0634614162	
8	Amma cabal dubale	0634283892	
9	Amma axmed cabdi	0634233918	
10	sayyid Abd. cabdige	063-4802270	
11	muhammed yonis	0634468839	
13	muhammed Ibrahim jilba	0634714230	
14	Abdi Axmed c/bah	4262437	
15	Cali axmed yonis	0634443761	
16	Abdi Ibrahim jilba	4079288	
17	Axmed muhammed yonis	0634477861	
18	muhammed cali gater	4446216	
19	Khalid Abd. yonis	2448774	

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia and Somaliland “Northern Interconnector-Wajaale-Berbera”

Stakeholder Hargize Municipal Authority

Date: 13 Jan-2024

[illegible]

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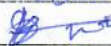
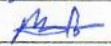
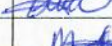
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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Community - Idike Deraayla ^{village} Date: 14/11/2024
"Male - group"

No	Name	Contact	Signature
1	Isaiah Muxamed	4463502	
2	Muxamed Cabdi Dibat	4116933	
3	Quraaysh Saleeban Aare	4129109	
4	Kasan Ismaaciil Cabdi	4660423	
5	Yusuf Cali Ibrahim	4608679	
6	ShuCaayb Cabdi Adan	4884952	
7	Mowliid Axmed Nour	4646922	
8	Muxamed Axmed Cismaan	4708343	
9	Mahd Cabdi Madar	4786930	
10	Warsame Barkhad	4629253	
11	Khadar Cabdi Maxamed	4929989	
12	Gulced Cabdi Maxamed	4677682	
13	Cicde Cabdi Maxamed	6121962	
14	Mahd Nour Cali	7354833	
15	Carab Alihi Mahd	7596043	
16	Moustafa Mowliid	7526253	
17	Faxan Mowliid Axmed	7878977	

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland “Northern Interconnector-Wajaale-Berbera”

Stakeholder Edunice Deerayahams
"women-group"

Date: 14-1-2024

[illegible]

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland “Northern Interconnector-Wajaale-Berbera”

Stakeholder

Stakeholder Edunice Deerayahants
"women-group"

Date: 14-1-2024

[illegible]

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia and Somaliland “Northern Interconnector-Wajaale-Berbera”

Stakeholder Ministry Social affairs, Employment and Family
(MSEAF)

Date: 10 Jan-2024

[illegible]

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia and Somaliland “Northern Interconnector-Wajaale-Berbera”

Stakeholder MSD

Date: 11 Jan-2024

[illegible]

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia and Somaliland “Northern Interconnector-Wajaale-Berbera”

Date: 09 Jan-2024

Stakeholder

Ministry of Environment & Climate Change (MOEC)

[illegible]

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Ethiopia and Somaliland “Northern Interconnector-Wajaale-Berbera”

Date: 13 Jan-2024

[illegible]

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Sheekh-muudhe Village/Community Date: 18-3-2024

No	Name	Contact	Signature
1	Abdullah Cali Yusuf	063-2640431	[Signature]
2	Omar Cenab Ali	063-3503910	[Signature]
3	Bahir guute Dirige	063-6226855	[Signature]
4	Abdiraxman omar Elm	063-4814300	[Signature]
5	Yusuf Mohamed Bahir	063-4773188	[Signature]
6	Mohammed Bahir Ahmed	063-4185308	[Signature]
7	Chadler Cabdi Kalin	063-_____	[Signature]
8	Maxamed Ahmed Jaamac	063-4810325	[Signature]
9	Sahra Adan Sugule	063-3547448	[Signature]
10	Sahra Maxamed Xasan	063-4068723	[Signature]
11	Aamina Cabdi Kaahin	063-_____	[Signature]
12	Farduus Eumar Cilmi	063-4735585	[Signature]
13	Muna Ahmed Kaahin	063-9561806	[Signature]
14	Xamda Daahir Awwaxamed	063-4059098	[Signature]
15	Ugaaga Adan Cabdillahi	063-3506914	[Signature]
16	Cabdixakiin Maxamed Cabdi	063-81944046	[Signature]
17	Abdi Ali Cilse	0634192455	[Signature]
19	Ridwan Ismail Abdilah	0634193172	[Signature]
20	Iid Maxamed Xasan	0634142107	[Signature]
21	Abdiraxman Jaamac	0634246798	[Signature]
22	Idiris Ismail Ali	0634074663	[Signature]

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder

Aw-Barre Village

Date:

16-march-2024

No	Name	Contact	Signature
1	Aw Barre Ahmed Ewab	063-416965	
2	Muxumed Aw-Cabdilahi Maxamed	063	
3	Cumab Xasan Muxumee	063-798123	
4	Dawad Muxumed Aw-Abdila	063-3619073	
5	Nimco Aadan Muxumee	063-7105432	
6	Hocan Cumar Xasan	063-6697927	
7	Nimco Abdilahi Oomaar	063-4210887	
8	Koos Maxamed Daahir	063	
9	Faysa Maxamed Cismaan	063-3291283	
10	Rugiya Xaashi Daahir	063-6252241	
11	Mahmud yuusuf Colow	063	
12	Salaam Cumacabdi	063-4173408	
13	Mutaas cabdicisma	063-6170768	
14	Barkhad cabdicali	063-4602691	
15	faysa cali nuur	063-4625880	
16	Amal faysal omer	063-4170957	
17	Nimco mahad Adam	063-4633611	
18	Axmed nuur caawale	063-4136084	
19	Amna maxmud cabd	063-4260019	
20	Sacda cllali farax	063-4442329	

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Dhegaxyo Cad community

Date: 13-3-2024

No	Name	Contact	Signature
1	IKraan Ismail Mohamed	0633818657	<i>[Signature]</i>
2	Mahsum Ibrahim	0634687657	<i>[Signature]</i>
3	Sahra Omar Muse	0636217066	<i>[Signature]</i>
4	Cagaga Ali Ismaaciil	0634678385	<i>[Signature]</i>
5	Bun Mahamed Cali	6633561169	<i>[Signature]</i>
6	Hinela Mowlid Cite	0633651636	<i>[Signature]</i>
7	Ogaso Hussein	063 -	<i>[Signature]</i>
8	Cagaga Ismaaciil	0634667702	<i>[Signature]</i>
9	Nimo Dibo Korahud	063 -	<i>[Signature]</i>
10	Raxma Aadan Xersi	063360784	<i>[Signature]</i>
11	Korodo Sayid Aadan	0633179164	<i>[Signature]</i>
12	Halimo Xasan Cabdi	0636002509	<i>[Signature]</i>
13	Cand Mahamed	0636123218	<i>[Signature]</i>
14	Aamina Omar Magid	0634080804	<i>[Signature]</i>
15	Farax Mowlid Amil	06382141870	<i>[Signature]</i>
19	Sayid Xasan Cabdi	0638307705	<i>[Signature]</i>
20	Filima Maxamed	0634258149	<i>[Signature]</i>
21	Nima Yusuf	0637973888	<i>[Signature]</i>
22	Yusuf Aadan	0637255885	<i>[Signature]</i>
23	Ahmed Nur Gase	0634661851	<i>[Signature]</i>
24	Mahamed Cabdi	063 -	<i>[Signature]</i>

- 25 - Mustafa Cabdi — 0633104765
- 26 - Faysal Maxamed — 0634680494
- 27 - Ismaaciil Hussein — 0634678445
- 28 - Shacaye Abdur — 0634017326
- 29 - Nazib Aadan — 0634670469
- 30 - Mahamed Muse — 0634667408
- 31 - Cabdi Aadan — 0634162555
- 32 - Mahamed Ahmed — 0634668926

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Dalarka Community

Date: 14-march-2024

No	Name	Contact	Signature
1	Admer (CP)	063-4186907	[Signature]
2	Mahyadin, Mohamed Hussein	063-4198503	[Signature]
3	Saifudeen Abdulahi, Jango	063-4805499	[Signature]
4	Rahime Mohamed Abdi	063- [blank]	[Signature]
5	Aamino Ismail Haysan	063-6002428	[Signature]
6	Halimo Osman Mohamed	063-60021406	[Signature]
7	Khadra Abdi Abdulahi	063-3744041	[Signature]
8	Xurub Ahmed Nur	063-60021401	[Signature]
9	Goos, Ismail Nur	063-6308512	[Signature]
10	Saado Abdi Mohamed	063-6209499	[Signature]
11	Asma Hussein Mohamed	063-6736026	[Signature]
12	Hinda Ahmed Hussein	063-4198741	[Signature]
13	Nuur, Ibrahim Syad	063-4816321	[Signature]
14	Fayad Mansur Omar	063-40440742	[Signature]
15	Amrta Abdi Mohamed	063-11632161	[Signature]
16	Ahmed Omar Yusuf	4077482	[Signature]
17	Hasan Ibrahim Syad	063-7446504	[Signature]
18	Abdillahi Ismail	665-4109914	[Signature]
19	Gumled Abdixayir	063-4413539	[Signature]
20	Abdirisak Maxamed	063-4010007	[Signature]
21	Maxamed Xasan Ibrahim	063-4065975	[Signature]

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder

Galode Village

Date:

20-3-2024

No	Name	Contact	Signature
1	Cabdi yusuuf Aadan	063-4066717	
2	Cawil Maxamed Siciid	063-4196699	
3	Cabdicasiis Cali Caawiye	063-4210579	
4	Faysal Muxumed Gaalib	063-4093303	
5	Axmed Cabdi ibraahim	063-4793902	
6	Caase Muxumed Gaalib	063-4853532	
7	Mawliid Axmed Siciid	063-8052192	
8	Cabdilaahi yusuuf Aadan	063-4251398	
9	Axmed yaasiin ibrahim	063-63666027	
10	Faysal Cismaan Xuseen	063-4079612	
11	Nuura Xasan Cabdilaahi	063-4795108	
12	Niciima Baashe Xasan	063-4827011	
13	Xaliimo Siciid Xandule	063-6226905	
14	Axmed Cali Aadan	063-4006970	
15	Sidiig Cabdi ibraahim	063-7219110	
16	Khaadija Faysal Muxamed	063-7945683	
17	Cabdiwasir Maxamed Maxamed	063-3503326	
18	Muna Ismaaciil Aadan	063-3289865	
19	Nimco Cali Muuse	063-3666164	
20	Eido ismaaciil Haariin	063-6226903	
21	Aamina Cismaan Muuse	063-4861431	

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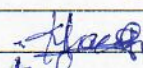
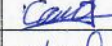
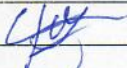
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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Tinad - Community

Date: 14.3-2024

No	Name	Contact	Signature
1.	Mohamed Muxumed Jama	063-4171304	
2.	Abelgaleh Abub Galib		
3.	Chaddeh Abub	063-4812136	
4.	Mohamed Mohamoud Adam	063-7178028	
5.	Ali Mohamed Moke	063-4068604	
6.	Mukhtar Nalir Adam	063-_____	
7.	Rahis Deg Ali	063-6378165	
8.	Abelgaleh Abub Galib	063-6255351	
9.	Yusuf Muxumed Abdi	063-_____	
10.	Ali Mohamed Moke	_____	
11.	Mohamed Hussein Hesen		
12.	Hamze Sheeg Farah	063-6775456	
13.	Mohamed Moke	063-4840106	
14.	Israhim Ahmed Abub	063-3287936	
15.	Dayib Ali Ismail	063-4174186	
16.	Abelgaleh Hussein Muxumed	063-4157978	
17.	Nalir Abub Galib	063-3778559	
18.	Nimes Muxumed Alaghi	063-4243167	
19.	Nimes Hussien Muxumed	063-4779096	
20.	Casshe CABOI Cumar	063-7186674	
21.	SHADO CABOI XAADI	063-6550063	

- 22- Maigum Elzein Nur 063-4642194
- 23- Hodan Muxumed Yoonis 063-4285743
- 24- Hamda Isdiris Abdi 063-8327177
- 25- Umukhsayr Sheeg Farah 063-6775501
- 26- Habubs Mawwad Abdi 063-7105535
- 27- Nimes Afrahi Abub 063-3232493

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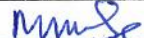
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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Maadhyaal community/village Date: 20-3-2024

No	Name	Contact	Signature
1	Abdi Gaaxnuug Maxamed	063-4248903	
2	Maxamed Saahid Faarax	062-4093940	
3	Xuseen Abshir Maxamed	063-4017964	
4	Hiil Aw-sagcin Faarax	063-4732612	
5	Abdishakur Maxamed Maxamed	063-4860215	
6	Mubareg Mawliid Maxamed	063-6031575	
7	Khaalid Faarax Cumar	063-3511991	
8	Abdilaahi Saqcin Faarax	063-7834471	
9	Maxamed Cabdilaahi Jaamac	063-426856	
10	Muse Abdilaahi Maxamed	063-40225241	
11	Khadan Saqcin Faarax	063-4749573	
12	Yusuf Biixi Oday	063-4749403	
13	Sagal Muse Maxamed	063-6103429	
14	Ughaad Siiciid Maxamed	063-4741735	
15	Fardusa Maxamed Abdilaahi	063-424548	
16	Nimco Abdilaahi Hussien	063-622789	
17	Sam Sam Abdilaahi Jaamac	063-4154520	
18	Raxma Cabdi Da'ud Haybe	063-4872441	

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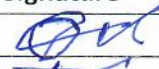
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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Shir Waaqo Community

Date: 18-3-2024

No	Name	Contact	Signature
1	Cali Muse Aw-muxumed	063-4783609	
2	Cabdi Axmed Aw-khalif	063-4864115	
3	Musafe Jibriil Aadan	063-4765484	
4	Raabi Cabdilaahi Jaamac	063 -	
5	ismaaciil Cabdilaahi Aw-khalif	063-3503674	
6	Cumar yuusuf khalif	063-4133551	
7	Sam-Sam ismaaciil Maxamed	063-470699	
8	Nimco Cismaan Muxumed	063-6154381	
9	Filhiing Cali Muse	063-3661392	
10	Najax Cismaan gawellah	063-7042727	
11	Adha Cabdi ismaaciil	063-7401219	
12	Xabiiba Muxumed Hure	063-740127	
13	Hinda Aadan Dhimbiil	063-3734847	
14	Aamina ibrahim Cabdilaahi	063- -	
15	Koos Muxumed Dhimbiil	063-7199426	
16	Amvan Mawliid Aadan	063-6284112	
17	Barkhad Axmed Haybe	063-6494743	
18	Maxamed Cabdi ismaaciil	063-8159081	
19	Axmed Ismaail Abdi	063-4121204	
20	Fardaws Ismaail	063 4175775	
21	Nimco Adh Ismaail	0636192819	

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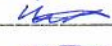
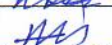
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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Xabaalo Tumaal Community

Date: 17/03/2024

No	Name	Contact	Signature
1	ismaciil Diitige Axmed	063-4441783	
2	Maxamed Cali	063-4062781	
3	Cabdilahi Cali Jaamac	063-4692828	
4	Khadar Axmed Cabdilahi	063-7340481	
5	Layla Hayaan Cabdilahi	063-3361693	
6	Dheeg Aadan Warsame	063-4608043	
7	Saynab Xirsi Dubad	063-4803253	
8	Caasha Xasan Xirsi	063-6160822	
9	Xamda Yusuf Maxamud	063-4692945	
10	Suleekha Maxamed Ismaciil	063-3774296	
11	Ayaan Jaamac Cabdi	063-6895497	
12	Carabaro Aw-Cabdi Xirsi	063-3716526	
13	Nimco Maxamed Xuseen	063-7478018	
14	Sahra Cabdi Maxamed	063-3480903	
15	Xaawa Warsame Xirsi	063-6785014	
16	Nimco Xasan Jaamac	063-6895344	
17	Muna Gaydh Xasan	063-4689147	
			

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder

Magaal Hodlaal-
Araad Lette-Feraweyne village

Date:

14th march-2024

No	Name	Contact	Signature
1.	Abel Amel Abetich	063-4059131	[Signature]
2.	Ali Hasbi Abetich	063-3462590	[Signature]
3.	Mohamud Jama Omar	063-4125339	[Signature]
4.	Hasan Ibrahin Ismail	063-	[Signature]
5.	Mohamed Mohamed		[Signature]
6.	Mahamed Abel Omar	063-7137831	[Signature]
7.	Jassen Abdi Ali Omar	063-4245532	[Signature]
8.	Yusuf Abdi Ahmed	063-7823484	[Signature]
9.	Sidiq Ahmed Jame	063-8110802	[Signature]
10.	Mustafa Ismail	063-	[Signature]
11.	Ismail Hassan Mohamed	061-34972	[Signature]
12.	Abetich Basir Hasan	063-7613184	[Signature]
13.	Mohamed Mohamed	063-4051879	[Signature]
14.	Eadar Aw cabdilaahi Sabah		[Signature]
15.	Safiya Aadan Muxamed		[Signature]
16.	Deega ismael Aadan	063-7306693	[Signature]
17.	Istahil Maxamed Ibrahim	063-7553229	[Signature]
18.	Xalimo Cismaan maxamed	063-3863713	[Signature]
19.	Shukri Aadan Ibrahim Ahmed	063-8110840	[Signature]
20.	Nineo maxamed Xuseen	063-7553369	[Signature]
21.	Xamda Muxamed Cali	063-	[Signature]
22.	Hinda Cali Xaashi	063-7906109	[Signature]
23.	Aamina Yusuf Cabdi	063-4767854	[Signature]
24.	Layla Daahir Maxamed	063-6001787	[Signature]
25.	Aamina Aw-Aadan Ahmed	063-6002321	[Signature]
26.	Canab Xuseen ismaaciil	063-6002287	[Signature]
27.	Saynab A/Lahi Maxamed	063-8110798	[Signature]
28.	Xalimo Muxamed Daahir	063-6520611	[Signature]
29.	Hibo Ibrahim Aadan	063-4646116	[Signature]
30.	ifraax Maxamed Aadan	063-	[Signature]

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Ethiopia And Somaliland “Northern Interconnector-Wajaale-Berbera”

Tibaze Village

19-3-2024

No	Name	Contact	Signature
1.	Ansein Ar Warfame	063-4789618	[Signature]
2-	Abdiraxman Saxonepoli	063-4764426	[Signature]
3	Ayaan Ismaaciil Jaamac	063-4789377	[Signature]
4	Muna Farxaan Faarax	063-4790205	[Signature]
5	Khadah Maxamed Muxumed	063-4245997	[Signature]
6	Faadumo Cali Jaamac	063-4829589	[Signature]
7	Deeq Maxamed Faarax	063-4715232	[Signature]
	Nasir Nuur Axmed	0633242941	[Signature]
	Ayhan maxamed maxamed	0634136318	[Signature]
	Gumel adan daahir	0634832792	[Signature]
	nimcan nuur faysal	0634254866	[Signature]
	maxmed daahir faarax	0636525114	[Signature]
	mubaatig cigaal Rooble	0633654992	[Signature]
	Nabhal Cahil' Cali B		[Signature]

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Community in Goollee
Coradda
Village

Date: 13-march-2024

No	Name	Contact	Signature
1.	Mohamoud Adun yey	0634469063	
2.	Abdi Cediir, Mohamud Samde	0634622554	
3.	Shirine Ahmed Abdir	063-4646016	
4.	Caaji Saleeban Osman	063-4668086	
5.	Mohamoud Mumin	063 4687781	
6.	Abas Saleeban	063-4605718	
7.	Ayane Hussein Gadi	063 4605834	
8.	Abdihakim Abdillahi	063-462016	
9.	Hussein Omar Adun	063-4636866	
10.	Ahmed Aw Mohamed	063-46388514	
11.	Safiya Xidun	063 820130	
12.	Abdirahman Halan Hira	063-466766	
13.	Hameda Aw-Halan	063 4684449	
14.	Saynas Rashid Sh.	063-8045385	
15.	Blalije Coras Saleeban		
16.	Fardus Yusuf Cali	0633848726	
17.	Sahra Isak Sami Jaamac	0634146018	
18.	Mohamed Cali Cali	0633844168	
19.	Maxamed Maxamed Adan	0634215144	
20.	Adan Jaamac Muw	0634473959	
21.	Mahmud Ahmed Adan	0634608835	

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland “Northern Interconnector-Wajaale-Berbera”

Stakeholder Am-Barkhale community

Date: 17/03/2024

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Sheekh Mohamed Yare - Community Date: 13- March- 2024

No	Name	Contact	Signature
1.	Abdullahi Ismail Aden	063-1	Ameh
2.	Husein Farah Egal	063-	Hus
3.	Abdullahi Ali Nur	063-	Abdullah
4.	Mohamed Farah Xonis	063-6492572	Mohamed
5.	Abdi Aden Ali	063-4627373	Abdi
6.	Abdi Shokan Xusuf Osman	063-4028709	Abdi
7.	Muhammed Aw Nur	063-4604441	Muhammed
8.	Ahmed Abdurrahman Saad	063-4645342	Ahmed
9.	Farkhan Aden Osman	063-3266813	Farkhan
10.	Husein Mohamed Mohamed	063-4632151	Husein
11.	Sayid Aw Cige	063-4605274	Sayid
12.	Jamal Mohamed	063-	Jamal
13.	Mohamed Mohamed		Mohamed
14.	Ahmed Husein	063-38385256	Ahmed
15.	Aden Firon Xonis	063-3852216	Aden
16.	Abdi Mohamed Mohamed	063-4289181	Abdi
17.	Muhammed Ahmed Farah	063-46391154	Muhammed
18.	Muhammed Cumar Cali	063-6065984	Muhammed
19.	Museaff Isag Mohamed	063-6877157	Museaff
20.	Cawaale Saleban Mohamed	063-7677506	Cawaale
21.	Abdiwasac Hassan Mohamed	063-7711953	Abdiwasac
22.	Abdigaadir idiris Cige	063-8112150	Abdigaadir
23.	Abdulkarim Ahmed Farah	063-7453270	Abdulkarim
24.	Abdi Joamac Batqal	063-	Abdi

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Lofa-Rung Village

Date: 23-3-2024

No	Name	Contact	Signature
1.	Maxamed Jaamac yaasiin	063-7074603	<i>[Signature]</i>
2.	Aadan Maxamed Cabdilaahi	063-4449710	<i>[Signature]</i>
3.	Saleebaan Yusuuf Aadan	063-4267779	<i>[Signature]</i>
4.	Maxamed yusuuf X. Xuseen	063-4558160	<i>[Signature]</i>
5.	ismaaciil Jaamac Cigaal	063-4869466	<i>[Signature]</i>
6.	Da'ud yusuuf Xasan	063-4247514	<i>[Signature]</i>
7.	Khayre Maxamed Cabdilaahi	063-4297061	<i>[Signature]</i>
8.	Mubarik Cabdi Xiirsi	063-4448933	<i>[Signature]</i>
9.	Saynab Maxamed Aadan	063-3708976	<i>[Signature]</i>
10.	Faadumo Haybe Xasan	063-444715	<i>[Signature]</i>
11.	Saynab Maxamed Aadan	063-4299773	<i>[Signature]</i>
12.	Maxamed Xuseen Cawaale	063-4881750	<i>[Signature]</i>
13.	Jimcaale Maxamed Maxamed	063-4734976	<i>[Signature]</i>
14.	Saleebaan Axmed Cilmi	063-4168882	<i>[Signature]</i>
15.	Cismaan Cali Nuux	063-4260718	<i>[Signature]</i>
16.	Axmed Geedi Cilmi	063-4800195	<i>[Signature]</i>
17.	Faadumo Xuseen Cawaale	063-4444193	<i>[Signature]</i>
18.	Nimco Ciise Maxamed	063-8319898	<i>[Signature]</i>
19.	Layla Siida Cabdi	063-7073516	<i>[Signature]</i>
20.	Khadaa Maxamed Cismaan	063-4707426	<i>[Signature]</i>
21.	Rooda Diirige Cabdi	063-4268902	<i>[Signature]</i>
22.	Caasha Haybe Maxamed	063-4248871	<i>[Signature]</i>
23.	Luul Maxamed yaasiin	063-4840729	<i>[Signature]</i>
24.	Warda Axmed Nuux	063-3673211	<i>[Signature]</i>
25.	Luul Daahir Xasan	063-3415276	<i>[Signature]</i>
26.	Aamina Cali ismaaciil	063-3483574	<i>[Signature]</i>
27.	Ardo Maxamed Xayd	063-34413243	<i>[Signature]</i>
28.	Xaawa Maxamed Aadan	063-335973	<i>[Signature]</i>
29.	Asli Cabdi Maxamed	063- -	<i>[Signature]</i>
30.	Raxma Cali Jaamac	063-4296419	<i>[Signature]</i>
31.	Hibaag Cabdiraxman Jamac	063-4796664	<i>[Signature]</i>
32.	Nasriin Bore Guleed	063- -	<i>[Signature]</i>
33.	Khadija Cismaan Jamac	063-7574192	<i>[Signature]</i>

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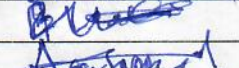
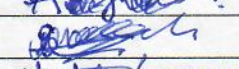
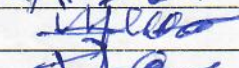
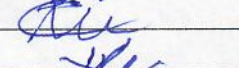
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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Laayo Community

Date: 13-march-2024

No	Name	Contact	Signature
1.	Mohamed Jama	063-466788	
2.	Sh. Mohammed Abeldali	063-4002976	
3.	Abdelali Mohamed	063-4023532	
4.	Bayib Ismail Muxumed	063-3654063	
5.	Abdi-Salan Ahmed	063-4650028	
6.	Hasan Ismail	063-40672914	
7.	Abdelali Mope	063-4015616	
8.	Basim Cali Ibrahim	063-4663181	
9.	Ahmed Haddi	063-4163800	
10.	Jamaal Muxumed Galin	063-4061571	
11.	Abdelali Mohamed Farah		
12.	Salma Ahmed Hussein		
13.	Chedra Farige	063-7362383	
14.	Ayaan Farax Cali	063-3469680	
15.	Aadan cumaromar	063-4479230	
16.	Ayaan Cilmi Cali	063-8293334	
17.	Cabdi Cisman Cali	063-4322314	
18.	Xamse Maxamed	063-4686500	
19.	Asma Jama Cabdi	063-4625880	
20.	Salman Isini's Jama	063-4187306	

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Markanka/Burcadda Far - Village

Date: 21-3-2024

No	Name	Contact	Signature
1.	Omar Yusuf Hirti	063-410 311 0	
2.	Ahmed Abdilahi Hasan	063-4161997	
3.	Hamse Abdi Walays	063-	
4.	Abdiraxman Muxumed	063-4153727	
5.	Mohamed Ibrahim Isah	063-4805346	
6.	Abdirasir Hasan Hirs	063-4014402	
7.	Zaki Hamse Abdi	063-7436097	
8.	Abdi Elmi Gureed	063-4234355	
9.	Abdi Mohamed Esse	063-4036776	
10.	Laysel Yusuf Abdi	063-4104742	
11.	Jimcaale Mohamed	063-7851568	
12.	Mohamed Deeg	063-4717527	
13.	Mohamed Ali	063-4021749	
14.	Ali Abdi Ismail	063-4407438	
15.	Ahmed Abdilahi	063-4722574	
16.	Maxamed Abdi Cuse	063-4107171	
17.	Sacad Hasan	063-4110648	
18.	Khadra Ibrahim	063-4734585	
19.	Ismaciil Cabdilahi	063-4222197	
20.	Hadamed Ahmed Maxamed	063-4100762	
21.	Hamse Siciid Abdilahi	063-4144264	

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Dacar-Budlung Community

Date: 17. march. 2024

No	Name	Contact	Signature
1.	Mustafe Smueli Ahmed	063 446 0437	
2.	Qadan Sematar H. Ibrahim	063 466 1977	
3.	Kawo Cali Hashi	063- 4859700	
4.	Aniza Abeli Jama	063 4447114	
5.	Qadan Ad'ud Mohamed	063- 415 9963	
6.	Laki Ibrahim Mohamed	063- 466 678	
7.	Nasra Mohamed Dirige	063- 466 678	
8.	Aamine Yusuf Mohamed	063- 468 4345	
9.	Sahra B. H. Hussein	063- 367 6649	
10.	Fardus Hashi Maxamud	063- 404 9461	
11.	Mura Abdi Hasan	063- 329 7717	
12.	Aamina Hasan Abdi	063- 766 9081	
13.	Rahma Hasan Ferah	063- 388 862	
14.	Halima Abdi Mohamed	063 408 7991	
15.	Chadia Mule Farah	063- 429 1295	
16.	Lul Aw. Cabeli Cali	063- 231 6046	
17.	Cooshe Jamal Yasin	063- 478 0012	
18.	Mohamed Ahmed Yusuf	063- 478 2105	
19.	Masum Mohamed Bile	063- 440 3816	
20.	Maxamud Cali Warsame	063- 447 0024	
21.	Ali Abdi Dirige	063- 458 5339	

22. Ahmed Awad Cilmi 063- 474 8428

23. Ahmed Cabeli Hasan 063- 447 4352

24. Mohamed Dubad Dirir 063- 611 8975

25. Smail Hussein Axon 063- 618 7965

26. Said Hasan Yasin 063- 411 7131

27. Ali Hussein Mohamed 063- 417 7264

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Environmental & Social Impact Assessment for the Transmission Line Project

Ethiopia And Somaliland "Northern Interconnector-Wajaale-Berbera"

Stakeholder Lafta - Jaraweyne Village

Date: 16-March-2024

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2.	Mohamed Aw- Ahmed	063-4150535	
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5.	Mahmed Hussein Ismail	063-	
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7.	Rashid Hasan	06 3873009	
8.	Mohamed Abdielahi	063	
9.	Gaasire Abdi Ismail	063-4121487	
10.	Ibrahim Ibrahim Ismail	063-386876	
11.	Rashid Xuday Mohamed	063-386876	
12.	Maxamed Cumar Cabdi	063-8280182	
13.	Cabdiilahi Cabdi Bate	063-4183552	
14.	Mukhtaar Ismaaciil Cali	063-3294218	
15.	Maxamed ibrahim Cabdi	063-61002263	
16.	Mustafe Adan Cisman	063-6252336	
17.	Ibrahim Ibrahim Ismail	063-4623568	
18.	Jama Yusuf Campy	063-	