Environmental and Social Impact Assessment (ESIA) Report For Lakadia Banaskantha Transco Limited

Lakadia Banaskantha Transco Limited

June 2021

Quality information

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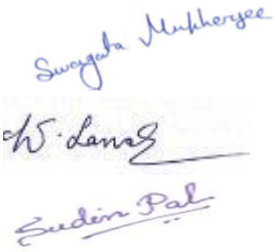			
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Executive Summary

Introduction

Adani Transmission Limited (herein after referred to as ATL) owns and operates various High voltage AC transmission lines and substations of 132kV, 220kV, 400kV, 765kV voltage level and also High Voltage DC transmission lines and substations of +/- 500kV voltage level. ATL has won the Lakadia Banaskantha Transco Limited (LBTL). Transmission System Strengthening Project on a Tariff Based Competitive Bid.
This report intends to assess Environmental and Social Impact Assessment (ESIA) of the proposed transmission line.

Route of Transmission line

Lakadia Banaskantha Transco Limited (LBTL) which is includes of Lakadia - Banaskantha 765kV D/C(Route length in 176.148km).Out of the total length 64.9 km,69.7km and 42.3km length is present in the Kutch, Patan and Banaskatha district respectively. The transmission line is through three districts of state in Gujarat i.e. Kutch, Patan and Banaskatha.

Need &Objective

The objective of the ESIA is

- To document various environmental and social impacts related to field activities that are being undertaken by ATL for laying of transmission line and
- To highlight the environmental and social management strategies, systems and procedures being employed along the transmission line route and to meet the environmental and social requirements of the funding institutions.

Project Description

The LBTL transmission line alignments traverses through the 49 villages located in 2 Tehsil of Kutch district and 2 Tehsil of Patan district and 3 tehsils of Banaskantha district.
NH 15 and NH 14 is main access road for Lakadia- Banaskatha 765 kV line proposed transmission line. During construction phase project team will access entire alignment through this road. There are different village which is connecting SH 51,52,58 and respective tower location and will be used as approach road during project execution. Total number of towers in Bhuj Lakadia 765 kV D/C line would be 473. Among them 337 nos A, 29 nos B, 31 nos C, 76 nos D types tower and Gantry type would be present. All construction activities would be carried out within the Right of Way for the safe operation of the transmission lines as per IS: 5613.The design, fabrication, testing, erection procedures and materials to be used for erection of towers, line materials ,construction foundations etc. will conform to the Bureau of Indian Standards(BIS), as amended up to date and provisions of the Indian Electricity Act Electricity rules and related statutory approval. The tower construction would start after the setting of the concrete is complete. As of 11.02.2021, 197number of towers has been already erected and 215 number of foundation activity has been completed i.e. approximately 69% of the towers are either partially or fully constructed. During the O&M stage of the project ground patrolling would be carried out. The patrolling would monitor the growth of tress in violation of the minimum safety clearance., development of any house or settlement within the RoW. Roads and bridges constructed within the ROW would also reduce the minimum safety clearance so these would also be monitored.
The foundation construction team would have around 15-20 labours in each team while the tower erection teams which would follow would have 25-35 labour in each team. There would be number of teams working on foundation and erection simultaneously in different stretches. Finally, the stringing team would also have around 45-65 labour in each team involved in the job. During the foundation and tower construction approximately 20-50 teams would be working in parallel. Thus approximately 200-250 labours would be working at any time in the project.
The project implementation has been planned over a period of 18 months, this would include the Detailed design Phase as well as Construction (Detailed Surveys, material supply, foundation, erection of tower, stringing, testing and commissioning). The date of commissioning is December 2021

Pollution and control measures

The pollution expected from construction activities includes fugitive dust emission due to excavation and project related vehicular movement and waste debris from casting of foundations. There is potential for disturbance to

habitations in proximity of the towers due to construction activities. Implementation of suggested measures will enable suppression of dust generation, disposal of waste debris and other adverse impacts.
From the preliminary environmental and social impact identified it is estimated that these are “potentially limited adverse social or environmental impacts that are few in number, generally site specific, largely reversible and readily addressed through mitigation measures”. The project is categorized as Category B.

Baseline

The baseline studies have profiled the environmental and social conditions along the transmissions line, covering in general a buffer distance of 500m of both side of the alignment where any significant environmental sensitive is identified. The studies were designed to collect information from secondary sources and to obtain primary information through site visits and consultation switch local communities and other related stockholders. Overall the is reflective of the environmental and social landscape of the districts through which the alignment would pass.
The transmission line is located in 2 Tehsil of Kutch district and 2 Tehsil of Patan district and 3 tehsil of Banaskantha district. The area has quite high temperatures during summer and moderate cold in winter. The average annual maximum temperature is 34.3^{o}C while the average annual minimum temperature is 19.3°C. The Kutch area experiences very low rainfall with the total rainfall of about 276.4mm (as per IMD 30 year’s average data) with 13.9 numbers of rainy days. The annual average wind speed recorded at the IMD weather station at Rudramata Aerodrome, Bhuj indicate that the highest monthly wind speed is 5.0 m/s in June followed by 4.7 m/s in May. The lowest windspeed was recorded in December 0.3 m/s.
Existing sources of generation of particulate matter and gaseous air pollutants is primarily because of the transportation of vehicles through adjoining road considering this context the ambient quality is expected to be well within the National Air Quality Standards for all parameters. The soils found in Kutch district can broadly be grouped into four types, i.e., Shallow Black soils, Residual Sandy soils, Coastal Alluvial soils and Desert soils. The depth to water was monitored by the Central Groundwater Board and it was found that in the pre- monsoon period (2012) the depth to groundwater is 2-5 m bgl along the alignment between Adipur Jn and Anjar. In regions near Bhuj the water level was 5-10 m bgl (below ground level). However, in the post – monsoon (2012) groundwater levels indicate that they are 5-10 m bgl across the entire alignment.

Details Forest Along the Alignment within AOI

Forest of Kachchh district classified under the Type 6B- Northern Tropical Thorn Forest, as per the forest classification of Champion and Seth (1968). These forests also known as Open scrub thorn forest due to poor canopy formation. This can be further divided in to 5/D-Dry deciduous Scrub, 6/E4 -Salvadora scrub, 6B/C-Desert Thorn Forest, 6B/DS2-Tropical Euphorbia scrub, 6B/ DS1- Zizyphus sp. scrub and Capparis sp. association 5/E3 -Babul (Acacia nilotica) forest, 5/DS5-Dry Savannah type vegetation (Acacia nilotica- Salvadora sp. association, 6/E2-Gorad (Acacia Senegal). However, due to the invasion of Prosopis juliflora in these forests, has changed the floral composition and vegetation structure. The transmission line wise protected/reserve/social forest area are given below:
765KV Lakadia-Banaskatha Transmission Line: Within this segment of the transmission line 25.1315ha forest land is present under four Forest Division namely Kutch-East Division, Kutch SF Division, Patan Division and Banaskantha SF Division in Kutch, Patan and Banaskantha District. Within eleven villages namely Kairai (0.2903ha), Sanwa (15.104ha), Patanka (4.3885ha), Daldi (3.9867ha), Dahisar (0.1545ha), Chichodra (0.2713ha), Chachasna (0.1251ha), Warsara (0.1868ha), Kantheriya (0.1551ha), Padardi (0.1872ha) and Khimana (0.282ha) the forest land is present.
The transmission line has been passed through Wild Ass Sanctuary, Reserve forest and social forest area. Project Area under Protected Area (Wild Ass Sanctuary) 9.749 ha of which forest land is 3.887 ha and non-forest land is 5.862 ha. No part of the project area falls under any Conservation Reserve, National Park and Ecologically Sensitive Zone. For forest clearance and wildlife clearance the proposal has been already submitted in “Parivesh” portal of MoEF&CC and both are under processing.

Flora

Sixty-nine (69) floristic species were recorded collectively at the sampling sites. The study area comprises of 20 tree species belonging to 10 families, 10 shrubs species belonging to 8 families and 38 herbs species belonging to 16 families. Most common species were *Azadirachta indica*, *Prosopis cineraria*, *Prosopis juliflora*, *Salvadora oleoides. Ziziphus nummularia*, *Blumea sp*., *Aristida sp*.

Mammals

At least thirty-four (34) species of mammals have reported ranges that include the Study Area. With respect to the IUCN Red List, one (01) of these species is designated as endangered and two near threatened. With respect to the WPA Schedules, eight (08) of these species are listed under Schedule I. Six (06) species of mammals were observed and six (06) recorded from consultation as part of the primary data. Though some portion of the project Area will be fall under Protected Area (Wild Ass Sanctuary), however, during the field visit no Wild Ass has been observed. It was reported that in rare cases the wild ass stray to the fringe areas of the sanctuaries where the transmission line is located.

Birds

One hundred sixty-seven (167) species of birds have reported ranges that include the Study Area. These include eighty (80) species which are resident with respect to the Study Area and Eighty-seven (87) species, which are migratory with respect to the Study Area. With respect to the IUCN Red List, out of 80 resident bird species one vulnerable (Sarus Crane) and one near threatened birds (Black-necked Stork) have reported ranges in study area. Out of 87 migratory birds' species one endangered, four vulnerable and five near threatened birds' species have reported ranges along the study area. With respect to the WPA Schedules, three (03) bird species from resident and five (05) birds species from migratory birds of the Study Area are listed under Schedule I. Forty-eight (48) species of birds, consisting of thirty-six (36) resident species and twelve (12) migratory species, were recorded as part of the primary data. Though within the 10km (5km of each side from the centre of the line) study area through the line no such globally significant concentration of migratory species and/or congregatory species have been reported and not observed during field visit.

Reptiles

At least twenty-five (25) species of reptiles have reported ranges that include the Study Area. With respect to the IUCN Red List, one (01) of these species is designated as vulnerable. With respect to the WPA Schedules, one (01) of these species is listed under Schedule I. Two (02) species of reptiles were observed and five (05) recorded from consultation as part of the primary data.

Amphibians

At least six (06) species of amphibians have reported ranges that include the Study Area. With respect to the IUCN Red List, none of these species are designated as globally threatened. With respect to the WPA Schedules, none of these species are listed under Schedule I. No species of amphibians were observed as part of the primary data and however two (02) recorded from primary consultation.

Social Issues and Management

The project Lakadia-Banaskantha 765 kV transmission line of length 176.148 km will pass through agricultural lands that falls under 3 districts of Gujarat. Total 473 towers would be constructed and the total estimated land requirement for tower footing would be 378400 sq. m (93.50 acre). The tower footing falls on private agricultural land belongs to approximately 600 landowners. Though the project does not involve permanent land take however, there is restrictions on land use for carrying out construction on these lands. Such restriction in future land-use changes diminishes the land value especially road facing plots which have a potential for non-agricultural use in the future will be restricted and will have a permanent implication on use of these lands for non-agricultural purpose.

During ESIA study, the compensation for land price for 20 villages (out of 58) was fixed for INR 881 for unirrigated land and INR 970 and 1772 for irrigated land per sq. m. For the remaining 38 villages, the land prices are yet to be fixed by the District Collector. The land prices in the area was reported to be INR 300000 -500000 per bigha (area within the village and far from road connectivity) and INR 500000-1000000 for land near to highways.

The community had raised concern on issues with regards to health and safety and potential exposure to electromagnetic fields during operation especially during rainy season. Besides, the community also had raised concern for adequate compensation for land use along the tower footprint as. current government circle rate was reported to me much lower than the prevailing market. In lieu to the MoP guidelines, the project has addressed the situation and land valuation was carried out through a committee formed by the District Magistrate in consultation with the affected landowners. The land value was reported to be 15 times higher than the prevailing government rate. The Project has completed payment compensation to more than 150(as of November 2020) affected landowners and still on-going. It is estimated that the total number of impacted landowners in the project would be 1627, of which 600 numbers of landowners would be affected due to the tower footing and 1027 numbers would be affected due to the RoW of the transmission line. Limited consultation could be carried out indicated that the local community were positive of the project and are willing to support the project. Embedded measure maintaining minimum ground clearance is mandatory and will be strictly monitored during operational stage to avoid any risk of exposure to any kind of safety hazards. A site engineer will be appointed by the project who will undertake a regular inspection of all lines from time to time.

Impact Assessment

Potential impacts of proposed transmission line during:

- The construction of the towers which would involve earthwork for excavation of the foundation would lead to air quality and noise impacts, but these would not be significant as the transmission line alignment are away from settlements. in addition, impacts on flora and fauna are also envisaged. For the portion of the line passing through the Wild Ass Sanctuary there are risk of the animal falling into the excavation and getting hurt.
- During the stringing operation winching machine would be used and is expected to have a noise levels of approximately 70 dB(A). However, since the transmission line is away from the settlement the noise levels are expected attenuate to levels within standards for residential areas.
- Construction of tower and the transmission lines would lead to restriction on the use of land which has been addressed by payment of compensation. Loss of the crops from land are also envisaged but these have would not be significant and crop compensation are paid
- Operational phase involves disturbances to vegetation and noise etc. The social impacts will be from movement along the corridor, expectation management and perception about generation of electromagnetic field.
- Mitigation to counter adverse impacts are discussed in the Environmental and social management plan.

Environmental and Social Management Plan

The ESMP provides a delivery mechanism to address potential adverse impacts, to instruct contractors and to introduce standards of good practice to be adopts for project activities taken up during construction and operation phases of the project. Inspection and monitoring of the environmental and social components phase activities will increase the effectiveness of suggested mitigations.
Through the process of inspection, audit and monitoring ATL will ensure that all the contractors comply with the requirements of conditions of forest clearance, and other permits including suggested action plans.
The inspection and audits will be done by trained team ATL's Environment, Health and Safety (EHS) department as well subject to be reviewed and conducted by external agencies/experts. The entire process of inspections and audits are being documented. The inspection ad audit findings are to be implemented by the contractors in their respective areas.

Conclusion

The ESIA has assessed overall acceptability of environmental and social impacts likely to arise as a result of construction and operation of transmission line for LBTL project. The proposed project is categories as category B as the social or environmental impacts are assessed as limited, few in number, site specific, largely reversible, and readily addressed through mitigation measures. Though some portion of the project Area will be fall under Protected Area (Wild Ass Sanctuary), however, during the field visit no Wild Ass has been observed. It was reported that in rare cases the wild ass stray to the fringe areas of the sanctuaries where the transmission line is located. Moreover, the transmission line is not considered as high-risk project because of the inherent low risks that they carry. Also, with these embedded mitigation measures the risk to the wild ass from the project is reduced. Also, note that the actual habitat of the wild ass is in the Little Rann of Kutch which is approximately 24 km south direction from the proposed transmission line.

The project is likely to generate some environmental and social impacts both during construction and operation. During construction phase the environmental impacts expected from the project include disturbance to fauna and flora, construction waste of disposal, increase of noise level and social impacts mainly from engagement of land and loss of crop. During operation phase the impacts include disturbance to vegetation, noise generation and social impacts of restricted activities within corridor.
Environmental and social management plan describes implementation mechanism for recommended mitigation measures during construction and operation phase to verify overall project performance.

1. Introduction

1.1 Background

Adani Transmission Limited headquartered in Ahmedabad, Gujarat is the largest private sector power transmission company in northern, western and central India. ATL owns and operates various High voltage AC transmission lines and substations of 132kV, 220kV, 400kV, 765kV voltage level and High Voltage DC transmission lines and substations of +/- 500kV voltage level. Today, ATL has portfolio of more than 14,000 ckt km of transmission lines and around 27,000 MVA of power transformation capacity.

ATL primarily aims at addressing the vast potential in India's transmission sector and has set an ambitious target to set up 20,000 circuit km of transmission lines by 2022. ATL has invested in the latest technologies resulting in the highest network availability of over 99.76% in the country, which corresponds to the best global standards.

ATL has won the Lakadia Banaskantha Transco Limited (LBTL) - Transmission System Strengthening Project on a Tariff Based Competitive Bid. The transmission line would connect the Lakadia Pooling substation to the Banaskatha Pooling Substation where would be connected to the 765 KV D/C line. The Scheduled Commercial Operation Date is December 2021 and the concession terms are 35 years.

The LBTL aims to strengthen the transmission system for relieving over loadings observed in Gujarat intra-state system due to renewable energy injections in Banaskatha pooling station. The project is part of Green Energy corridor and will help in evacuation of renewable power projects in Gujarat. Adani Transmission Limited has won the project in Tariff Based Competitive Bidding (TBCB) and a Letter of Intent to this effect was issued on 28th October 2019.

AECOM India Private Limited has been commissioned by Adani Transmission Limited (ATL), a subsidiary of the Adani Group to undertake an Environmental and Social Impact Assessment (ESIA) study for the establishment of transmission system for Lakadia Banaskantha Transco Limited (LBTL) which is includes of Lakadia - Banaskantha 765kV D/C(Route length in 176.148km).Out of the total length 64.9 km, 69.7km and 42.3km length is present in the Kutch, Patan and Banaskatha district respectively. The transmission line is through three districts of state in Gujarat i.e. Kutch, Patan and Banaskatha.

This report discusses the environmental and social baseline within which the proposed transmission power project is commissioned and assesses the potential adverse and beneficial impacts that the project could have, along with suitable mitigation measures and an Environmental and Social Management Plan (ESMP) for the project

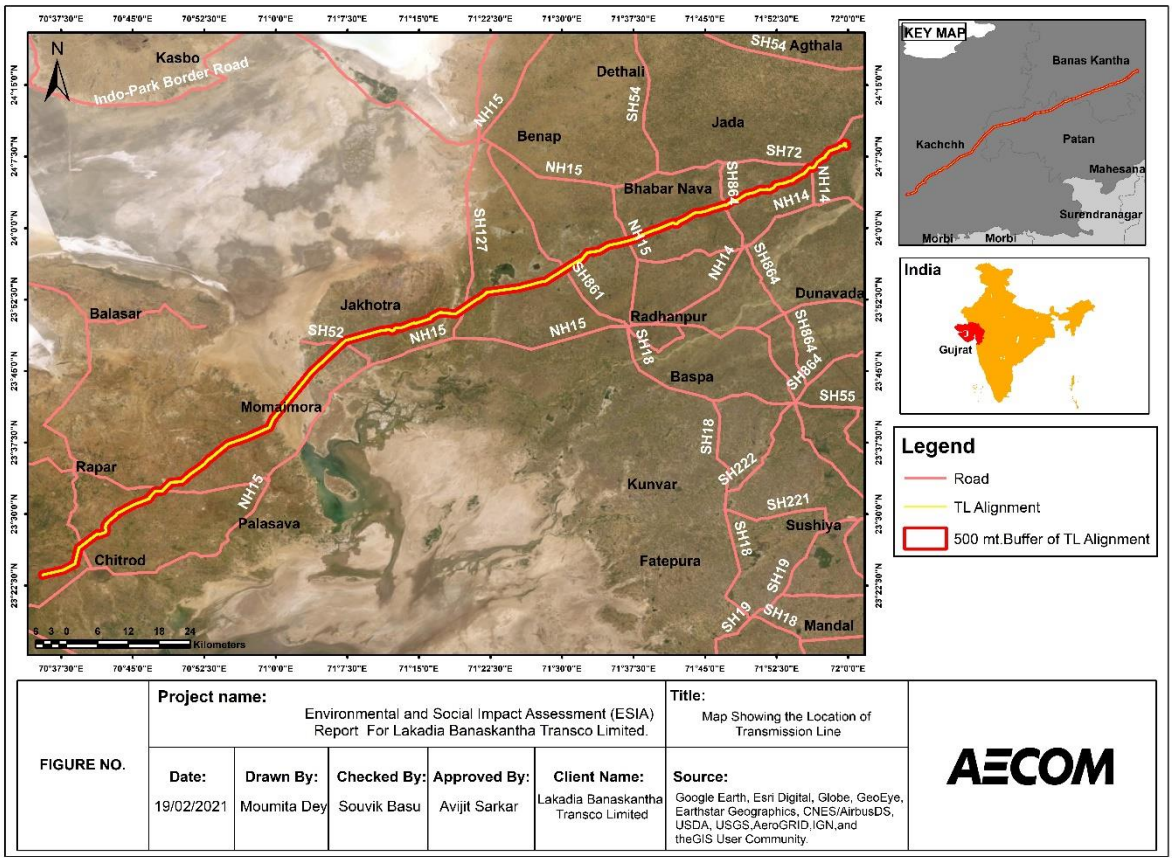


Figure 1-1. Location of the LBTL transmission lines

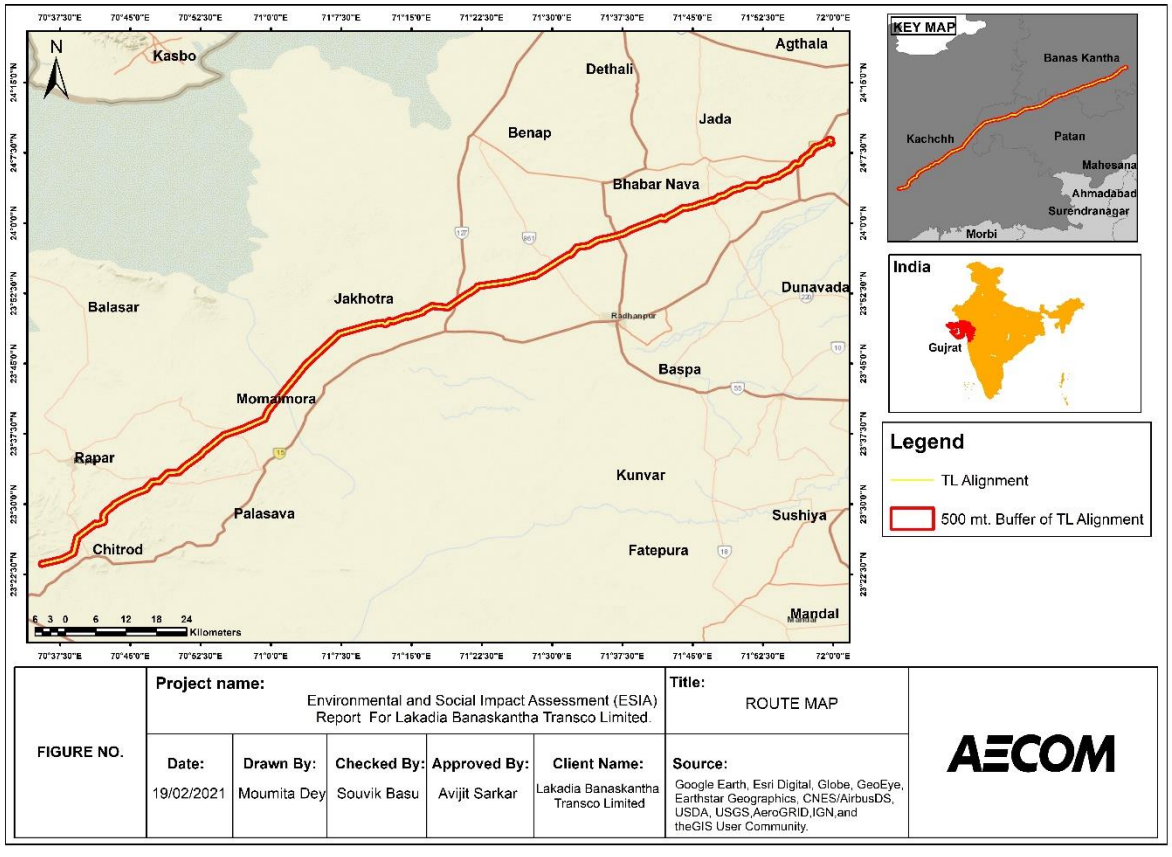


Figure 1-2. Route Map of the LBTL transmission lines

1.2 Objective of the Report

Adani Transmission Line (ATL) is currently exploring for fund from international lenders, and this ESIA is prepared to help meet the requirement in terms of providing the lenders, an assessment of the project against international standards. In this context, the project requires evaluating the environmental and social risks associated with the project and to implement mitigation measures to avoid adverse impacts for the remainder of the project's lifecycle.

This report discusses the environmental and social baseline within which the proposed transmission line project is commissioned and assesses the potential adverse and beneficial impacts that the project could have, along with suitable mitigation measures and an Environmental and Social Management Plan (ESMP) for the project. The following sections provide an understanding of the scope of work and the applicable reference framework for the ESIA.

1.3 Scope of the Report

The scope of work for ESIA included the following:

I. Identification of applicable local and national environmental and social regulations and relevant international E&S standards for transmission power projects.

II. Categorization of the projects based on IFC Performance Standards.

III. Summary of the approach adopted by ATL for design of the transmission line and assessment of alternatives available for the project together with an overview of outcome of the key decisions already taken up by the company for the transmission line route.

IV. Description of the environmental and social baseline of the project in terms of the key sensitivities and potential constraints on the construction and operation and maintenance of the transmission line.

V. Identification of the potential adverse environmental and social impacts during erection and operation of the transmission line and mitigation measures to be adopted by ATL.

1.4 Project Proponent

The Adani Group's journey in the transmission sector started in 2006, well before Adani Transmission Limited (ATL) was formally established. This was necessitated by need to evacuate power from Adani's Mundra Thermal Power Plant. The dedicated lines, commissioned for evacuation of power spanned more than 3800 ckt kms connecting Mundra – Dehgam, Mundra – Mohindergarh and Tirora – Warora.

Another line spanning more than 1200 ckt kms was commissioned in 2014 for evacuation of power from Adani's Tiroda power plant. Subsequently, in 2015, looking at the enormous business potential in transmission sector, Adani Transmission Limited (ATL) was carved out of Adani Enterprises Limited (AEL) for a focused pursuit of opportunities in transmission sector. ATL has also tapped various inorganic avenues for growth and acquired GMR's transmission assets in Rajasthan (2016), Reliance Infrastructure's transmission assets in Gujarat, Madhya Pradesh and Maharashtra (2017) and KEC's Bikaner Sikar transmission asset in Rajasthan (2019)

In 2018, ATL forayed into the distribution space with the acquisition of Reliance Infrastructure's Power Generation, Transmission & Distribution Business in Mumbai. Today, Adani Electricity Mumbai Limited (AEML) caters to electricity needs of over 3 million customers in Mumbai suburbs and Mira-Bhayender Municipal Corporation in Thane district with a distribution network spanning over 400 sq. kms.

Today, ATL is the largest private transmission company and operates more than 11,000 ckt kms of transmission lines and around 18,000 MVA of power transformation capacity. ATL has further set an ambitious target to set up20,000 circuit km of transmission lines by 2022 by leveraging both organic and inorganic growth opportunities.

1.5 Limitation of the Report

This ESIA report is based on scientific principles and professional judgment applied to facts with resultant subjective interpretations. Professional judgments expressed herein are based on the analysis of available data and information. The ESIA report was prepared with the following limitations;

I. The assessment of the environment and social risks is limited to project information available at this stage of the project, discussion with stakeholders, secondary data collected, consultation with local community and observations made during site survey. Professional judgement and interpretation of facts has been applied for presenting inference from the collected information.

II. The consultations undertaken as part of the ESIA were limited to the stakeholders, who were available for consultation during the site visit; which included landowners, local community, and Project site Team;

III. Consultation with the local community was limited to those villages only where the project has already obtained the land as recommended by ATL as it apprehends that locations where land uptake is in process consultations may cause some hinderances.

IV. As rapid site assessment was undertaken for a short duration, report does not address seasonal variability of the data.

V. Due to the prevailing pandemic situation in India i.e. COVID-19, limited consultation with local communities has been conducted with all safety provision.

1.6 Report Structure

The structure of the ESIA report is given below in **Table 1.1**

Table 1-1 :Structure of the Report

Chapter	Particulars	Description
Chapter 1	Introduction	Introduction to the Project
Chapter 2	Project Description	Technical description of the Project & related infrastructure and activities
Chapter 3	Policy Legal and Administrative framework	Discussion of the applicable environmental and social regulatory framework and its relevance for the Project.
Chapter 4	Description of Environment	An outline of the Environmental, Ecological and Social Baseline status with in the study area of the Project.
Chapter 5	Anticipated impacts and mitigation measures	This section includes details of identified environmental, ecological and social impacts and associated risks due to project activities, assessment of the significance of impacts, and presents mitigation measures for minimizing and /or offsetting potential impacts identified.
Chapter 6	Environmental and Social Management plan (ESMP)	Outline of the Environmental and Social Management Plan (ESMP) taking into account identified impacts, proposed mitigation measures, and monitoring requirement
Chapter 7	Stockholder Assessment and Discloser	An outline of the engagement with the stakeholder groups undertaken as part of the assessment process and the key issues identified from the same
Chapter 8	Grievance Redressal /mechanism	Discuss about the Grievance redressal process of the employee and local community
Chapter 9	Conclusion and Recommendation	Short description of the project background

2. Description of the Project

ATL has been selected as a successful bidder by Bid Process Coordinator (REC Transmission projects Company Limited) as Transmission Service Provider (TSP) on build, own, operate and maintain basis for Lakadia Banaskantha Transco Limited (LBTL) which is includes of Lakadiya - Banaskatha 765kV D/C (Route length in 176.2 Km).

2.1 Need of The Project

Renewable power in Gujarat is a fast-developing industry given that the large state is mostly arid. Gujarat was one of the first states to develop solar generation capacity in India. The total installed capacity of solar and wind power plant in Gujarat as on 30.07.2020 is 3127.88 MW and 7523.451 MW. Large plants have also been setup in Kutch, Banaskatha district of Gujarat. The transmission line project has been set up with an aim to strengthen the transmission system for relieving over loadings observed in Gujarat intra-state system due to renewable energy injections in Banaskatha pooling substation. The project is part of Green Energy corridor and will help in evacuation of renewable power projects in Gujarat

2.2 Project Proposal

The LBTL would include the following:

- Lakadia PS – Banaskantha PS 765kV D/c line
- 765kV Bays at Lakadia and Banaskantha sub-stations for Lakadia PS – Banaskantha PS 765kV D/c line
- 2x240MVAr switchable Line reactor along with bays at Banaskantha PS end of Lakadia PS – Banaskantha PS 765kV D/c line and 1x80 MVAr, 765 kV, 1 Ph switchable line reactor (spare unit) at Banaskantha end

2.3 Regional Setting

The LBTL transmission line alignments traverses through the 49 villages located in 2 Tehsil of Kutch district and 2 Tehsil of Patan district and 3 tehsils of Banaskantha district. Details of tehsil wise villages list is provided in table below.

Table 2-1 : List of Tehsil wise village List

Sl. No	District	Block	Core Village
1.	Kachchh	Bhachau	Shivlakha
2.	Kachchh	Rapar	Bhutakiya**
3.	Kachchh	Rapar	Chitrod
4.	Kachchh	Rapar	Dedarwa
5.	Kachchh	Rapar	Govindpur (Kharol)**
6.	Kachchh	Rapar	Hamirpur Moti
7.	Kachchh	Rapar	Khirai
8.	Kachchh	Rapar	Kidiyanagar
9.	Kachchh	Rapar	Momayamora
10.	Kachchh	Rapar	Mora**
11.	Kachchh	Rapar	Sai

[1] https://geda.gujarat.gov.in/Gallery/Media_Gallery/Wind_Power_Capacity_Addition_in_Gujarat_as_on_31.07.2020.pdf

12.	Kachchh	Rapar	Sanwa
13.	Kachchh	Rapar	Tindalwa Mota
14.	Kachchh	Rapar	Tindalwa Nana**
15.	Banaskantha	Bhabhar	Chachasna
16.	Banaskantha	Bhabhar	Chichodra
17.	Banaskantha	Bhabhar	Gosan
18.	Banaskantha	Deesa	Mudetha
19.	Banaskantha	Kankrej	Chimangarh
20.	Banaskantha	Kankrej	Fatepura
21.	Banaskantha	Kankrej	Isarva
22.	Banaskantha	Kankrej	Raviyana
23.	Banaskantha	Kankrej	Kantheriya
24.	Banaskantha	Kankrej	Kashipura
25.	Banaskantha	Kankrej	Khimana
26.	Banaskantha	Kankrej	Khodla
27.	Banaskantha	Kankrej	Nekoi
28.	Banaskantha	Kankrej	Padardi
29.	Banaskantha	Kankrej	Rajpur
30.	Banaskantha	Kankrej	Tervada
31.	Banaskantha	Kankrej	Warsara**
32.	Patan	Radhanpur	Lotiya
33.	Patan	Radhanpur	Sathali**
34.	Patan	Radhanpur	Thikaria (Hasenpur)**
35.	Patan	Saltanpur	Babra
36.	Patan	Saltanpur	Bakutra
37.	Patan	Saltanpur	Bavarda
38.	Patan	Saltanpur	Dahisar
39.	Patan	Saltanpur	Daldi
40.	Patan	Saltanpur	Datrana
41.	Patan	Saltanpur	Dhokavada
42.	Patan	Saltanpur	Gadha
43.	Patan	Saltanpur	Jamvada (Badarpura)
44.	Patan	Saltanpur	Jhandala**
45.	Patan	Saltanpur	Korda
46.	Patan	Saltanpur	Madhutra
47.	Patan	Saltanpur	Patanka

48.	Patan	Saltanpur	Rampura
49.	Patan	Saltanpur	Vauva

2.4 Accessibility

NH 15 and NH 14 is main access road for Lakadia- Banaskatha 765 kV line proposed transmission line. During construction phase the heavy construction material would be transported through these highways. The SH 51,52,58 intersects/connects the National Highway and would be used to reach the alignment. However, to reach the respective tower location village approach roads would be used. The accessibility map of the project site is presented in Figure 2-1. The alignment has also been overlaid on the toposheet and is presented in Figure 2-2, Figure 2-3, Figure 2-4, Figure 2-5, Figure 2-6, Figure 2-7, Figure 2-8 and Figure 2-9.

2.5 Crossing of Road and Rail

The National highway 15 and 16 cuts across Transmission Line alignments. In addition, two Transmission Line alignments also crossing the railway line.

For approval of NHAI has been in the final stage. In principal approval received from Ministry of Railway, a demand draft against demand note has been submitted. Railway permission for the same is expected by March'21. Power Line crossing approval has been obtained for 29 out of 33 Transmission Line. The remaining approval for the 4 Transmission Line is expected to be obtained by March'21.

The details of the locations where the highway cut the alignment are presented in Table 2.2

Table 2-2 : Accessibility of the Project site

SL no	Line	Highway	Approx. segment (Angle point (AP) from -to)
1.	765kV D/C Bhuj (PS) -Lakadia (PS) to Banaskatha PS	NH 15	AP-66LB+0 to AP-67LB+0
2.		NH14	AP-102LC+0 to AP-103LC+6
3.		Railway	AP-64LD+3 to AP-65LD+3

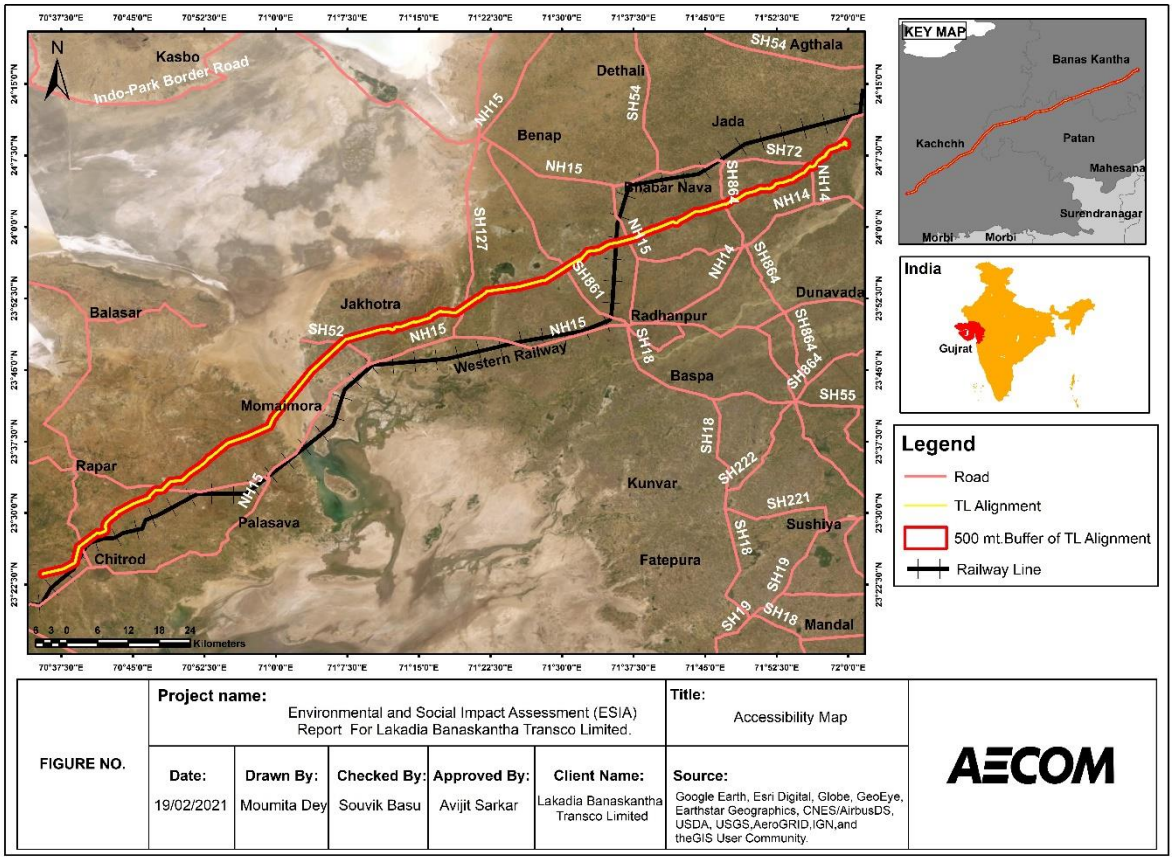


Figure 2-1. Accessibility map for LBTL Line

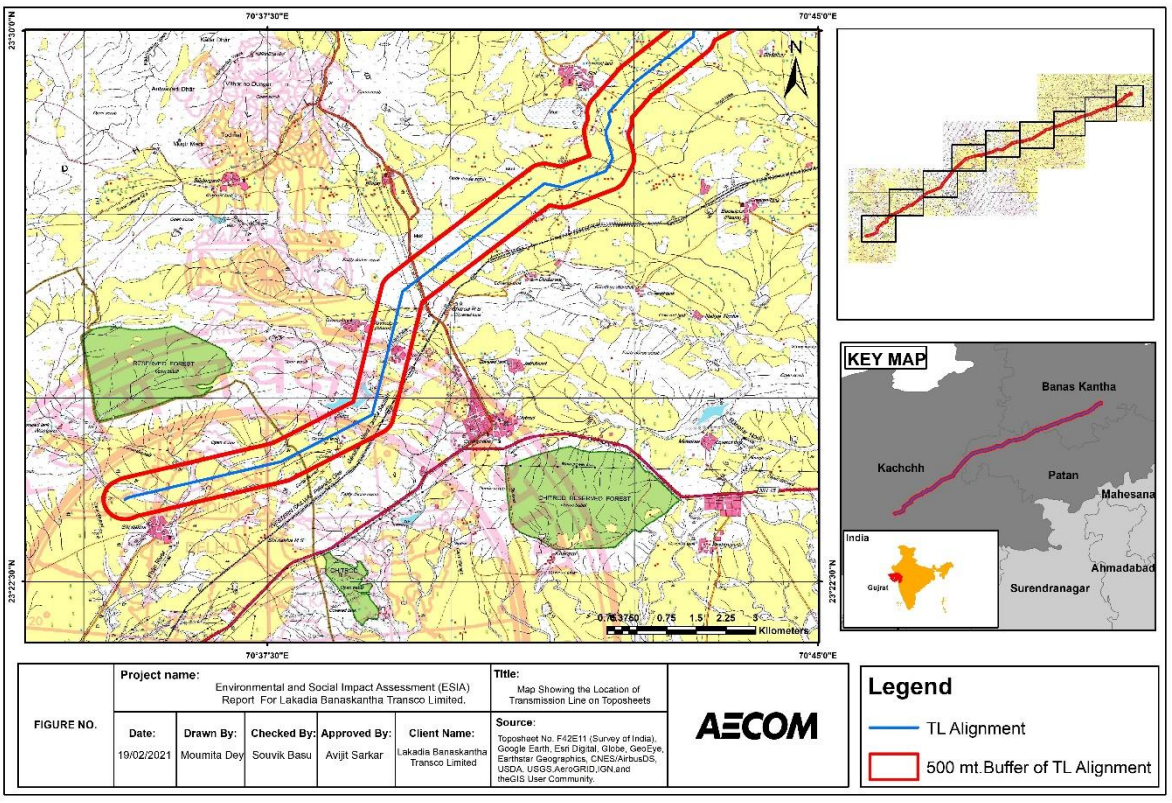


Figure 2-2. Alignment of the project site (1)

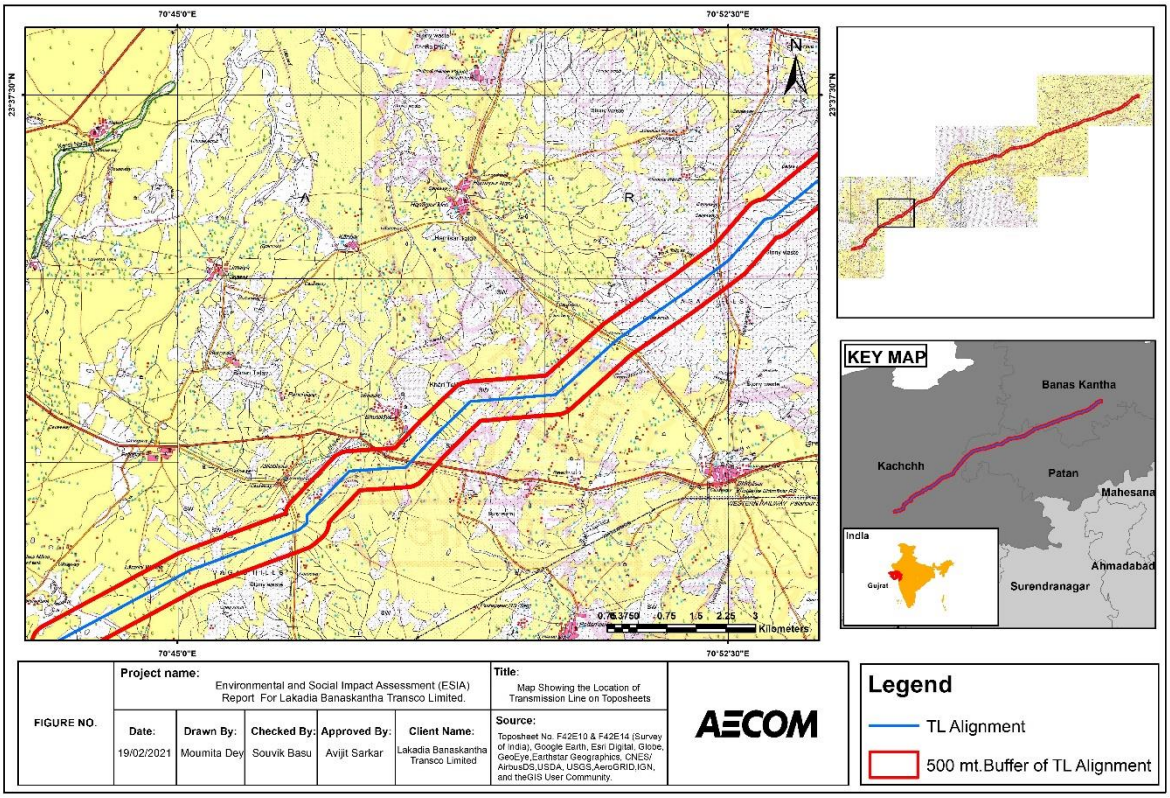


Figure 2-3. Alignment of the project (2)

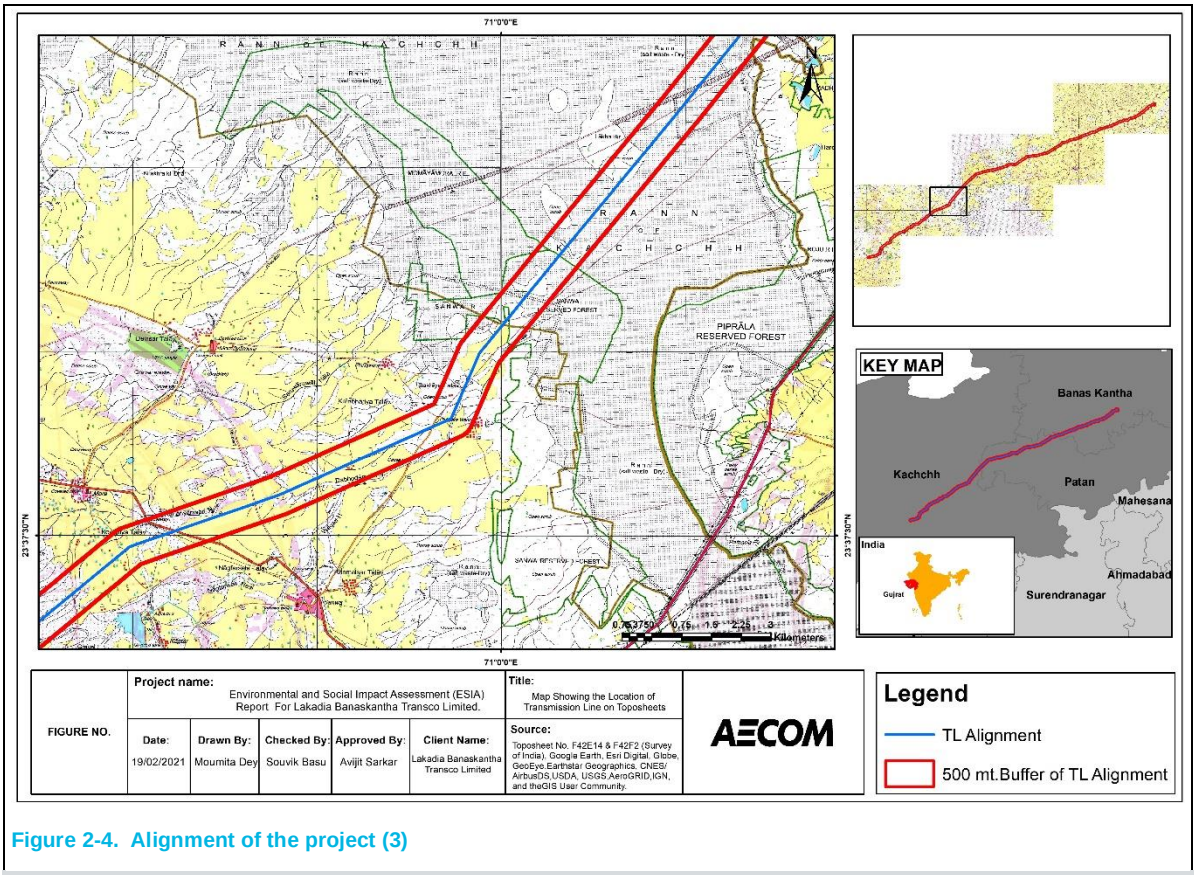


Figure 2-4. Alignment of the project (3)

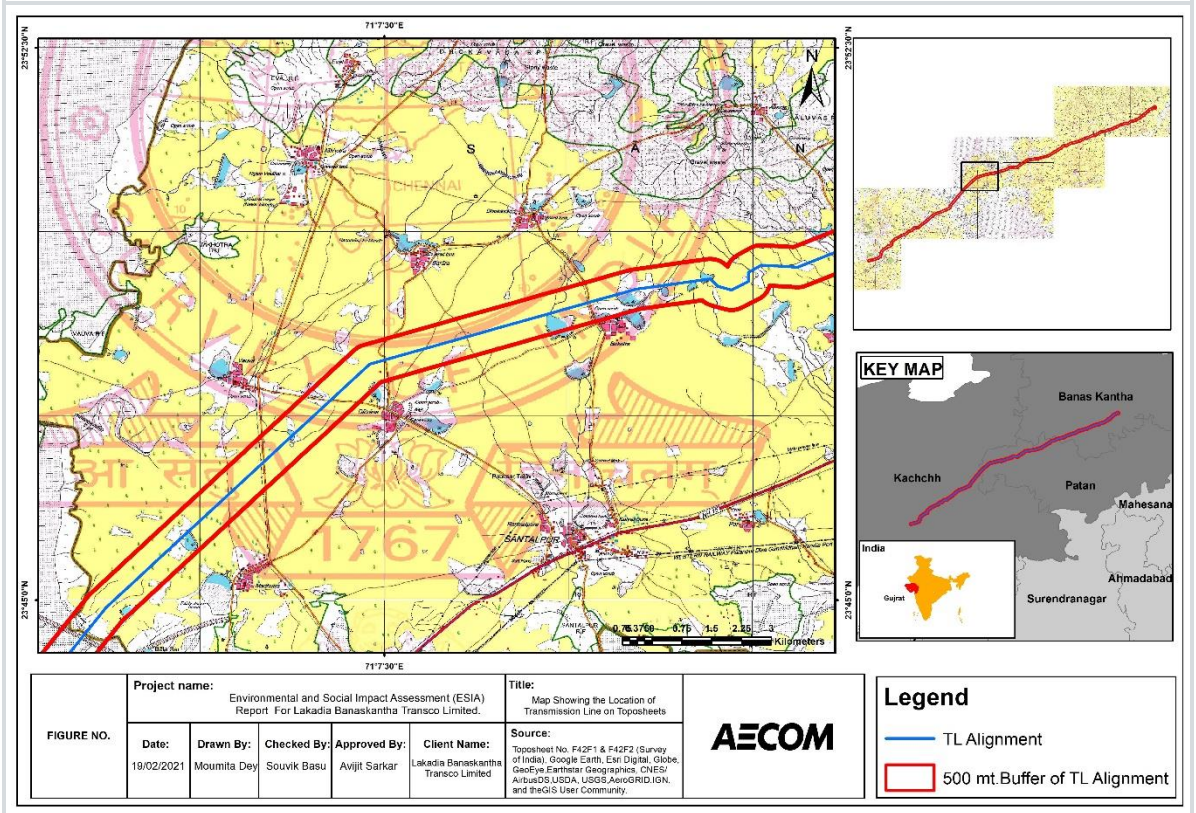


Figure 2-5. Alignment of the project (4)

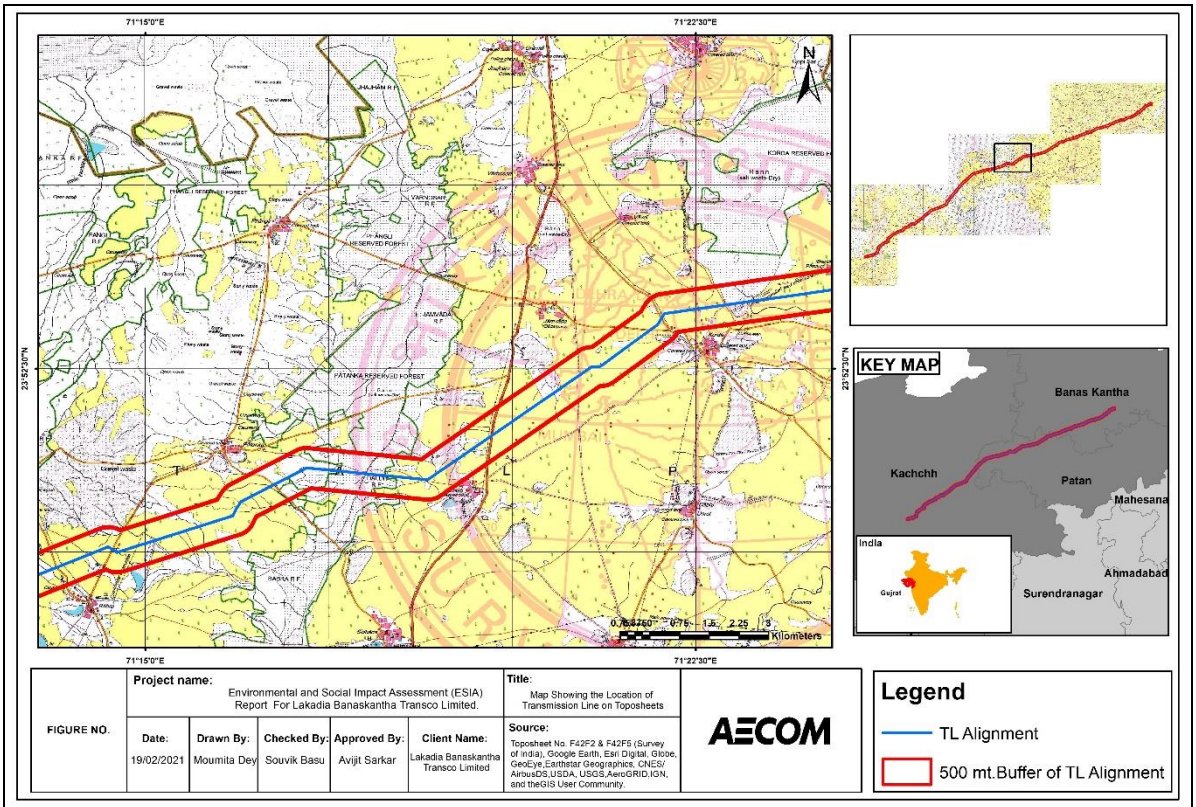


Figure 2-6. Alignment of the project (5)

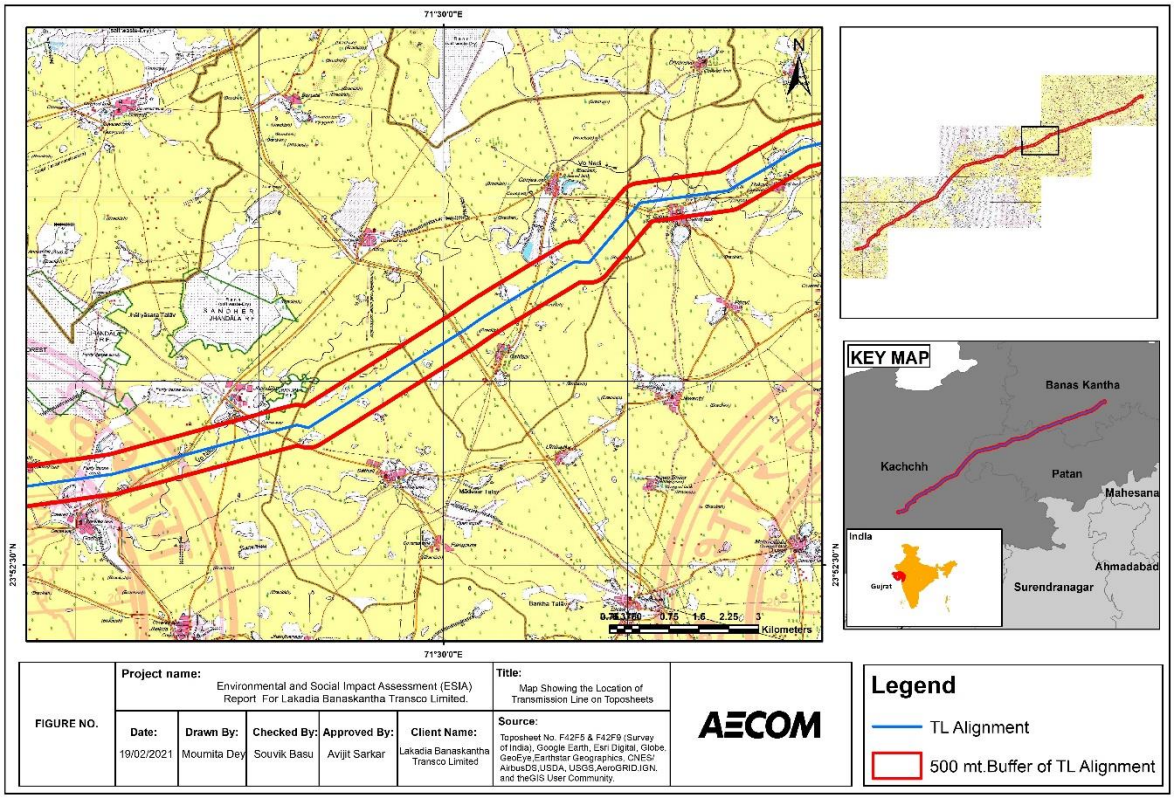


Figure 2-7. Alignment of the project (6)

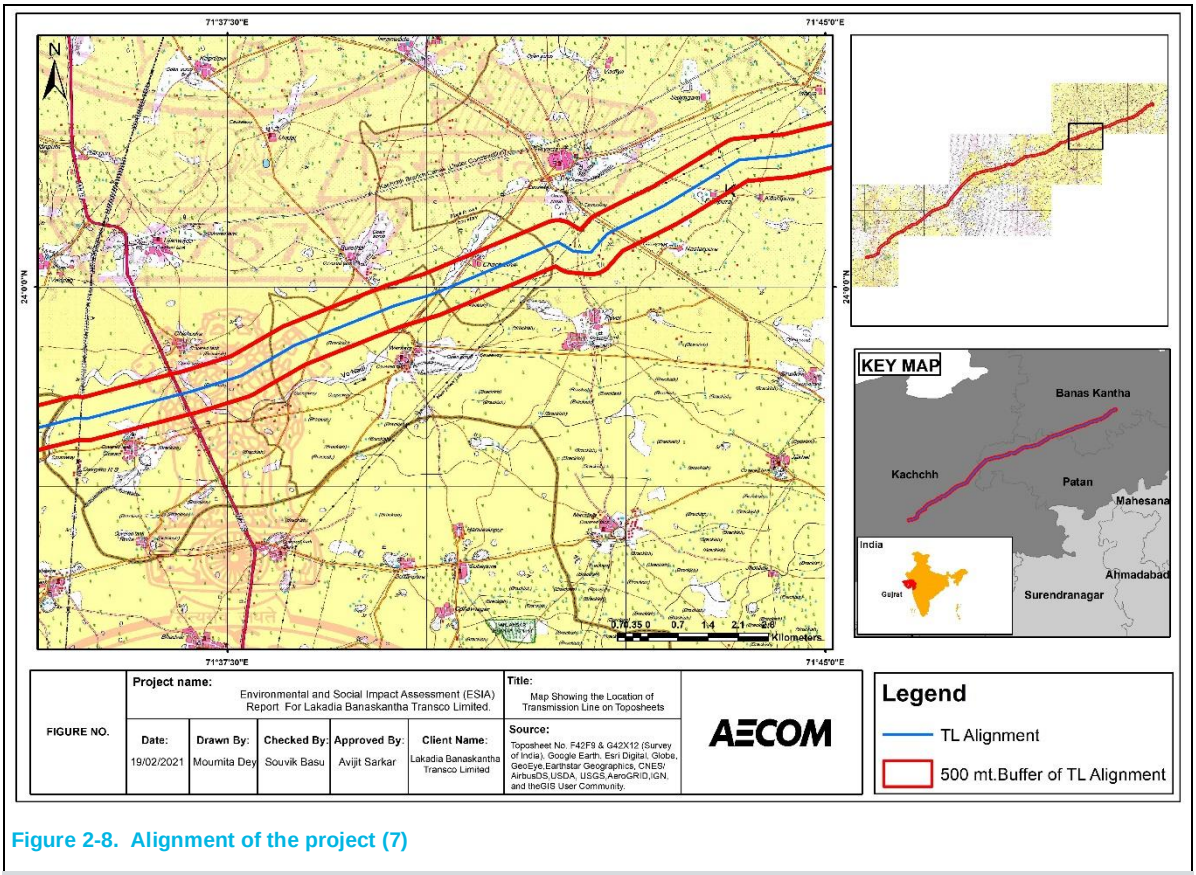


Figure 2-8. Alignment of the project (7)

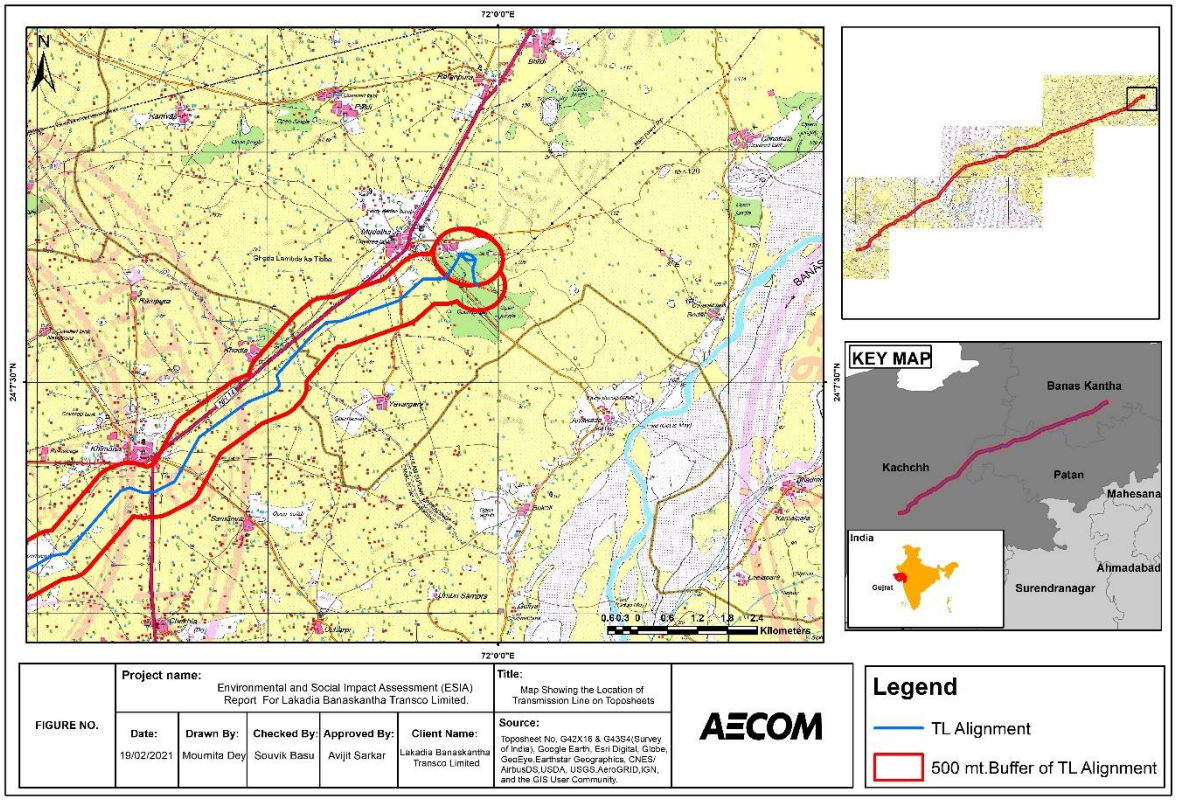


Figure 2-9. Alignment of the project (8)

2.6 Analysis of Alternative Transmission Line Alignment

Alternative analysis has been carried out by project team during preparation of detailed project report of the project and based on that present alignment has been selected.

Three alternatives routes were explored along the Bee Line keeping the in view the design considerations, environmental, forest and wildlife impacts, avoid habitat areas, keeping the crossings of Roads and Highways, Power Lines and Railway lines etc. to minimum. The route was marked on the toposheets and corresponding GPS co-ordinates were obtained for all the Alternative Routes. Thereafter, walkover survey of all the routes was carried out to ascertain the features along the routes and select the most suitable route for the transmission line. An exhaustive exercise was carried out during the survey to select the route keeping the involvement of forest land and wildlife sanctuary area to minimum.

Analysis of alternative route for LBTL projects are given below table 2.3. From the comparative statement, forest area and wildlife sanctuary area involvement in Alternative-I is least among all the three alternatives i.e. only 25.1315 ha and cannot be avoided. In addition, the length of line is the shortest along the Alternative-I among the three. The crossings of existing power transmission lines, railways and Highways is also less in comparison to other alternatives. Keeping in view the advantages as stated above, Alternative-I is found to be most suitable from technical, environmental, forests & wildlife and implementation and O&M point of view and thus is considered to be adopted for laying of the transmission line. Alternative -1 or the selected option has a route length of 176 Km & approx. cost of material is Rs. 576 Cr includes all construction related activity cost for entire transmission line.

Table 2-3 : Comparative Statement of Alternative Route for 765KV Transmission line

S.R	Description	Route I	Route II	Route III
1	Route particulars			
	Bee line (KM)	165.408	165.408	165.408
2	Length of alternatives(kms)	176.148	185.404	181.627
3	Transmission line corridor	Red	Blue	Green
4	Total Forest area involvement	25.1315ha (i.e RF &SF:21.2445ha Forest include WLS:.3.8870 ha)	51.280ha (i.e RF &SF:40.7811ha Forest include WLS:10.4989ha)	38.987 ha (i.e RF &SF: 34.6655ha Forest include WLS:4.3215ha)
5	Wild ass sanctuary area			
	Length of line through WAS	1.599kms	1.948kms	3.294 kms
	Area of WAS	9.749ha (Forest 3.8870 ha and Non forest 5.8620 ha)	13.0516ha (Forest 10.4989 ha and Non forest 2.5527 ha)	22.0698ha (Forest 4.3215 ha and Non forest 17.7483 ha)
6	NH Crossing	3 Nos	4nos	3 nos
7	Railway line crossing	2 Nos	4nos	2nos
8	Power line crossing	33 nos	39 nos	41 nos
9	Historical/cultural monuments	Nil	Nil	Nil

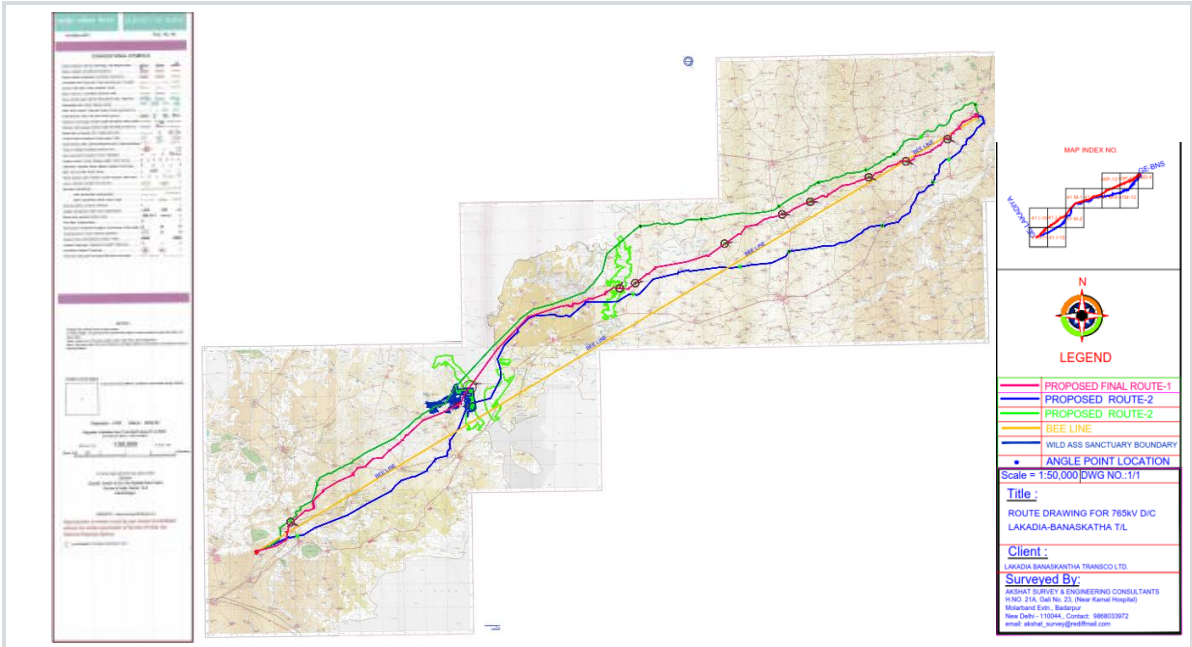


Figure 2-10. Map of Analysis of alternative

2.7 Proposed Components of Transmission Lines

The LBTL Transmission line will be laid overhead using lattice structures fabricated with MS angles and galvanized. Lines are strung with aluminium cored steel reinforced conductor (ACSR) or all aluminium alloy conductor (AAAC) supported on the towers by porcelain disc insulator strings.

Transmission line towers will be self-supporting lattice towers. There are four types of towers which can be used in the project. These include:

- **Tangent tower (A type Tower):-** This is a suspension tower designed to support power conductor and ground wire(s) for extending the power line alignment in a straight line.
- **15º Small Angle Tower (B Type Tower):** - Fitted with two stacks of insulators per each phase duly connected by a jumper. This tower will facilitate deviation of line alignment up to 15º.
- **30ºMedium Angle Tower (C Type Towers)**: - This is similar to above angle tower but designed to take line deviation up to 30º.
- **Large Angle Dead end Tower (D Type Tower)**: - This tower is designed for use as terminal tower as well as an angle support capable of taking deviation up to 60º. All angle towers are used at cut point (Tension towers). In addition to the above towers, special structures may be used for river crossings and hill slopes.

Type of tower at each location is decided and selected from the standard tower types/ designs adopted for various voltage classes and wind zones. Special type of towers required for a specific location to suit a specific purpose may also be designed. The design of Transmission line towers is governed by the stipulations of IS 802 (Part-I - Section 1 & 2) of 1995/92 use of structural steel in overhead transmission line towers and wind load referenced in IS 875-(Par-3) - 1987 “Code of practice for design loads for buildings and structures (second revision)”, terrain and topographic characteristics of the ground.

The various members of the tower are i) Foundation, ii) Main leg members including ground wire peak, (iii) Lattice member (iv) Horizontal and longitudinal belt members situated and (v) Cross arm members and (v) Redundant members and hip bracings.

Tower Foundations: The foundation of the tower is based on soil type, tangent/angle locations, normal/extended towers, narrow based towers, river crossings etc) & wind zones. Standard designs for various types of foundations for normal soil are readily available. However, proper type of foundations is selected from the standard designs available based on the soil investigation result or if needed specially designed for a specific application. In case of 765 KV lines the tower footing would be approximately 20.78 m X 20.78 m. For the foundation an excavation of 4m X 4m X 2m would be carried out and for casting of tower footing in open pits. Since the transmission line passes through a creek region or aggressive soil region Concrete of M30 Grade design Mix conforming to IS 456 and epoxy coated reinforcement as per IS 13620 shall be used. However, these would vary on the technical parameters

e.g. load, angle of the conductor, soil characteristics, wind speed etc. Once the concrete is allowed to set the earth is backfilled and compacted. Total number of towers in LBTL 765 kV D/C line would be 473. Among them 337 nos A, 29 nos B, 31 nos C, 76 nos D types tower and Gantry type would be present. Foundation cost approx. from Rs. 1.54 Lac to Rs. 6 Lac per location

Tower Structure: The Tower shall be fully galvanized using mild steel or/and high tensile steel sections. Bolts and nuts with spring washer are to be used for connection. Each tower shall be earthed such that tower footing resistance does not exceed 10 ohms. Pipe type or Counterpoise type earthing shall be provided in accordance with relevant IS. Additional earthing shall be provided on every 7 to 8 kms distance at tension tower for direct earthing of both shield wires. Since, the transmission lines are passing through coastal/ creek regions, the fabricated tower parts and stubs shall have a minimum overall zinc coating of 900 gms/sq m of surface area except for plates and sections below 5mm which shall have a minimum overall zinc coating . These components would be fabricated at the factory and delivered to the site and stored in the Construction Camp/Laydown area.

Insulators: Porcelain/ Glass disc insulators or Porcelain Long rod insulators having specific minimum creepage distance shall be used. The creepage would be dependent on a number of technical factors

Conductors: The transmission lines shall have to be designed for a maximum operating conductor temperature of 85 deg C for both ACSR as well as AAAC. In case of the 765kV D/C transmission lines Hexa Zebra Steel Aluminium Conductor shall be used.

2.8 Description of Project Phases

2.8.1 Detailed Design

During the stage the route planning for the transmission line takes place. At the planning stage three alternatives are identified avoiding the major settlements, forests and other technical considerations. An analysis is carried out to identify the best alternative.

The typical activities which would be carried out during the project conceptualisation phases include:

- Walkover surveys of the three alignment: These have already been carried out and the finding have been used in the analysis of alternative section presented below.
- Detailed survey of the final alignment. The inputs from this study has also been used in the ESIA report e.g. number of trees to be felled. number of structures etc.
- Soil investigation of the tower locations at regular interval to ascertain the type of foundation;

2.8.2 Construction Phase

The construction of the transmission line route includes carrying out check surveys, site clearing and access road establishment through to foundation construction and structure installation to energising. This phase is expected to take between 15 months to complete. The Construction is projected to be over by December 2021.

In additions, the contractor would carry out i) Check Surveys, ii) Site Clearance and vegetation removal (including felling trees if required) iii) Excavation for tower foundation, construction of the concrete bases for the transmission line towers, iv) transportation in of the tower components and other raw materials; v) assembly and erection of the towers; vi) stringing of the transmission line; and vii) site rehabilitation.

2.8.2.1 Check Surveys

Check surveys are carried out by the contractor at the initiation for fixing the tower locations. At this point of time the once the tower locations are known the ownership of the land is identified by the Contractor with the help of the Revenue Department. The right of use for land for the tower footing and the RoW would be primarily procured through negotiated settlement. All construction activities would be carried out within the Right of Way for the safe operation of the transmission lines as per IS 5613.Check survey has been completed for both the line.

2.8.2.2 Clearing of Sites

At the tower site all vegetation in the footprint of the tower base and the working area of approximately 2 m on each side of the base (20.78m x 20.78 m) would be cleared of vegetation

2.8.2.3 Excavations

Excavators would be used to excavate the foundation for tower footing. Foundation sizes would be as described above dependent on the soil conditions and tower type. Excavated soil will be dumped around the excavation and excess dump rock will be uplifted and removed as required. Each excavation will be inspected and tested to confirm its suitability. The foundations would be filled with concrete. on

The formwork, reinforcing bars, embedded of the tower and any earthing elements would be placed in the pits. A 50 mm thick pre-stressed concrete cement pad is laid at the base of the foundation. Concrete will be sourced from a 'ready-mix' truck which will access the site or concrete will be mixed on site using a portable concrete mixer. Approximately, 80-100 m3 of concrete is required per tower. The casting of the foundation would take approximately 15- 30 days and would involve 15- 20 labours depending on the terrain and soil conditions. Once the excavations have been filled, the concrete requires 28 days for curing. The excavated soil would be backfilled and compacted as per the good engineering practices.

2.8.2.4 Erection of Tower

The material for the construction of the tower would be brought by tractor trailer or manually depending on the accessibility and site condition and delivered directly from the storage yard/lay down area to the tower construction site. Transposition is to be done for all transmission lines whose length is greater than 100 km. Transposition should be carried out at 1/3 and 2/3 of line length tower positions. The tower construction would start after the setting of the concrete is complete. It is estimated that in in LBTL 473 nos of towers would be constructed. Among them 197 number of towers has been already erected and 213 number of foundation activity has been completed. The prefabricated component of the lattice structure would be first assembled on the ground. The erection of the tower is done manually. The components are also hoisted manually by using a pulley system.

2.8.2.5 Stringing of Conductors

The stringing of the conductors will be done by tension method using a winching machine. The tension methods are generally used for stringing as this method keeps the conductor surface safe during stringing process. As part of the stringing process using the tension method, the conductor is kept under tension during the stringing process. This helps it to keep the conductor clear of the ground. For pulling the conductor a pulling line is installed on travellers affixed temporarily to the arms of the tower. A pulling line is pulled which are then used to pull the conductor from the reel stands using specially designed tensioners and pullers. Two types of pulling machines used in the construction of transmission lines being strung under tension. These are defined as bull wheel and drum/reel-type. Pullers would be equipped with load-indicating and load-limiting devices. Tensioners would be equipped with tension indicating devices. The capacities of the puller and tensioner would be based on the conductor, span length, terrain and clearances required above obstructions. Sag tensions can never exceed during stringing. The capacity for both puller and tensioner are calculated as per IEE 524.Positive braking systems will be required for pullers and tensioners to maintain conductor tension when pulling is stopped.

2.8.3 Operation and Maintenance

During the O&M stage of the project ground patrolling would be carried out. The patrolling would monitor the growth of tress in violation of the minimum safety clearance., development of any house or settlement within the RoW. Roads and bridges constructed within the ROW would also reduce the minimum safety clearance so these would also be monitored.

Further to ensure safety to adjoining properties; development of oil and gas pipelines, development of industry and plants, like cement, chemicals, dumping yard etc would be monitored appropriated measures taken to prevent such activities would might reduce the efficiency of the transmission lines. For this monitoring exercise ground patrolling would be organised preferably on a monthly basis.

2.8.4 Details of ROW

The Right of Way of the transmission line has been defined as per as per IS 5613. In case of 765 KV lines 65 m is considered as the ROW. This is also the horizontal clearance required for transmission lien of these capacity. The minimum ground clearance for 765 kV transmission lines shall be 15 m, so that maximum electric field does not exceed 10kV/m within the ROW and does not exceed 5kV/m at the edge of the ROW as per international guidelines.

Approval under Section 164 of Electricity Act. 2003 has been received. Further under section 164, DC orders have been received for most of the villages. All required clearances are obtained / to be obtained in progressively for RoW/construction of Transmission Line. As stated in section 2.5, other requirement like NHAI, Power line crossing has been obtained by March 2021(expected).

2.8.5 Details of Tree Enumeration and Cuttings

During site visit, discussion with project team reveals that, tree enumeration activity along the ROW has not been completed. As per Part -2 information recommended by DFO and Stage- I Forest Approval granted by RMOEF for the Project, about 145 no of trees are required to be felled during execution of the project. Cost of trees in forest land are included under the NPV (Net Present Value) determined by the forest department, under the provision of FC Act and NPV shall be paid by LBTL the time of Stage 1 forest approval compliance. NPV (Net Present Value) determined by the forest department, which includes tree compensation shall be paid by LBTL. Extraction cost for trees, if any raised shall be paid to Forest dept during execution of project. The tree cutting in private land will carried out in supervision of local administrative department and compensation towards tree cutting will be paid to land owner.

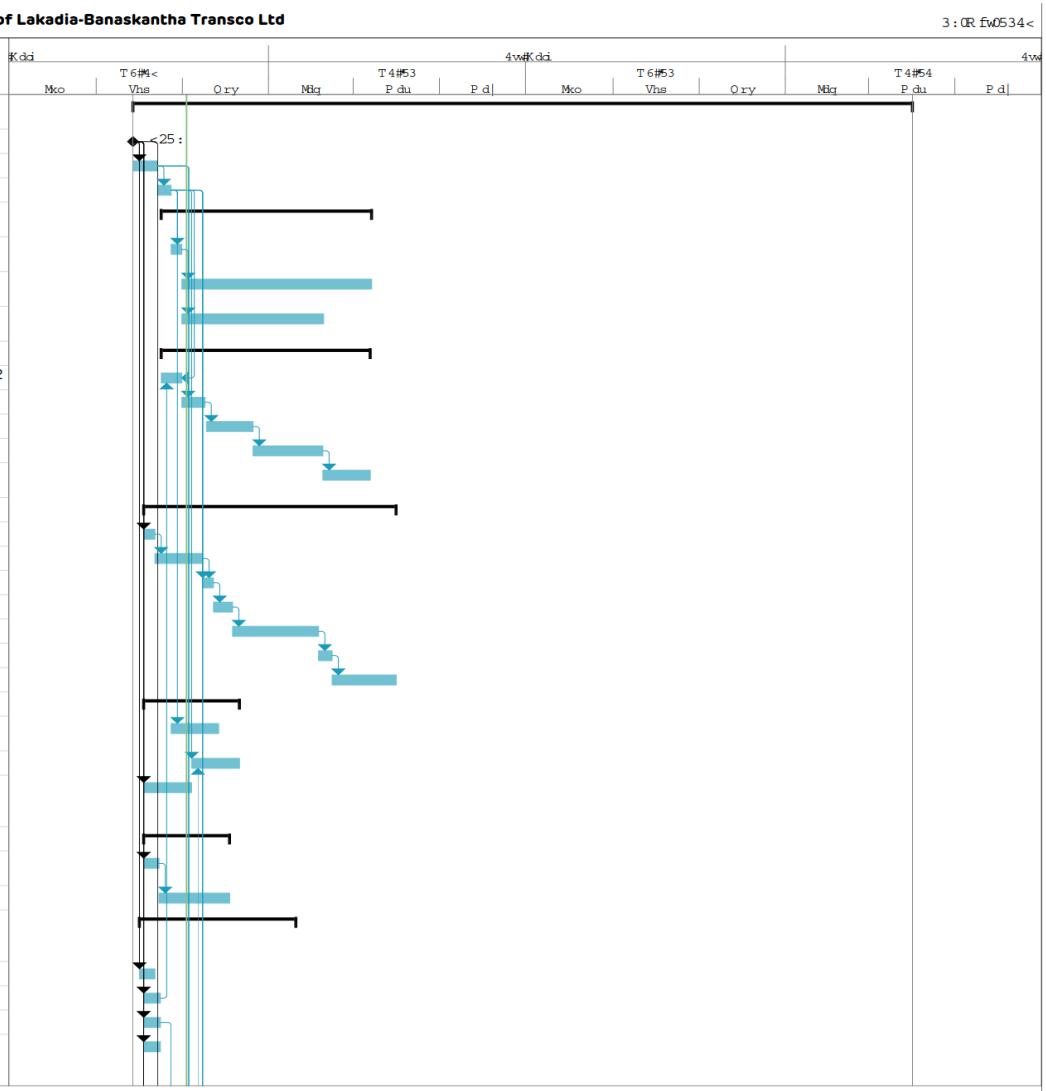
However, Tree feeling permission from Govt. of Gujarat has not been obtained. it will be obtained by the project team before stringing activity.

2.9 Project Duration and Schedule

The project implementation has been planned over a period of 18 months, this would include the Detailed design Phase as well as Construction (Detailed Surveys, material supply, foundation, erection of tower, stringing, testing and commissioning). The date of commissioning is December 2021.

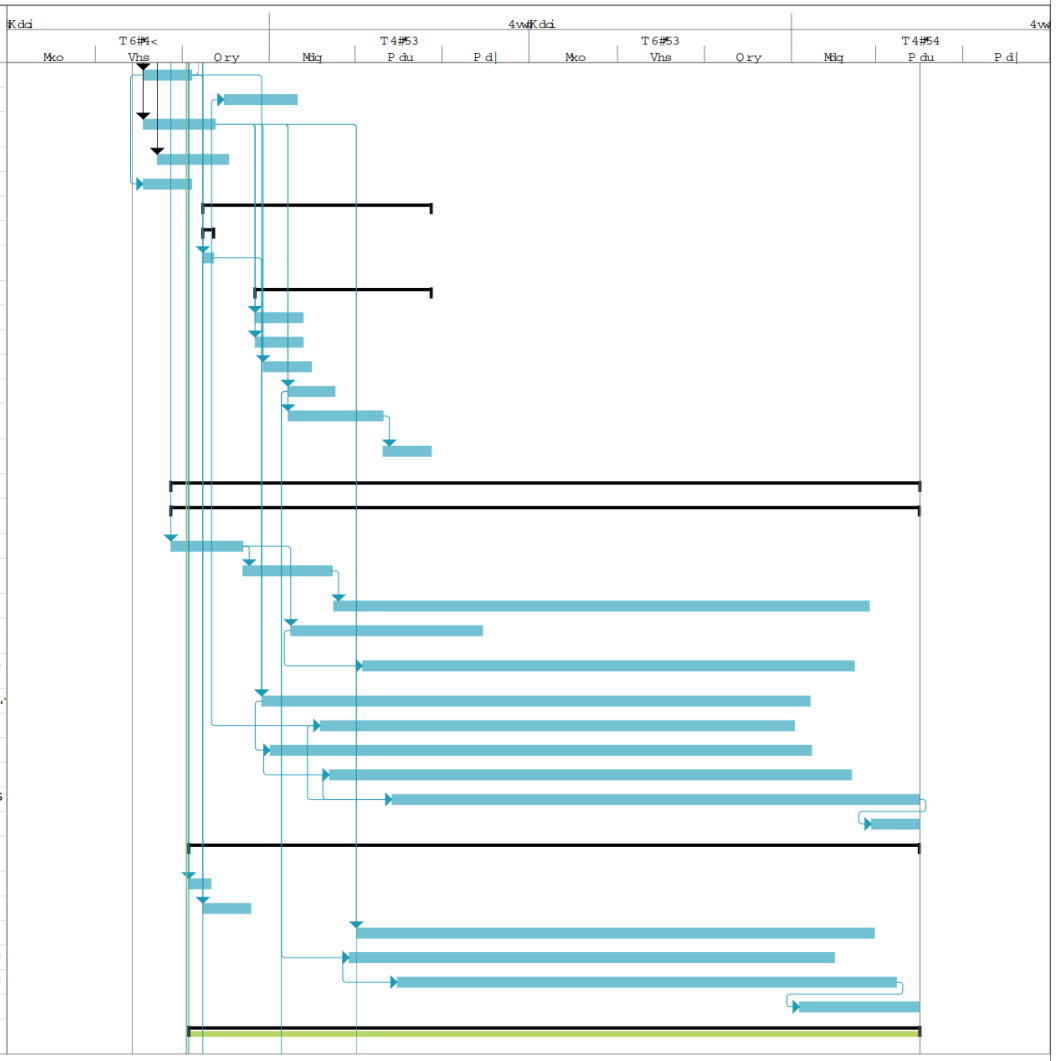
L1 Schedule of Lakadia-Banaskantha Transco Ltd

IG	Wdvn#Qdp h	Uhvsrqvleoh	Gxudwrq-	Vwduw	Ilqlvk	Suhghfhvvruv
4	**Implementation of Banaskantha -Lakadia Project**		**492.75 days**	**Fri 9/27/19**	**Wed 3/31/21**	
5	**Winning of Bid - LBTL**	**BD**	**0 days**	**Fri 9/27/19**	**Fri 9/27/19**	
6	**Receipt of LOI from BPC**	**BD**	**15 days**	**Fri 9/27/19**	**Mon 10/14/19**	**2**
7	**SPV Take over (Signing of SPA)**	**BD**	**9 days**	**Mon 10/14/19**	**Wed 10/23/19**	**3**
8	**Compliance to Condition Subsequent (CS) -TSA**	**Regulatory / F&A/**	**133.25 days**	**Thu 10/17/19**	**Fri 3/13/20**	
9	Submission for Transmission License & Tariff Application	Regulatory	7 days	Thu 10/24/19	Thu 10/31/19	4
:	Processing and Approval for Transmission License	Regulatory	120 days	Thu 10/31/19	Fri 3/13/20	6
;	Processing and Approval for Tariff Adoption	Regulatory	90 days	Thu 10/31/19	Sat 2/8/20	6
<	**Financial Closure**	**F&A/ Projec**	**132.25 days**	**Thu 10/17/19**	**Thu 3/12/20**	
43	Detailed Project Report (DPR)	Projects	13.25 days	Thu 10/17/19	Thu 10/31/19	4FF+7 days,32
44	Discussion of proposal with bank	F&A	15 days	Thu 10/31/19	Sat 11/16/19	10
45	IM Preparation	F&A	30 days	Mon 11/18/19	Fri 12/20/19	11
46	Approval process of Bank / Syndica	F&A	44 days	Sat 12/21/19	Sat 2/8/20	12
47	LIE report/legal document/due diligence /PDC compliance	F&A	30 days	Sat 2/8/20	Thu 3/12/20	13
48	**Approval Under Section 164 of EA'03**	**Projects**	**159 days**	**Fri 10/4/19**	**Tue 3/31/20**	
49	Collection of Toposheet		7 days	Fri 10/4/19	Sat 10/12/19	2FS+7 days
4:	Preparation of public notice for the I		30 days	Sat 10/12/19	Fri 11/15/19	16
4;	Public notice in news paper		7 days	Fri 11/15/19	Fri 11/22/19	17,4
4<	Gazette Notifications		12 days	Sat 11/23/19	Fri 12/6/19	18
53	Public Consultation		54 days	Fri 12/6/19	Wed 2/5/20	19
54	Application to CEA for approval u/s 1		9 days	Wed 2/5/20	Fri 2/14/20	20
55	Receipt of Approval		40 days	Sat 2/15/20	Tue 3/31/20	21
56	**Statutory Requirement**	**F&A/HR**	**60 days**	**Fri 10/4/19**	**Wed 12/11/19**	
57	Registration of GST/IEC/IEM Registration, Bank A/C opening etc.	F&A	30 days	Thu 10/24/19	Tue 11/26/19	4
58	Registration as Principal Employer & I	HR	30 days	Thu 11/7/19	Wed 12/11/19	4,35
59	Mapping of company structure in SAP (Plant Code, Company Code, Profit & Cost centre, WBS, etc.)	F&A	30 days	Fri 10/4/19	Thu 11/7/19	2FS+7 days
5:	**Allocation of Manpower**	**HR**	**54 days**	**Fri 10/4/19**	**Wed 12/4/19**	
5;	Organization Structure finalization & Approval		9 days	Fri 10/4/19	Tue 10/15/19	2FS+7 days
5<	Manpower Placement		45 days	Tue 10/15/19	Wed 12/4/19	28
63	**Award of Contract**	**CTCG/ BD/ Projects/ Eng.**	**98.5 days**	**Tue 10/1/19**	**Mon 1/20/20**	
64	Budget approval from Management	CTCG/BD	10 days	Tue 10/1/19	Sat 10/12/19	2FS+4 days
65	Detailed Project Report (DPR)	CTCG	10 days	Fri 10/4/19	Wed 10/16/19	2FS+7 days
66	Survey (RA & DS) third party	CTCG	10 days	Fri 10/4/19	Wed 10/16/19	2FS+7 days
67	Finalization of Package Philosophy	CTCG / Projects / Eng.	10 days	Fri 10/4/19	Wed 10/16/19	2FS+7 days



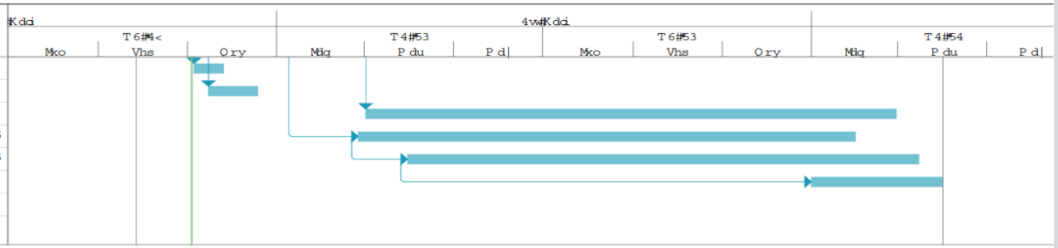
L1 Schedule of Lakadia-Banaskantha Transco Ltd

IG	Wdvn#Qdp h	Uhvsrqvleln	Gxudwlrq-	Vwduw	Ilqlvk	Suhghfhvvruv
68	Transmission Line - EPC Order (LOI Da	CTCG	30 days	Fri 10/4/19	Thu 11/7/19	2FS+7 days
69	Free Issued Material (FIM) - Conductc	CTCG	45 days	Sat 11/30/19	Mon 1/20/20	58SS-60 days
6:	Bay Extension - Lakadia & Banaskantha (Civil and EPC)	CTCG	45 days	Fri 10/4/19	Sat 11/23/19	2FS+7 days
6;	Reactor Package- Supply & EPC	CTCG	45 days	Mon 10/14/19	Tue 12/3/19	2FS+15 days
6<	Third Party Inspection Agency (TPIA)	CTCG	30 days	Fri 10/4/19	Thu 11/7/19	35SS
73	**Engineering**		**143 days**	**Fri 11/15/19**	**Thu 4/23/20**	
74	**Transmission Line**	**Eng.**	**7 days**	**Fri 11/15/19**	**Fri 11/22/19**	
75	765kV Towers of WZ-4 & 5 (Same towers of WRSS-21 Project)		7 days	Fri 11/15/19	Fri 11/22/19	35FS+7 days
76	**Bay Extension**	**Eng.**	**110 days**	**Sat 12/21/19**	**Thu 4/23/20**	
77	Basic Engineering - Electrical		30 days	Sat 12/21/19	Fri 1/24/20	37FS+25 days
78	Basic Engineering - Civil		30 days	Sat 12/21/19	Fri 1/24/20	37FS+25 days
79	Detailed Engineering - Civil		30 days	Fri 12/27/19	Thu 1/30/20	37FS+30 days
7:	Detailed Engineering - Equipment		30 days	Tue 1/14/20	Sat 2/15/20	37FS+45 days
7;	Detailed Engineering - Engineered Items / Cable Engg.		60 days	Tue 1/14/20	Fri 3/20/20	37FS+45 days
7<	Detailed Engineering - PLCC & FOTE/SCADA		30 days	Fri 3/20/20	Thu 4/23/20	48
83	**Construction of Elements**		**468.75 days**	**Thu 10/24/19**	**Wed 3/31/21**	
84	**765kV D/C Lakadia-Banaskantha Line**	**Projects/ Forest**	**468.5 days**	**Thu 10/24/19**	**Wed 3/31/21**	
85	Detailed Survey & Profiling by thirc	Projects	45 days	Thu 10/24/19	Fri 12/13/19	33FS+7 days
86	Preparation and Submission of Forest Proposal (15.4 Kms / 50.58	Forest	56 days	Fri 12/13/19	Thu 2/13/20	52
87	Approval of Forest Proposal (Stage	Forest	335 days	Sat 2/15/20	Wed 2/24/21	53FS+1 day
88	Submission of Statutory Proposals (NH/Powerline/Rly/Aviation/PTCC)	Projects	120 days	Thu 1/16/20	Fri 5/29/20	52FS+30 days
89	Approval of Statutory Proposals (NH/Powerline/Rly/Aviation/PTCC)	Projects	308 days	Fri 3/6/20	Sat 2/13/21	55SS+45 days
8:	Material Supply - Contractor Scope	Projects	343 days	Thu 12/26/19	Wed 1/13/21	35FS+30 days,
8;	Material Supply - FIM (Conductor)	Projects	297 days	Wed 2/5/20	Sat 1/2/21	61SS-45 days
8<	Foundation	Projects	339 days	Wed 1/1/20	Thu 1/14/21	57SS+5 days
93	Erection	Projects	327 days	Wed 2/12/20	Thu 2/11/21	59SS+37 days
94	Stringing	Projects	330 days	Fri 3/27/20	Wed 3/31/21	60SS+28 days
95	Testing and Commissioning	Projects	30 days	Fri 2/26/21	Wed 3/31/21	61FS-30 days
96	**2 nos of 765 kV bays at Banaskantha for Lakadia -**	**Projects/ Eng.**	**457.5 days**	**Tue 11/5/19**	**Wed 3/31/21**	
97	Receipt of Drg from PGCIL	Eng.	14 days	Tue 11/5/19	Wed 11/20/19	3FS+20 days
98	Access to Land/Permission	Projects	30 days	Fri 11/15/19	Wed 12/18/19	4FS+20 days
99	Civil works incl. site setup	Projects	325 days	Mon 3/2/20	Sat 2/27/21	37FS+30 days
9:	Supply	Projects	304 days	Wed 2/26/20	Sat 1/30/21	47SS+30 days
9;	Equipment Erection	Projects	312 days	Mon 3/30/20	Mon 3/15/21	67SS+30 days
9<	Testing & Commissioning	Projects	75 days	Wed 1/6/21	Wed 3/31/21	68FS-60 days
:3	**2 nos of 765 kV along with 2 x 240MVAr bays at Lakadia**	**Projects/ Eng.**	**457.75 days**	**Tue 11/5/19**	**Wed 3/31/21**	



Task — Project Summary — Manual Task — Start-only — Deadline
Split — Inactive Task — Duration-only — Finish-only — Progress
Milestone — Inactive Milestone — Manual Summary Rollup — External Tasks — Manual Progress
Summary — Inactive Summary — Manual Summary — External Milestone

LG	WdvnQdph	Uhvsrqvleh	Gxudwlrq-	Vwduw	Ilqlvk	Suhghfhvvruv
:4	Receipt of Drg from WRSS-21	Eng.	18 days	Tue 11/5/19	Mon 11/25/19	3FS+20 days
:5	Access to Land/Permission	Projects	30 days	Fri 11/15/19	Wed 12/18/19	4FS+20 days
:6	Civil works incl. site setup	Projects	325 days	Mon 3/2/20	Sat 2/27/21	37FS+30 days
:7	Supply incl reactor	Projects	304 days	Wed 2/26/20	Sat 1/30/21	47SS+30 days
:8	Equipment Erection	Projects	312 days	Mon 3/30/20	Mon 3/15/21	74SS+30 days
:9	Testing & Commissioning	Projects	80 days	Fri 1/1/21	Wed 3/31/21	75SS-59 days
::						
:;	*In scheduling, sunday considered as Non working day.*					



Task		Project Summary		Manual Task		Start-only		Deadline	
Split		Inactive Task		Duration-only		Finish-only		Progress	
Milestone		Inactive Milestone		Manual Summary Rollup		External Tasks		Manual Progress	
Summary		Inactive Summary		Manual Summary		External Milestone			

Figure 2-11. Execution plan for LBTL project

2.10 Raw Materials Requirement

2.10.1Raw material

The raw material required for the construction of the transmission line and substation has been estimated These are presented in Table 2-4.ATL has been provided the service order of EPC contractor to AECOM (Reference number S.O number 5700280267 dated 13.12.2019). As per ATL, EPC contractor has been awarded based on turnkey basis.

Table 2-4 : Raw Material Requirement for LBTL Transmission line

Material	Lakhadiya PS- Banskatha PS
Cement (kg)	2.84 lakh KG
Sand (m^3)	5.04 lakh kg
Aggregate (m^3)	10.9 lakh
Water (Concrete Only) (KL)	190 KL

2.10.2 Land Requirement

Land Requirement for Transmission Line

Discussion with site personnel of LBTL reveals that land requirement for A, B, C, D type of tower is varying from 400 sqmt to 800 sqmt depending on the tower type. The project Lakadia-Banaskantha 765 kV transmission line of length 176.148 km will pass through agricultural lands that falls under 3 districts of Gujarat. Total 473 towers (Among them 337 nos A, 29 nosB, 31 nos C, 76 nos D types tower and Gantry type would be present) would be constructed and the total estimated land requirement for tower footing would be 243173 sq mt (24.3173 ha). Majority of the tower footing falls on private agricultural land and it belongs to approximately 600 landowners. Details on the land requirement for tower footing is provided in Table below.

Right of way width for the 765-kV transmission line would be 67 m (33.5 m both side of the transmission line) and length of the transmission line would be 176.148 km. During the ESIA study, ROW has been obtained for 360 Towers. As the process is still ongoing, details on the numbers of landowners will identified by Jun'21.

TL Lines	Types of Tower	Area Required for each Tower Type (in sq mt)	Total number of Towers to be erected	Total Area Required in sq.mt
765 kV	Type A+0	461	337	155357
	Type B+0	583	29	16907
	Type C+0	635	31	19685
	Type D+0	674	76	51224
	TOTAL		473	243173

Land Requirement for Stockyard/Laydown and Labour Camp

The project has leased in 12 acres stockyard area for construction materials during the construction period. For this, the EPC contractor (Larsen and Turbo) has taken land on lease for a yearly basis. The land belongs to a 4 landowners and the agreement was signed between the EPC contractor and the landowners. The 12 acres of land comprises of the laydown area and labour camps for workers. As informed during site visit, the land was reported to be barren and no cultivation was undertaken prior to land lease. Post construction the land will be handover to the landowner in its original condition. The same has been specified in clause 9 (a) of the rent agreement between the EPC contractor and the landowners. Apart from this, temporary land will be required for setting up canvass camp for labour during foundation and tower erection.

2.10.2.1 Land Procurement Process for Transmission line

Land procurement for transmission line required obtaining right of way [2]of the land. No permanent land take is required for the transmission line. The process of land procurement for TL has been carried out as per the requirements of the Electricity Act 2003, Part VIII, Section 67 and 68, Indian Telegraph Act 1885, Part III Section 10 (e) and Ministry of Power (MoP) Guidelines for Payment of Compensation Towards damages in regards to RoW, October 2015. As per the provisions of the Electricity Act 2003 and Telegraph Act (1885), the project will not permanently procure the land under the tower footprints or RoW. Easement rights for the tower and right of way will be procured through the payment of crop compensation and 85:15 of the land value for tower footing and ROW. Prior to start of construction, the project has obtained the following permission for ROW and Tower

a. Approval under Section 68 of the Electricity Act 2003
b. Approval under Section 164 of the Electricity Act 2003:
c. Consent from affected landowner

The process of land procurement starts with Detailed survey carried out by LBTL. During this process, location of tower and transmission line was determined, and list of the villages were the line will pass through was identified. The Headman/Sarpanch of the villages impacted by the ROW were informed of the project. Land details and landowner were identified and discussion with the landowner was undertaken for assessing their willingness/consent for easement rights of use of land for tower and ROW. The District administration issued notification under section 164 of the Electricity Act. The notification was issued not for any forceful acquisition of land but for notification and public disclosure.

2.10.2.2 Determination of Easement Access Price

According to the discussions with the In LBTL case when personnel from LBTL team approach land owner for obtaining land for tower footing, initially land owners are reluctant to provide the right of use of the land to company as govt land schedule rate was not revised since 2011 and it is very low in comparison to the current market land value. Then LBTL team approach to the District Authority for revising the land schedule rate. Representative of landowners are also approached for same to district authority. A tripartite meeting between district authority, land owner and LBTL company was organised where collective decision was taken that INR 900 per sqmt land price was fixed for unirrigated land and INR 950 per sqmt land price for irrigated land would be provided by the company to the land owner for obtaining Right of Use for tower footing and ROW. For Tower base, LBTL compensated 85% of land value for Tower footing and 15% of land value for ROW. It was reported by LBTL that this amount is paid to the landowner in three instalments i.e. i) 33% at Foundation, ii) 33% at time of tower construction and iii) 33% at time of stringing.

2.10.2.3 Compensation Mechanism

The amount of cash is paid to landowners through issuance of cheques. About 150 landowners have received compensation. The final list of the affected landowners for Tower footing will be completed by June, 2021. As the process of obtaining easement rights for ROW is a continuous process, it is anticipated that the final list of the affected landowners for ROW to be completed by Aug'21 hence compensation to all the remaining landowners would be completed a month prior to commissioning of the project..

2.10.3 Manpower Requirement during Construction

The construction activity would be carried out by primarily three teams i) foundation ii) Tower erection iii) stringing. The foundation construction team would have around 15-20 labours while the tower erection teams which would follow would have 25-35 people. Finally, the stringing team would also have around 45-60 people involved in the job. During the foundation and tower construction approximately 10-15 teams would be working in parallel. Thus approximately 550-650 labours would be working at any time in the project. However, these number can increase, and 750 people may be employed at a maximum at any point of time in the project. However, the main- contractor might sublet a part of the work, especially the labour-intensive part of the development of foundation to the sub-contractors. The development of the substation and bays would be carried out by a separate team specialized in these activities. This team would comprise of 30-50 people.

Most of the labour required for the foundation, especially unskilled labour would be sourced from the local area. Only, skilled, and semi-skilled labour required for tower erection, stringing, operation of equipment and machinery

[2] The right of way is a strip of land where the transmission line is fall under the constructed, erected, operated and maintain. The transmission line is kept in the centre of right of way (ROW) and Right of Use are the land that allows to enter the land & use it as passage which are purposely and continuously in use for fulfilment of project throughout the life after construction, operation and maintenance.

would be migrant labour from other states. For housing of the skilled and semi-skilled labour temporary construction camps would be setup. The construction camps have to be provided with amenities and facilities so that there is no competition between the labour and the local community over resources or conflicts between then over the disposal of solid and liquid waste or other social resources. During operation phase approximately 15 people would be required and working in 3 shifts.

2.10.4Equipment and machinery used in Construction

The construction of the transmission line and the substation would require the following machinery i.e. front-end loader, backhoe, concrete mixer, crane, poker vibrator. This equipment would be mainly located at the site of the construction activity. A temporary staging shall be in the Construction Camp. The maintenance and repairs of the equipment would also be carried out at the camp. The operating noise levels of the equipment is presented in

Table 2-5 :Reference Noise levels of various equipment to be used in the construction activity

Equipment	Noise Level	Equipment	Noise Levels
Front End Loader	85-91	Crane	90-96
Backhoe	79-89	Concrete Mixer	<85
Poker Vibrator	87-98	Electric Drill	102

2.10.5Power requirement during Construction

Power required at the construction activities would be drawn from the grid where it is available, else diesel generator DG sets would be used to supply the power. 2 nos. of 100 KVA DG set would be used for the supply of power. 1(One) DG would be in running condition and another one (1) on standby. In addition, one 50 KVA DG set would be used for domestic purpose. All the DG sets used would conform to the Central Pollution Control Board (CPCB) standards for DG sets.

2.10.6Water requirement during Construction

Water would be required for both construction activities and domestic purpose during the construction period. The operations period of the project would also have water requirement, but the quantities required would be much lesser in quantities. The water requirement for construction depends on the climatic conditions, type of equipment, type of material available, mix design, type of construction. Considering the above factors and the total duration of the execution of the project it is estimated that the average water requirement for domestic consumption and construction would be approximately 50 KLD and 5000 KLD respectively. However, there would be variation in the daily water requirement depending on the construction activities. During the operation phase considering the activities which have been considered the quantity of water required would be negligible.

2.11 Pollution Sources & Characteristics during Construction

Operation of Heavy Vehicle and Machinery: The operations of construction vehicles, diesel generators and machineries engaged in the construction would contribute to Suspended Particulate Matter (SPM), Sulphur and Nitrogen dioxides (SO2 and NOx), Carbon monoxide (CO) and other hydrocarbons (HC). In addition, fugitive emissions are envisaged from plying of vehicles, storage, handling and transportation of materials during the construction phase. Dust will be mainly emitted during material transport, loading-unloading activities. Also, during construction phase, noise will be generated from operating heavy machineries, vehicular movement etc. All the generator sets will be equipped with exhaust mufflers and acoustic enclosures and subjected to periodic preventive maintenance to reduce noise and shall conform the CPCB requirement for generators.

2.12 Waste Management during Construction

Generation of waste from construction activities: Due to the construction of the transmission line approximately 500 m3 of construction waste would be generated. This would be primarily from concreting activities and can easily be used as a backfill material. This construction and demolition waste can be used for raising the sites for substation and strengthening of approach road.

Discharges from Campsite and Construction areas: Sewage effluent will be generated during the construction. The campsite would be provided with septic tank and soak pit / bio-toilets to treat the sewage. Since the camp would primarily cater to the requirement of the skilled and semi-skilled labour, who are migrant from outside the area, the number of people staying at the camp would be limited, thus the waste generated would be minimal. Also, mitigation measures e.g. septic tanks and soak pits or bio-toilet will be constructed at the construction camps. These measures are embedded included in the project design to prevent the discharge of untreated sewage or wastewater. It is estimated that on an average 15.0 kg of municipal solid waste (MSW) would be generated per day during the construction phase from the camps. This would comprise of food waste and recyclables viz. packaging material. The MSW would have to be handled by the Contractor so that the adjoining areas are not contaminated.

Hazardous Waste: The used oil and lubricant, oil-soaked rags, empty drums from transformer oils would be considered as Hazardous Waste. In addition, paints, solvents, and oil used would also be considered as hazardous waste. These would be disposed of by the Contractor as per the provisions of the Hazardous and Other Waste (Management and Transboundary) Movement Rules 2016.

2.13 Waste Management During Operations

E-waste: During operations e-waste would be the main type of waste which would be generated. The e-waste is likely to be generated primarily from the maintenance of the substation equipment. These must be disposed as per the E-Waste Management Rules 2016.

Hazardous Waste: The waste transformer oil (which would be generated after 5 years of the commissioning) would qualify as a Hazardous waste would have to be disposed as a Hazardous and Other Wastes (Management and Transboundary Movement) Rules 2016.

Battery Waste: The substation would have DC battery which would be required to supply power to some of the equipment in case of emergency. The battery waste would be disposed of as per the Battery (Management & Handling) Rules 2001.

2.14 Quantification of greenhouse gas

Quantification of green house gas (GHGs) was estimated for the Lakhatia to Banaskantha 765 kv transmission line using the World Bank Guidance Note: Greenhouse Gas Accounting for Energy Investment Operations Transmission and Distribution Projects Power Generation Projects.

2.14.1Screening of the scopes

In accordance with the guidelines a screening was carried out for the proposed activity of the establishment of transmission line to identify activities which would cross the threshold for GHG emission for transmission liens ,The prominent activities, which could be the major contributor to the green-house gas emission include

- Land clearing and the subsequent erection of tower.
- Vehicular emission due to transportation of equipment and Technical loss of energy in the transmission line during operation.

Construction of the Tower footings

For the construction of the tower footings approximately, 12,999 tons of cement would be required to prepare M20 and M10 grade concrete. Approximately, 900 kg of CO_2 is emitted to prepare 1 ton of cement, by calculating the above factor with the total quantity of cement, it has been estimated that 12896 tonnes of CO_2 would be emitted in the atmosphere. But this would considered as, indirect emission of GHG for the proposed project, as project proponent was not directly involved in the cement preparation procedure.
It has been assumed that each transmission tower would consists almost 12 tonnes of steel, in both the lines total 473 towers are scheduled to be set up. So, it can be assumed that approximately 5676 tonnes of steel is required for the project.
To make one ton of steel almost 1.9 tonnes of CO_2 emitted in the atmosphere. So, by calculating the total amount of steel with the said factor, it can be predicted that total 10,784 tonnes of CO_2 have been emitted in the atmosphere, which is indirectly associated with the project.

Technical Loss in transmission line

According to the information from the project proponent, the transmission line approximately equipped with a power flow of 1340 MWh and incurred a loss of 4.5 MWh.

Methodology

According to the user guide of the CO2 database for the Indian power sector, published by Central Electricity Authority, the weighted average of the grid emission is 0.82 tonnes of CO2 per megawatt per hour. Using the grid emission factor total emitted co2 for the transmission line was estimated as 32324.40 tonn annually.

Land clearing due to erection of tower

New construction of long-distance lines, or even of distribution lines and substations, may affect carbon stored in biomass and soil. Depending on the circumstances, land clearing could account for the largest fraction of total gross emissions within the project boundaries. An obvious example would be clearing a forest for a long-distance transmission line, which would result in a one-time release of the carbon stored in the vegetation. According to the study of the urban forest network, 1 acre of forest can sequester 2.5 tonnes of carbon annually, so inversely, if 1 acre of forest land would clear. it could release 2.5 tonnes of CO2 in the atmosphere. But considering the forest type in the region, which is mainly shrubs and medium tree, it can be concluded that these forests are not capable of sequestrate that much of CO2 from the atmosphere. So, this scope could be ruled out from the GHG emission.
Vehicular emission due to transportation of equipment's to the tower site
Vehicular emission would be considered as mobile emission source for the proposed project. According to the information from the project proponent, only one truck would be needed for erection of one tower. So, it has been predicted that daily 2 truck would be needed, to transfer the tower erection equipment at two different sites. Considering the tower numbers for both the lines, it can be predicted this activity will continue for at least one year. Considering the time frame, total distance and vehicle type (heavy duty truck), total predicted co2 emission would be 68.91 tones annually.

Conclusion

Considering all the sources of GHG emission in the transmission project is below the thresholds and thus doesnot require a detailed assessment A computation of CO emission sources are presented in a graphical manner in figure 2.12

Emission sources	Co2 (tonn)
Technical loss	32324
Construction emission	23680
Vehicular emission	68.91

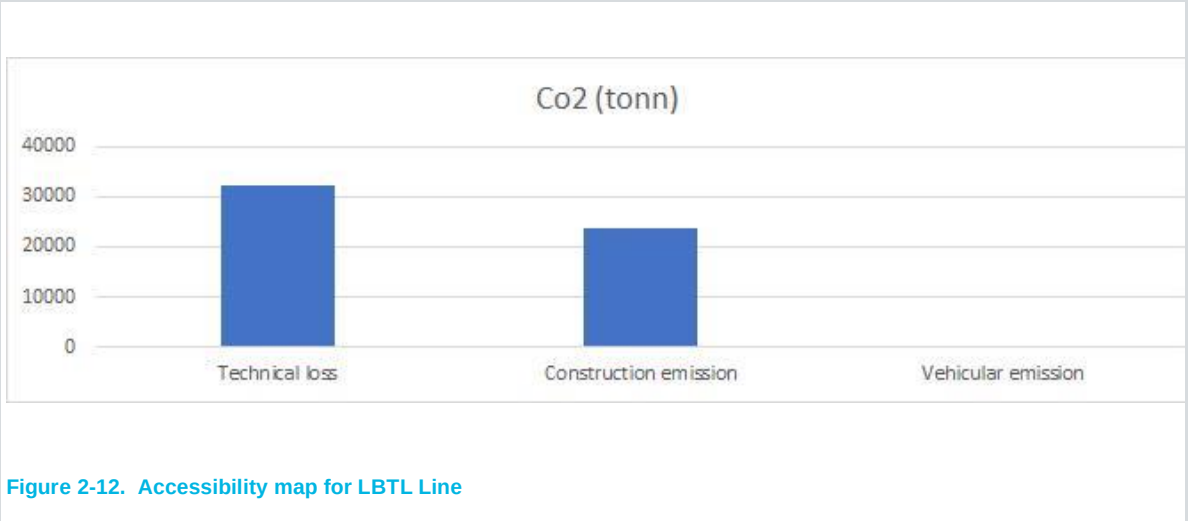


Figure 2-12. Accessibility map for LBTL Line

2.15 Present Status of the Project

As already, the proposed project involves construction of 176.48 km of transmission line located at Gujarat in the districts of Kutch, Patan and Banaskatha. As on date (11.02.2021), out of the total of 473 towers, 197 number of towers have been erected and 213 number of towers are founded. Stringing activities have not been initiated yet. A lay down area has been set up at Radhanpur. This area covers an area of 12 acres and comprises of pre-fabrication yard, casting area, machinery & vehicle maintenance area, administrative area, labour camps and general service area. This Lay-down area provides support to the whole transmission line alignment.

2.16 Labour and Working Condition

The project is already in a construction stage, at the time of ESIA, L&T has been contracted as the EPC contractor for construction. The EPC contractor had been completed and labour had already mobilised on site. A total of 20-30 worker on site mobilised for tower foundation and erection work. A total of 150-200 workers were engaged for tower foundation and 250-300 workers for tower erection.

The unskilled labourers employed were recruited from the local villages itself, while the semi-skilled and skilled labourers are reported to be workers from other districts of Gujarat. The few migrant workers were reported from Bihar and Jharkhand.

2.16.1 Labour Accommodation:

The labour accommodation for the project is required during construction stage. In keeping up with IFC guidelines following are the key provisions

- Provision of potable water for drinking
- Labours shall be provided with at least one toilet/urinal/washing facility shall be available per 15 construction workers;
- Arrangement for separate cooking area and supply of cooking fuel- LPG gas or kerosene oil;
- Provision of waste collection and segregation (biodegradable and non-biodegradable)
- Sleeping or resting area (as in a temporary arrangement) should be adequate in size and appropriate to protect its occupiers from harsh weather conditions and keep their personal belongings safe.;
- The EPC contractor to consult with the relevant Gram Panchayat before selecting the location of the labour camp;

During the operation phase, the total work force expected to be deployed is 10-15 individuals for maintenance and for regular patrolling. This regular patrolling will be undertaken at least twice in a fortnight along the entire route. This team will primarily comprise of technicians, electricians and skilled and semi-skilled workmen.

3. Policy Legal and Administrative Framework

This section highlights the relevant environmental and social policies and regulations, IFC and World Bank Group guidelines applicable for transmission projects especially transmission projects in Gujarat. The regulatory framework is based on a) applicable national and state level environmental and social regulations for the project; b) International Standards and Conventions; and c) Applicable Environmental and Social Guidelines. The institutional framework for implementation of the regulatory framework has also been taken into consideration

3.1 National and State Laws

Constitution of India under Article 21 assures that "The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country." Similarly, Article 51 (A) also make say that "It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures." Considering the direction from the constitution, the Government of India has laid out various policy guidelines, acts and regulations pertaining to protection of environment. Consequently, the individual states have also framed rules to further the cause of environment protection.

The Environment (Protection) Act, 1986 provides umbrella legislation for the protection of environment. As per this Act, the responsibility to administer the legislation has been jointly entrusted to the Central Ministry of Environment Forests and Climate Change (MoEF & CC) and the CPCB / State Pollution Control Board (SPCB)

The implementation of the subprojects will be governed by Government of India and State of Gujarat and other applicable environmental acts, rules, regulations, and standards. These regulations impose restrictions on the activities to minimize or mitigate likely impacts on the environment. It is the responsibility of the project executing and implementing agencies to ensure subprojects are consistent with the legal framework, whether applicable international, national, state or municipal or local. Key standards include those related to air quality, and protected areas are included. Compliance is required in all stages of the project including design, construction, and operation and maintenance of Transmission lines. The specific regulatory compliance requirements of for the LBTL Project are shown in **Table 3.1**

Table 3-1 :Applicable Environmental Legislations and Specific Requirements for the Project

Sl. No.	Acts/Rule/Policy	Description	Applicability & Action Required	Responsibility
Environment related regulations				
1.	National Environment Policy, 2006.	NEP is a comprehensive guiding document in India for all environmental conservation programs and legislations by central, state and local government. The dominant theme of this policy is to promote betterment of livelihoods without compromising or degrading the environmental resources. The policy also advocates collaboration method of different stakeholders to harness potential resources and strengthen environmental management.	The LBTL Project should adhere to NEP principle of "enhancing and conservation of environmental resources and abatement of pollution".	LBTL
2.	Environment (Protection) Act, 1986 and Environmental Standards.	The Environment (Protection) Act is an umbrella legislation seeking to supplement the existing laws on the control of pollution (the Water Act and the Air Act) by enacting a general legislation for environment protection and to fill the gaps in regulation of major environmental. hazards.	The Railway electrification project and all activities under the same should adhere to the regulations and standards under the Environment (Protection) Act, 1986 and Environmental Standards.	LBTL and the contractors / subcontractors and other supply chain contractor should adhere to the rules and standards specified under the Environment Protection acts

Sl. No.	Acts/Rule/Policy	Description	Applicability & Action Required	Responsibility
3	EIA Notification of 2006 and the later amendments	The EIA Notification set out the requirement for environmental assessment in India. This states that Environmental Clearance is required for certain defined activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. The Schedule I of the notification defines threshold of activities which require to undertake an environmental assessment and obtain an environmental clearance from statutory bodies. Projects are categorized as A3 or B4	The transmission projects are not included in the Schedule I of the EIA notification. Thus there is no requirement for LBTL to undertake environmental clearance.	Not applicable
4.	Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments	Control of water pollution is achieved through administering conditions imposed in consent issued under provision of the Water (Prevention and Control of Pollution) Act of 1974. These conditions regulate the quality and quantity of effluent, the location of discharge and the frequency of monitoring of effluents. Any component of the Project having the potential to generate sewage or trade effluent will come under the purview of this Act, its rules and amendments. Such projects must obtain Consent to Establish (CTE) under Section 25 of the Act from Gujarat Pollution Control Board (GPCB) before starting implementation and Consent to Operate (CTO) before commissioning. The Water Act also requires the occupier of such subprojects to take measures for abating the possible pollution of receiving water bodies.	The transmission line project does not require any permission under the Water Act 1974. However, the Contractor has to obtain a Consent to Operate (CTO) under the said Act. The Consent has to be regularly renewed during the tenure of the project.	Contractor
5.	Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments.	The subprojects having potential to emit air pollutants into the atmosphere must obtain CTE under Section 21 of the Air (Prevention and Control of Pollution) Act of 1981 from GPCB before starting implementation and CTO before commissioning the project. The occupier of the project/facility has the responsibility to adopt necessary air pollution control measures for abating air pollution.	For the subproject, the CTE and CTO from GPCB is required for (i) diesel generators; and (ii) cement concrete batching plants, stone crushers, etc. if installed for construction.	Contractor
6.	The Motor Vehicles Act, 1988 (59 Of 1988) (14 Oct. 1988)	The equipment and vehicles used in the sub-projects will emit air pollutants. Enforcement of air pollution norms and other	Rule no 115. Emission of smoke, vapor, etc. from motor vehicles and Rule 115 (A) sub-rule (8) also provides	Contractor

[3]**Category A** projects require EC from the central Ministry of Environment, Forests and Climate Change (MoEF&CC). The proponent is required to provide preliminary details of the project in the prescribed manner with all requisite details, after which an Expert Appraisal Committee (EAC) of the MoEF&CC prepares comprehensive Terms of Reference (ToR) for the EIA study. On completion of the study and review of the report by the EAC, MoEF&CC considers the recommendation of the EAC and provides the EC if appropriate.

[4]**Category B** projects require environmental clearance from the State Environment Impact Assessment Authority (SEIAA). The State level EAC categorizes the project as either B1 (requiring EIA study) or B2 (no EIA study) and prepares ToR for B1 projects within 60 days. On completion of the study and review of the report by the EAC, the SEIAA issues the EC based on the EAC recommendation. The Notification also provides that any project or activity classified as category B will be treated as category A if it is located in whole or in part within 10 km from the boundary of protected areas, notified areas or inter-state or international boundaries.

Sl. No.	Acts/Rule/Policy	Description	Applicability & Action Required	Responsibility
		applicable rules as per the motor vehicle act	standards for construction equipment	
7.	Noise Pollution (Regulation and Control) Rules, 2002 amended up to 2010.	This provides for standards for noise for day and night for various land uses and specifies special standards in and around sensitive receptors of noise such as schools and hospitals. Contractors will need to ensure compliance to the applicable standards and install and operate all required noise control devices as may be required for all plants and work processes.	The project during the construction and operation has to adhere to the noise limits for various land use	Contractor during the Construction and Operation and maintenance
8.	National Institute of Occupational Safety and Health (NIOSH) Publication No. 98-126	NIOSH has laid down criteria for a recommended standard: occupational noise exposure. The standard is a combination of noise exposure levels and duration that no worker exposure shall equal or exceed.	Internationally recognized environmental standards have to be adhered to during the construction and operation of the railway electrification Project	LBTL and Contractor
9.	Municipal Solid Wastes Management Rules, 2016	Rules to manage municipal solid waste generated; provides rules for segregation, storage, collection, processing and disposal.	During the construction municipal waste generated has to be managed according to the rules	Construction
10.	E-Waste (Management) Rules, 2016	Bulk consumer of electrical and electronic equipment will ensure that e-waste generated is channelized through collection centre or dealer of authorized producer or dismantler or recycler or through the designated take back service provider of the producer to authorized dismantler or recycler.	The project would qualify as a bulk consumer and that the e-waste generated from the project has to comply with the provisions of the rules and disposed through the prescribed channels only	LBTL
11	Construction and Demolition Waste Management Rules, 2016	Rules to manage construction and to waste resulting from construction, remodelling, repair and demolition of any civil structure. Rules define C and D waste as waste comprising of building materials, debris resulting from construction, re-modelling, repair and demolition of any civil structure.	All debris generated during the construction would be handled in accordance to the provisions of the Construction and Demolition Waste Management Rules, 2016	Contractor
12.	Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016	According to the Rules, hazardous wastes are wastes having constituents specified in Schedule II of the Rules if their concentration is equal to or more than the limit indicated in the said schedule.	The hazardous waste generated from the construction e.g. waste oils, lubricants, and rags would have to comply with the provisions of the rules with regards to storage and disposal. The rules also make it mandatory for maintaining records and reporting the same to the GPCB.	Contractor
13.	Battery (Management & Handling) Rules 2001	It is the responsibility of the bulk consumer to ensure that the used batteries are deposited with the dealer, manufacturer, or registered recycler for handling and disposal. A half-yearly return (Form-1) is to be filed as per the rule to GSPCB.	The batteries need to be disposed off as per the provision of the notification	LBTL
14.	Ozone Depleting Substances (Regulation and Control) Rules, 2000	The project would reduce the use of ozone depleting substances	LBTL shall follow the provisions of the notification and shall phase out all	LBTL

Sl. No.	Acts/Rule/Policy	Description	Applicability & Action Required	Responsibility
			equipment, which uses these substances. In case of substation no equipment would be procured which contain CFC's.	
15	Forest (Conservation) Act, 1980 and Forest Conservation Rules, 2003 as amended	As per Rule 6, every user agency, who wants to use any forest land for non-forest purposes, shall seek approval of the Central Government.	Stage 1 forest approval has been granted by RMoEF for the project the working permission / tree felling shall be granted by state forest department on receipt stage I conditions compliance by LBTL the same are under progress Stage-II under process	LBTL
16.	Saurashtra Felling of Trees (Infliction of Punishment) Act, 1951. and rules thereunder	Permission is required for felling of Teak, Black wood, Sandal wood, Khair, Mahuda, Timru, Simla, Sadad, Kanaj, Kanaji, Seven, Bio, Rohan, Ebony, Kadao, Kalam, Baldervo, Harde, Dhavada, Mango, Palmyra palm, Date tree and Jamun. The State has relaxed felling of some species Neem, Kasia, Kanji, Khijdo, Mango and Amla under the Act.	In case of felling of the tree species mentioned above permission for felling has to be obtained.	Contractor
17.	The Ancient Monument and Archaeological Sites and Remains (Amendment and Validation) Act 2010	The Rules designate areas within a radius of 100 m and 200 m from the "protected property/ monument/ area" as "prohibited area" and "regulated area" respectively.	The Ancient Monument and Archaeological Sites and Remains (Amendment and Validation) Act 2010	Contractor
18.	Draft ESZ Notification-Kutch Desert Wildlife sanctuary	The ESZ area for Kutch Desert Wildlife Sanctuary not notified till date. However, as a general principle the width of the ESZ could be go up to 10km around a protected area as provide in the Wildlife Conservation Strategy-2002.	LBTL need to be obtain NOC form Forest department if ROW of the line pass through the ESZ area.	LBTL
19.	The National Green Tribunal (NGT) Act, 2010	NGT provides an effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith. NGT has jurisdiction over matters related to Water Act, 1974; Water Cess Act, 1977; Forest (Conservation) Act, 1980; Air Act, 1981; Environment (Protection) Act, 1986; Public Liability Insurance Act, 1991; and Biodiversity Act, 2002. Consequently, no other court will have jurisdiction over the matters related to environment falling under the above referred Acts. Being a dedicated tribunal for environmental matters with the necessary expertise to handle environmental disputes.	Stakeholders / affected persons may approach NGT to resolve project induced environmental issues	LBTL
Electricity Related Rules and Regulations				

Sl. No.	Acts/Rule/Policy	Description	Applicability & Action Required	Responsibility
20.	Electricity Act 2003	Under the provisions of Section 68(1): -prior approval of the Govt. of Gujarat (GoG) is a mandatory requirement to undertake any new transmission project to plan and coordinate activities to commission a new Transmission project.	The permission under Section 68(1) has already been obtained	LBTL
21.		Under Section 164: - (Government of Gujarat) GoG, may by order in writing, authorize LBTL for the placing of electric line for the transmission of electricity confer upon licensee (i.e. LBTL) in the business of supplying electricity under this act subject to such conditions and restrictions, if any, as GoG may think fit to impose and to the provisions of the Indian Telegraph Act, 1885, any of the power which the Telegraph authority possesses.		LBTL
Labour Related regulations				
22.	The Child Labour (Prohibition and Regulation) Amendment Act, 2016 The Child Labour (Prohibition and Regulation) Act, 1986	No child below 14 years of age will be employed or permitted to work in any of the occupations set forth in the Act's Part A of the Schedule or in any workshop wherein any of the processes set forth in Part B of the Schedule. Child can help his family or family enterprise, which is other than any hazardous occupations or processes set forth in the Schedule, after his school hours or during vacations	No children between the age of 14 to 18 years will be engaged in hazardous working conditions.	LBTL and Contractor
23.	Contract Labour (Regulation and Abolition) Act, 1970	The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided by the Principal Employer by Law. The principal employer is required to take Certificate of Registration and the Contractor is required to take a License from the designated Officer. The Act is applicable to the establishments or Contractor of principal employer if they employ 20 or more contract labour.	Applicable to all construction works under Railway Electrification	LBTL and Contractor
24.	The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996.	All the establishments who carry on any building or other construction work and employ 10 or more workers are covered under this Act. All such establishments are required to pay Cess at rate not exceeding 2% of the cost of construction as may be notified by the Government. The employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for workers near the workplace etc. The employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government	Applicable to any building or other construction work employing 10 or more workers. provide safety measures at the construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for workers near the workplace etc.,	LBTL and Contractor

Sl. No.	Acts/Rule/Policy	Description	Applicability & Action Required	Responsibility
		- Cess should be paid at a notified rate. -The employer must obtain a registration certificate from the Registering Officer		
25.	The Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979	The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The inter-state migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home up to the establishment and back, etc.,	Contractor shall register with Labour Department if Inter-state migrant workmen are engaged Adequate and appropriate amenities and facilities to be provided to workers - housing, medical aid, traveling expenses	LBTL and Contractor
26.	Minimum Wages Act, 1948.	The employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Railway, and Runways are scheduled employment.	All construction workers should be paid not less than the prescribed minimum wage.	LBTL and Contractor
27.	Workmen Compensation Act, 1923.	The Act provides for compensation in case of injury by accident arising out of and during employment.	Compensation for workers in case of injury by accident.	LBTL and Contractor
28.	Equal Remuneration Act, 1979.	The Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees in the matters of transfers, training and promotions etc.	Equal wages for work of equal nature to male and female workers.	LBTL and Contractor
29.	The Public Liability Insurance Act, 1991 and	These provide for public liability insurance for providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as hazardous substance under the Environment (Protection) Act 1986, and exceeding such quantity as may be specified by notification by the Central Government	The Contractor needs to obtain an insurance under this act to compensate any liability arising out of environmental degradation caused wilfully or unwilfully by him.	LBTL and Contractor

3.2 Clearance and Permission Required

Clearances / permissions to be obtained prior to start of construction are presented in. This list indicative and the LBTL/ Contractor should ascertain the requirements of any additional permission required and obtain the same prior to start of the construction.

Table 3-2 :Permission and Clearance required in the Project

Sl.No	Construction Activity	Regulatory Agency	Implementation	Supervision
1.	Railway crossing permission	Indian Railway	March 2021	
2.	NH crossing	NHAI	March 2021	
3.	Power Line (PTCC)	CEA (Central Electricity Authority)	Obtained 29 out of 33. Balance by Mar'21	
4.	Permission for Activities in ESZ	Wildlife Division, Forest Department, Government of Gujarat	PIU	PMU
5.	Tree Cutting/pruning –of Trees (if required[5])	State Forest Department	PIU	PIU and PMU
6.	Establishment of batching plant	Consent to establish and consent to operate under Air Act, 1981 from GPCB	Contractor	PIU
7.	Procurement of construction material (sand, aggregate)	Permission from District Collector/ State Department of Mining, under Gujarat Minor Minerals Concession Rules 2017	Contractor	PIU
8.	Temporary traffic diversion measures	District traffic police	Contractor	PIU

* All the approvals & clearances shall be taken within project schedule.
* The approval shall be obtained before SCOD (Schedule commercial operation date)

3.3 Codes and Guidance

The transmission line for the codes which would be relevant from an environmental and social perspective include:

- IS 5613. Code of Practice for Design, Installation and Maintenance of Overhead power Lines
- IS-875. Code of Practice for Design of Loads (other than Earthquake) for Buildings and Structure

3.4 IFC Policy

The EPs, based on the IFC Performance Standards on social and environmental sustainability and on the World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines), are intended to serve as a common baseline and framework for the implementation by Lending Agency/IFC. The applicability of EP to the project has been outlined in **Table 3.3**.

Table 3-3: Application of Equator Principles

Equator Principles	Requirements	Project Information/ Application
Principle 1 : Review and Categorization	As the project is seeking financing from Lending Agency/IFC, the project has to be categorized based on the magnitude of its potential impacts and risks in accordance with the environmental and social screening criteria of IFC.	Proposed transmission project is identified as a Category "B" project. The rationale is presented in Section 3.6 of this report
Principle 2: Social and Environmental Assessment	For each project assessed as being either Category A or Category B, the Lending Agency/IFC will require the borrower need to conduct an Environmental and Social Assessment process to address, to the Lending Agency/IFC's satisfaction, the relevant environmental and social risks and impacts of the proposed Project. The assessment should also propose measures to minimize, mitigate, and offset adverse impacts in a manner relevant and appropriate to the nature and scale of the proposed Project.	The social and environmental assessment has been carried out including a risk assessment.

[5] *As described above, there may be requirement for felling of certain trees, However, the requirement will be established ones the final designs are prepared during the construction.*

Equator Principles	Requirements	Project Information/ Application
Principle 3: Applicable Social and Environmental Standards	The principle requires the Environment and Social Assessment to refer to the applicable IFC performance standards and then applicable industry specific EHS guideline including the project's overall compliance with or justified deviation from, the respective Performance Standards and EHS Guidelines. The assessment process also needs to address compliance with relevant host country laws, regulation and permits that pertain to social and environmental matters.	The compliance to IFC standards are reported in chapter-8. The industry specific EHS guidelines also mention, and relevant host country laws, regulation and permits are mentioned in this chapter.
Principle 4: Action Plan and Management System	For all Category A and B projects, an Action Plan (AP) need to be prepared which addresses relevant findings and draws on the conclusions of the Assessment. The AP will describe and prioritize actions needed to implement mitigation measures, corrective actions and monitoring measures necessary to manage the impacts and risks identified in the Assessment. In this regard, the borrower /proponent needs to maintain or establish a Social and Environmental Management System that addresses the management of these impacts, risks and corrective actions required to comply with applicable host country social and environmental laws and regulations, and requirements of the applicable Performance Standards and EHS Guidelines, as defined in the AP.	In accordance with the provision of this Principle, an Environmental and Social Management Plan has been drawn up as part of the ESIA study for the proposed project specifying appropriate plans and procedures which requires to be implemented during various phases in order to prevent, control and mitigate any potential environmental and social risks. For further details please refer to Chapter 6 of this document.
Principle 5: Consultation and Disclosure	According to this Principle, for all Category A and (as appropriate), Category B projects, the Government, borrower or third party expert to consult with project affected communities in a structured and culturally appropriate manner. For projects with significant adverse impacts on affected communities, the process will ensure their free, prior and informed consultation and facilitate their informed participation as a means to judge, vide IFC norms, whether a project has adequately addressed the concerns of the affected communities.	Given the proposed project is rated as "Category B", with no potential adverse impacts on communities. However, in congruence with the requirement of this Principle, the proponent, have undertaken social consultation with the affected persons and nearby village's representatives to establish the socio-economic condition of the area, at the same time trying to understand any community concern that might be associated with the proposed project, particularly related to loss of land, livelihood, resource requirement etc during the ESIA Preparation.
Principle 6: Grievance Mechanism	For all Category A and (as appropriate), Category B projects, it needs to be ensured by the proponent that consultation, disclosure and community engagement continues throughout construction and operation of the project and community concerns/grievances addressed through establishing a 'Grievance Redressal Mechanism'. In this regard, the proponent of the proposed solar PV project need to develop and implement a 'Grievance Redressal Mechanism (GRM)' to receive and facilitate resolution of any concern and grievance that may be raised by land loser groups and/or nearby village communities during both construction and operational phase of the project. As part of this Principle, it is also imperative that the proponent maintains regular dialogue with communities through implementation of focused CSR programmes/ initiatives.	The EHS team of LBTL will take care of grievances raised verbally or in written manner. The details are given in chapter-8.
Principle 7: Independent Review	For all Category A projects and, as appropriate for Category B projects, an independent social or environmental expert not directly associated with the proponent will review the assessment, action plan and consultation process documentation in order to assist Lending Agency/IFC 's due diligence, and assess Equator Principle Compliance.	As part of the loan approval for the project LBTL will appoint an independent social or environmental expert/organization for review of ESIA/ESMP report and its implementation.
Principle 8: Covenants	For Category A and B projects, the proponent will covenants in financing documentation: a) to comply with all relevant host country social and environmental laws, regulations and permits in all material respects; b) to comply with the action plans (where applicable) during the construction and operation of the project in all material respects; c) to provide periodic reports in a format agreed with	E&S Covenants shall be embedded within the contracts drawn between LBTL and the contractors hired for construction activities and technology providers and waste handlers. Periodic reporting to the project developers will have to be carried out by the contractors.

Equator Principles	Requirements	Project Information/ Application
	Lending Agency/IFC (with the frequency of these reports proportionate to the severity of impacts, or as required by law, but not less than annually), prepared by in-house staff or third party experts, that) document compliance with the action plans (where applicable), and ii) provide representation of compliance with relevant local, State and host country social and environmental laws, regulations and permits (where applicable) d) to decommission the facilities, where applicable and appropriate, in accordance with an agreed decommissioning plan.	
Principle 9: Independent Monitoring and Reporting	To ensure ongoing monitoring and reporting over the life of loan, Lending Agency/IFC will, for all Category A projects and, as appropriate for Category B projects, require appointment of an independent environmental and/or social expert, or require that the proponent retain qualified and experienced external experts to verify its monitoring information which would be shared with Lending Agency/IFC	The project will fall under category B and the periodic reporting mechanism will be done as agreed between Lending Agency/IFC and LBTL/LBTL.

Equator Principal IV

The Equator Principle IV has emphasized on addressing potential and adverse impacts for Human Rights and requires the Project complies with relevant host country laws, regulations and permits that pertain to environmental and social issues. For addressing compliance (in addition to national social applicable laws) the project has in place existing mechanism for policies adaptation for workers and affected communities. Table 3-4 provides an overview of the policies adaptation by the project.

Table 3-4: Labour and Human Rights Policies Requirements

Requirements	Aspects of Human Rights Issue	Adani Compliance to Requirements
EP IV requires to conduct risks and impacts on workers which includes employees and contractors. As per UNGP the project should consider avoid causing or contributing to adverse human rights impacts through their own activities, and address such impacts when they occur; (b) Seek to prevent or mitigate adverse human rights impacts that are directly linked to their operations, products or services by their business.	Child Labour: As per ILO standards prohibit engagement of children under 18 years in hazardous work. Moreover, it also prohibits engagement of Children for those under 15, with limited exceptions for developing countries.	The Business Responsibility Policies has strictly prohibited engagement of Child Labour in the operation. Principle 3 of the BRP prohibit use of child labour, forced labour or any form of involuntary labour, paid or unpaid in the business activities for Adani Transmission. The company existing human right principle is committed to upholding of fundamental human rights and compliance with applicable laws including internationally recognized human rights, as set out in the International Bill of Human Rights and the International Labour Organization's declaration on Fundamental Principles and Rights at Work. This policy applies to all direct employees, consultants (including fixed term appointees), associates, trainees, suppliers, vendors, etc. For ensuring contractors/vendors compliance to Human rights violations, General conditions of Contract is in place whereby contractors shall bound to comply to the labour and human rights requirements. The GCC forms parts of the contractor identification, screening and onboarding process.
	Collective Bargaining and Freedom of Association	As per Principle 2 and 3 of Adani's Business Responsibility Policies (BRP)is committed and respects the employees' right to freedom of association, participation and collective bargaining. Employees at all levels shall have freedom of association and be free to participate in collective bargaining. The company's Business Responsibility Policies is also committed to provision non-discrimination and equal opportunity to all employees irrespective of their caste, creed, gender, race, religion, and language. The discrimination policy is applicable for Employees, agency
	Non-Discrimination and Forced Labour	

		staff, vendors, customers and suppliers (*Principle 4 of Business Responsibility Policies)*.
	Working Conditions and Occupational Health and Safety	Section 25.1 of the GCC mandates Contractor and Sub-Contractors to abide by all applicable laws including environmental laws and laws pertaining to health and safety. The Contractor shall take all necessary care that the Services are performed with the minimum possible impact on the environment and local community in respect of land and occupants affected by or adjacent to the Site. Section 25.2 The Contractor shall comply with the specific rules and regulations (including safety regulations) and the same shall abide for Sub-Contractors, labor's and personnel to comply with the said rules and regulations. Such rules and regulations shall include rules in respect of security, safety of the Services and people at the Site, gate control, sanitation, medical care and fire prevention. The Contractor shall also strictly comply with standard safety norms, rules and regulations prevalent in the industry while performing its obligations. At the company level, committed to provide workplace environment that is safe, hygienic and which upholds the dignity of the employee. Moreover, schemes and policies to address health, superannuation issues and welfare needs of employees and their families will be put in place to promote well-being of employees.
	Wages	As per clause 14.3 9c) of the general conditions of Contracts requires the Contractor to be liable and responsible for all payments to its personnel, including salaries, wages, Taxes, allowances and other benefits in accordance with the laws. This covers compliance to national labour requirements in terms of basic minimum wages, equal remuneration, provident fund etc.
	Women Rights	The company besides the discrimination policy has put in place stringent policies (POSH) to ensure that the employees especially female employees do not suffer harassment and create the environment where they feel safe and secure in discharging their responsibilities. This policy is applicable for employees, contractor workers etc.
	Social Security	Section 20 subsection 20.1 of the GCC mandates that Contractor shall, at its own cost, arrange, secure and maintain, all insurance policies workmen's compensation, employees' state insurance, public liability insurance and insurance for all its employees. For the employees, principle 3- of the BRP policies- to promote wellbeing of all employees requires that schemes and policies to address health, superannuation issues and welfare needs of employees and their families will be provided to all employees. Besides insurance, adequate training will be provided to employees to meet the challenges of a dynamic business environment and will also provide adequate grievance handling mechanisms.
EP IV requires to conduct actual or potential adverse impacts to the communities.	Potential Human right/risks issues such as right to health, right to participate in the cultural life of the community, right to natural resources.	The project has in place policies for ensuring balance between economic social and environmental performance. As per the BRP, the company is committed to respect the rights of people in communities impacted by the business operations. Any potential adverse human rights will be

		identified and take appropriate steps to avoid, minimize and/or mitigate them. The company will also undertake several initiatives to engage with and ensure sustainable development of the marginalized groups in the local communities around its sites of operations. Principle 6 of BRP of the Company is committed to addressing the global environmental issues such as climate change and global warming through energy conservation, efficient natural resource utilization and adoption of cleaner energy. The company has put in place a CSR plan for the affected communities for ensuring inclusive growth and equitable development by establishing competitive and sustainable value chains capable of generating sustainable livelihoods, especially among the poor in rural India. The inclusive development includes education, health care, natural resources management and rural infrastructure
Consultation must be undertaken with indigenous peoples potentially impacted by projects affecting lands or resources subject to traditional or customary use, requiring relocation or resettlement, or impacting cultural heritage. This includes evaluating whether the free, prior and informed consent (FPIC) of indigenous peoples has been obtained for projects with specific impacts on indigenous peoples.	Indigenous Peoples are afforded unique group rights under international law that permits them to give or withhold their consent to projects that may impact them under certain scenarios	The project does not fall under the schedule and transmission line does not involve any SC/ST land and no displacement of people (including indigenous people). The land has been leased from willing owners; hence this requirement is not applicable.
EP IV requires, to establish effective grievance mechanisms which are designed for use by Affected Communities and Workers, as appropriate, to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance.	All people have the right to remedy when their rights have been violated and identify that they have caused or contributed to adverse Human Rights impacts.	The company has in place the website which acts as a special window called 'Help-desk' which may be accessed by stakeholders of the Company for redressal of their grievances. For LBTL project specific Grievance Redress Mechanism has been developed for the projects for stakeholders - workers and communities.

3.5 IFC PERFORMANCE STANDARDS

IFC Performance Standards (revised applicable from January 2012) define clients' roles and responsibilities for managing their projects and the requirements for receiving and retaining financing from EPFI's. The applicability of IFC Performance Standards to the project is outlined in.

Table 3-4: Application of IFC Performance Standards to the Project

IFC Performance Standards	Requirements	Project Information/ Application
Performance Standard 1: Social & Environmental Assessment and Management System	The project should have a social and environmental management system that incorporates the following: (i) policy; (ii) identification of risks and impacts; (iii) management programs; (iv) organizational capacity and competency; (v) emergency preparedness and response; (vi) stakeholder engagement; and (vii) monitoring and review.	This Performance Standard is applicable to the Project. Corporate ESMS encompassing implementation for all transmission line projects has been developed and same has been applied for LBTL project.
Performance Standard 2: Labor and Working conditions	LBTL/ requires to follow requirements on (i) working conditions and management of worker relationship (human resource Conditions policy, working conditions, terms of employment, workers organizations, non-	This Performance Standard is applicable to the Project and addressed in Table 3-1as well as the

	discrimination equal opportunity, retrenchment, grievance mechanism); (ii) protecting work force (not engaging child labour and forced labour); (iii) occupational health and safety; (iv) workers engaged by third parties; and (v) adverse impacts related to supply chain.	Environment Management Plan in Chapter 6.
Performance Standard 3: Pollution Prevention and Abatement	LBTL requires to consider (i) sustainable resource utilization (water consumption); (ii) pollution prevention (wastes, hazardous materials management, pesticide use and management)	This Performance Standard is applicable to the Project and the relevant activities are presented in Environment Management Plan Chapter 6
Performance Standard 4: Community Health, Safety and Security	LBTL requires to follow requirements on i) infrastructure and equipment design and safety; (ii) hazardous materials management and safety; (iii) ecosystem services; (iv) community exposure to disease; (v) emergency preparedness and response; and (vi) security personnel.	This Performance Standard is applicable to the Project and is addressed in the management plan. Details are given in Chapter 6.
Performance Standard 5: Land Acquisition and Involuntary Resettlement	Specifies requirements on (i) project design to avoid or minimize physical and/or economic displacement; (ii) compensation and benefits for displaced persons; (iii) community engagement; (iv) grievance mechanism; (v) resettlement and livelihood restoration planning and implementation; (vi) physical and economic displacement; (vii) private sector responsibilities under government-managed resettlement	The project involves right of use of land for transmission line ,but for the substation land would be procured from the landowners. Thus this policy would be triggered.
Performance Standard 6: Biodiversity Conservation and Sustainable Natural Resource Management	Specifies requirements on (i) protection and conservation of biodiversity (modified, natural, critical habitat, legally protected and internationally recognized areas, invasive alien species); (ii) management of ecosystem services; (iii) sustainable management of natural resources; and (iv) supply chain	The site is located in close proximity of the Desert Wildlife Sanctuary. Thus there are chances of impact on bio-diversity . Thus this would be triggered.
Performance Standard 7: Indigenous Peoples	Specifies requirements on (i) avoidance of adverse impacts; (ii) participation and consent; (iii) circumstances requiring free, prior, and informed consent; (iv) mitigation and development benefits; and (v) private sector responsibilities where government is responsible for managing indigenous peoples issues	The transmission line does not involve any SC/ST land and no displacement of people (including indigenous people). The land has been leased from willing owners; hence this performance standard is also met.
Performance Standard 8: Cultural Heritage	Specifies requirements on (i) protection of cultural heritage in project design and execution (chance find procedures, consultation, community access, removal of replicable cultural heritage, removal of non-replicable cultural heritage, critical cultural heritage); and (ii) project's use of cultural heritage	As such the project does not impact any cultural property or structure of archaeological importance.

3.6 Project Classification

An initial reconnaissance of the LBTL alignment indicates that the transmission lines does not pass through the or interfere with any natural habitat or sensitive environmental areas. Further the impacts are mostly during the construction activities and are predictable, localised and not of any unprecedented nature and thus mitigation measures can be clearly defined. The LBTL has been categorised as "**Category B" project**.

4. Description of Environment

The transmission line is through three districts of state in Gujarat i.e. Kachchh, Patan and Banaskatha. In this section of the report, the present climatological, environmental and social conditions of the area have been described. The baseline data generation was supplemented with field observations, surveys ad interactions with the community and project personnel. The details of the baseline conditions along the transmission line corridor falling in the three districts in Gujarat is presented in the following sections.

4.1 Study Area

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

Considering the project activity described in Chapter 2 it is anticipated that scale and magnitude of project related impacts are likely to be perceived in an area within 500 m both side of the alignment and has been considered to be the study area for the ESIA. Site surveys were conducted in the study area understand the environmental setting of the alignments and the study area, presence of physiographic features, location of the habitations with respect to the alignment etc. Ecological surveys and community consultations were also conducted to collect the information related to the local community and biological environmental conditions of the study area

4.2 Physical Environment

A brief description of the existing physical environment within the project site is detailed in the sections below. The physical features map of the study area is showcased in Figure 4.1The map displays the following features that are located within 5 m radius from the Project site:

- Villages and settlements within 2 km radius;
- Road network around the site, comprising of village roads and National Highway and railways
- Other features such as schools, shops, temples, and water ponds.

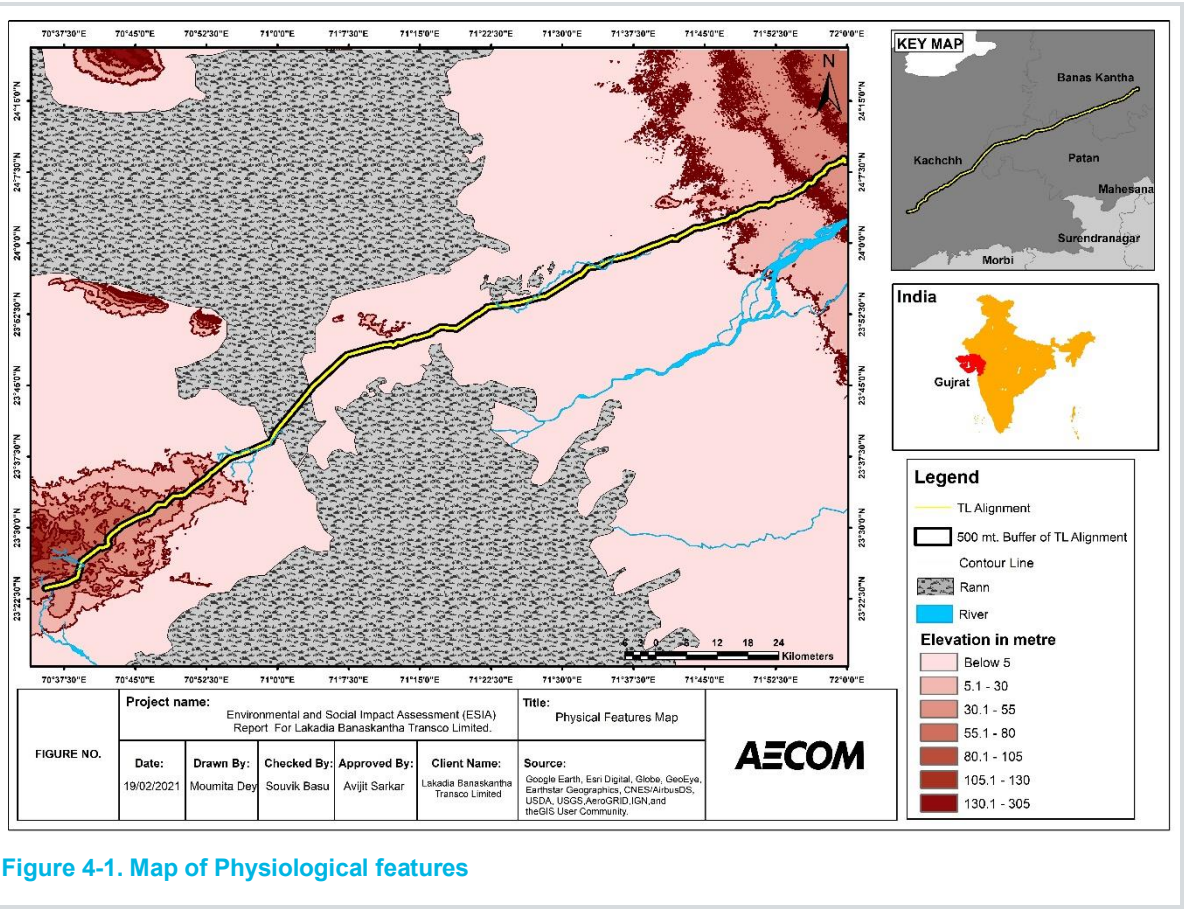


Figure 4-1. Map of Physiological features

4.3 Topography

Topography of Gujarat shows a wide range of physical features ranging from physiology, drainage, soil to coastal and marine environment, etc. In terms of topography, Gujarat shows a wide variation.

Gujarat is is located between 20°01' to 24°07' north latitudes and 68°04' to 74°04' east longitude and covers an area of 195,984 square kilometres. Thus, spread over a vast area, the topography of Gujarat is divided into 3 major regions, namely:

- The Peninsular - the region, which is also known as Saurashtra, is essentially a hilly tract.
- The Kachchh - It is a barren and rocky area containing the great Rann. The Rann is further divided into the Greater Rann and the Lesser Rann.
- The mainland that extends from the Rann of Kachchh and the Aravalli hills to the river Damanganga.

The general slope of the terrain is toward the north (from the hills towards Bhuj) whereas underground “waterproof layer” slopes the other way around.6

The project lies in the North Gujarat region. The alignment traverses through the districts of Mehsana, Patan and Banaskhanta.

Bhuj is located on a “porous” sandstone which acts like a “sponge”. The surface rain waters flow towards Hamirsar and the other city lakes. It can then penetrate the ground and get “stored” in this enormous natural underground “tank”. The underground water could then be tapped through one of the 60 wells in the city. The shale layer, below the sandstone, is water proof and makes sure that the water doesn't flow out of Bhuj Area underground.

All the “feeder dams”, in the upper part of the catchment, are directly in contact with the shale layer. The water doesn't go underground and is therefore a great surface water storage which can be used to “refill” Bhuj lakes when required.

[6] http://bhujbolechhe.org/en/infos/2-geology-and-topography-and-around-bhuj#:~:text=The%20general%20slope%20of%20the,slopes%20the%20other%20way%20around.&text=Bhuj%20is%20located%20on%20a,and%20the%20other%20city%20lakes.

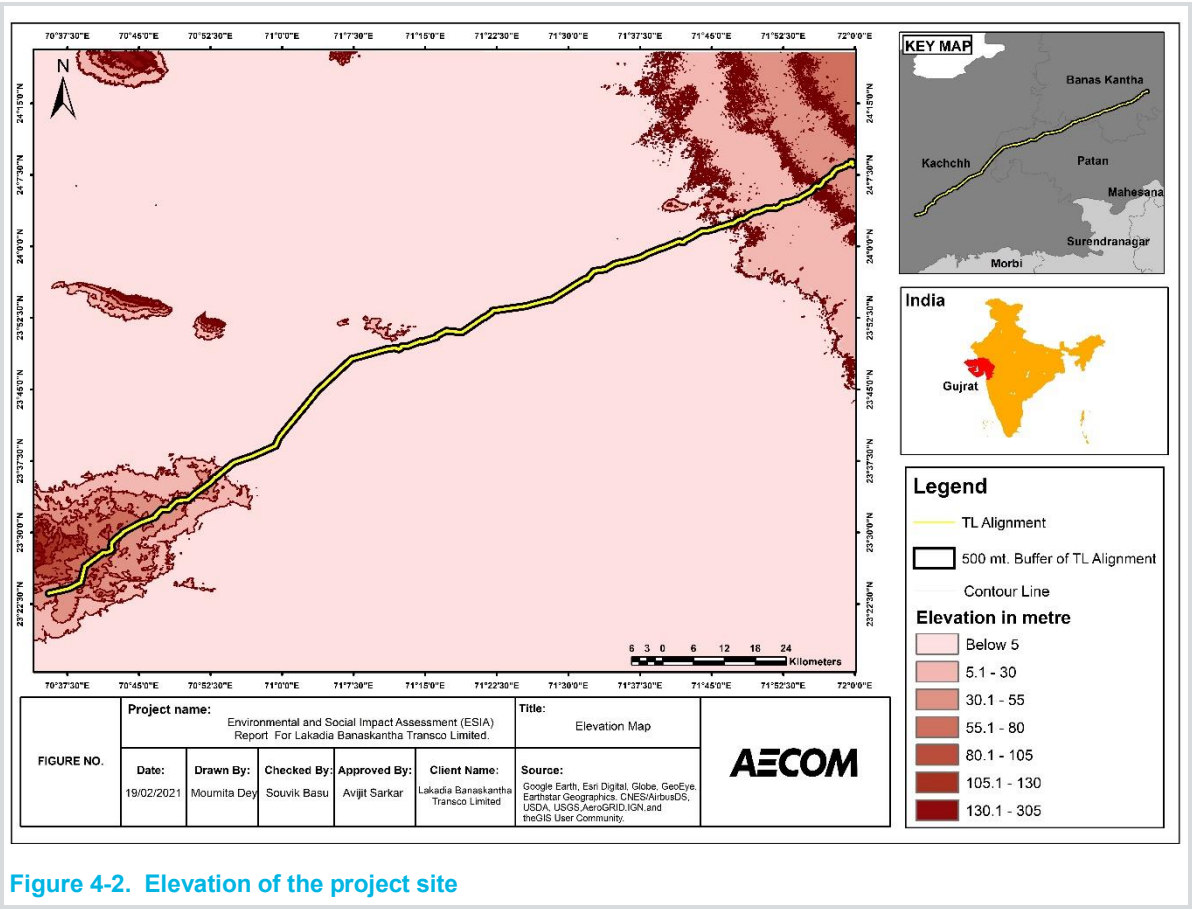


Figure 4-2. Elevation of the project site

4.3.1 Physiography

Kachchh District

Kachchh (Kutch) is a district of Gujarat state in western India covering an area of 45,612 km² surrounded by the Gulf of Kachchh and the Arabian Sea in south and west, and by the Great and Small Rann in the northern and eastern parts. This region can be divided into four physiographic units namely, Rann (salt marsh), Banni Plains (grass land), Hilly tracts or highlands and Coastal plains or low lands. The Rann is dissected by a few sandy and rocky mounds giving appearance of islands. The hilly tract comprises the island belt (Pachham, Khadir, Bela and Chorar) in the north, Wagad region in the northeast and the Kachchh Main Land in the central part. Landscape of Kachchh region is mostly structurally controlled. Katrol hill range, in the mainland, is the highest area forming E-W water divide for north and south flowing rivers. Rivers in the area are short and ephemeral. Catchment area of the rivers is small. These rivers are flowing radially following hump shaped topography of the region. Consistent flow of water is rarely observed in the rivers even during the monsoon period reflecting the present hyper-arid climate necessitating construction of many small and minor dams for the water storage.

Patan District

This region can be divided into four physiographic units namely, Alluvial plain & Rann

Banaskantha District

The district can be divided in three main parts – the hilly- mountainous region having high relief and rugged topography covering parts of Dhanera, Palanpur, Vadgaon and entire Danta taluka in the east, the piedmont zone all along the periphery of hilly area, and west and southwest of River Banas the area is flat plain with occasional undulations given rise to by sand dunes and mounds in the west. The western extension of this plain merges into the marshy area of Rann of Kachchh. It is mostly sandy plain with an altitude of 100 m above mean sea level. There are a few small channels, which merge into little Rann of Katchchh. The region mainly extends over the north and north western parts of the district bounded by the state of Rajasthan in the north, Banvalley in the east and south and Vav sandy plain in west. The region has the sloppy gradient, towards the west in which the river Sukal flows. Geologically area is composed of Alluvium, blown sand etc. c) Banas Vally: This region extends over the central and south-western part of the district, it is mainly formed by the Banas River which flows southwesterly

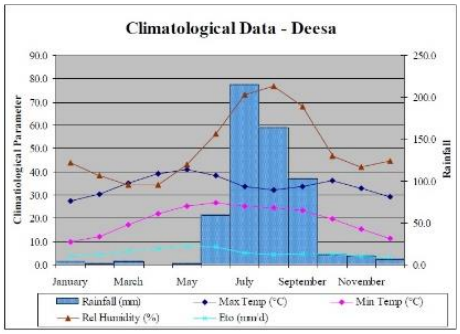
direction and ultimately merges into Rann of Katchchh. Northern part of this region is high in elevation than the south and western portions.

4.4 Regional Profile

4.4.1 Climate

The region has semi-arid climate. Extreme temperatures, erratic rainfall and high evaporation are the characteristic features of this type of climate. The climate of this area is characterized by hot summer and dryness in the non-rainy season. The period from March to May is the hottest and the cold season is from December to February and experiences low temperature

a .Banaskatha



b. Patan

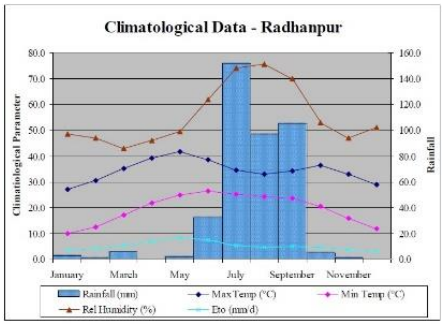


Figure 4-3. Climatological Data for a) Mehsana b) Patan c) Banaskhanta

4.4.1.1 Secondary Data as per IMD, Bhuj

The summer begins in early March and lasts until June. April and May are the hottest months. Monsoon begins in late June. October and November see the retreat of the monsoon and a return of high temperatures until late November. Winter starts in December and ends in late February. The summary of the 30 years' meteorological data of Bhuj (Rudramata) IMD Station from 1970-2000 is shown in Table 4-1.

Table 4-1: Climatology & Meteorology of Bhuj Observatory

S. No.	Parameter	Season	Months	Monthly Total (mm)		Heaviest fall in 24 hours (mm)	No. of Rainy Days
i	**Rainfall in mm**	Winter (Dec to Feb)	Dec	0.2		36.8	0
			Jan	2.0		14.5	0.3
			Feb	0.6		61.5	0.1
			Total	2.8		112.8	0.4
		Summer (March to May)	March	1.2		42.2	0.2
			April	0.2		67.1	0.1
			May	2.6		186.9	0.4
			Total	4.0		296.2	0.7
		Monsoon (June to Sept)	June	34.7		178.5	1.4
			July	104.6		467.9	4.4
			Aug	74.4		241.4	3.5
			Sept	43.5		176.1	2.3
			Total	257.2		1063.9	11.6
		Post-Monsoon (Oct to Dec)	Oct	8.1		118.6	0.7
			Nov	4.3		102.4	0.5
			Dec	0.2		36.8	0
			Total	12.6		257.8	1.2
ii	**Temperature (Mean daily**	Winter (Dec to Feb)	**Months**	**Max.**	**Min.**	**Average**	
			Dec	28.8	9.6	19.2	
			Jan	30.1	8.4	19.3	

S. No.	Parameter	Season	Months	Monthly Total (mm)		Heaviest fall in 24 hours (mm)	No. of Rainy Days
	temperature in ^{0}C)		Feb	35.4	11.4	23.4	
			Average	31.4	9.8	20.6	
		Summer (Mar to May)	March	39.2	17.0	28.1	
			April	39.7	21.9	30.8	
			May	37.9	25.2	31.6	
			Average	38.9	21.4	30.2	
		Monsoon (June to Sept)	June	34.3	27.2	30.8	
			July	33.0	26.4	29.7	
			Aug	34.9	25.3	30.1	
			Sep	36.8	23.9	30.4	
			Average	34.8	25.7	30.3	
		Post-Monsoon (Oct to Dec)	Oct	32.9	20.7	26.8	
			Nov	28.8	14.7	21.8	
			Dec	28.8	9.6	19.2	
			Average	30.2	15.0	22.6	
iii	**Relative Humidity in (RH) %**	Winter (Dec to Feb)	**Month**	**8.30 hrs**		**17.30 hrs**	
			Dec	71		31	
			Jan	74		30	
			Feb	70		26	
			Average	71.7		29	
		Summer (Mar to May)	March	67		26	
			April	66		26	
			May	70		36	
			Average	67.7		29.3	
		Monsoon (June to Sept)	June	70		36	
			July	73		50	
			Aug	80		63	
			Sep	82		64	
			Average	76.3		53.3	
		Post-Monsoon (Oct to Dec)	Oct	71		33	
			Nov	69		30	
			Dec	71		31	
			Average	70.3		31.3	
iv	**Wind pattern**	Winter (Dec to Feb)	**Months**	**Wind speed**		**Wind direction**	
				kmph	**knots**		
			Dec	5.8	3.1	NE, N	
			Jan	6.1	3.3	NE, N	
			Feb	6.9	3.7	N, NE	
			Average	6.3	3.4		
		Summer (Mar to May)	March	8.0	4.3	W, NW	
			April	11.0	5.9	W, SW	
			May	15.6	8.4	W, SW	
			Average	11.5	6.2		
		Monsoon (June to Sept)	June	17.2	9.3	SW, W	
			July	16.7	9.0	SW, W	
			Aug	14.6	7.9	SW, W	
			Sep	10.8	5.8	W, SW	
			Average	14.8	8.0		
		Post-Monsoon	Oct	6.5	3.5	W, N, SW	
			Nov	5.6	3.0	NE, N	
			Dec	5.8	3.1	NE, N	

S. No.	Parameter	Season	Months	Monthly Total (mm)	Heaviest fall in 24 hours (mm)	No. of Rainy Days
		(Oct to Dec)	Average	6.0	3.2	

Source: Climatological Table 1971–2000, Indian Meteorological Department, GoI, New Delhi (Bhuj- Rudramata Station)

4.4.1.2 Temperature

The area has quite high temperatures during summer and moderate cold in winter. The average annual maximum temperature is 34.3oC while the average annual minimum temperature is 19.3°C (Figure 4.3).

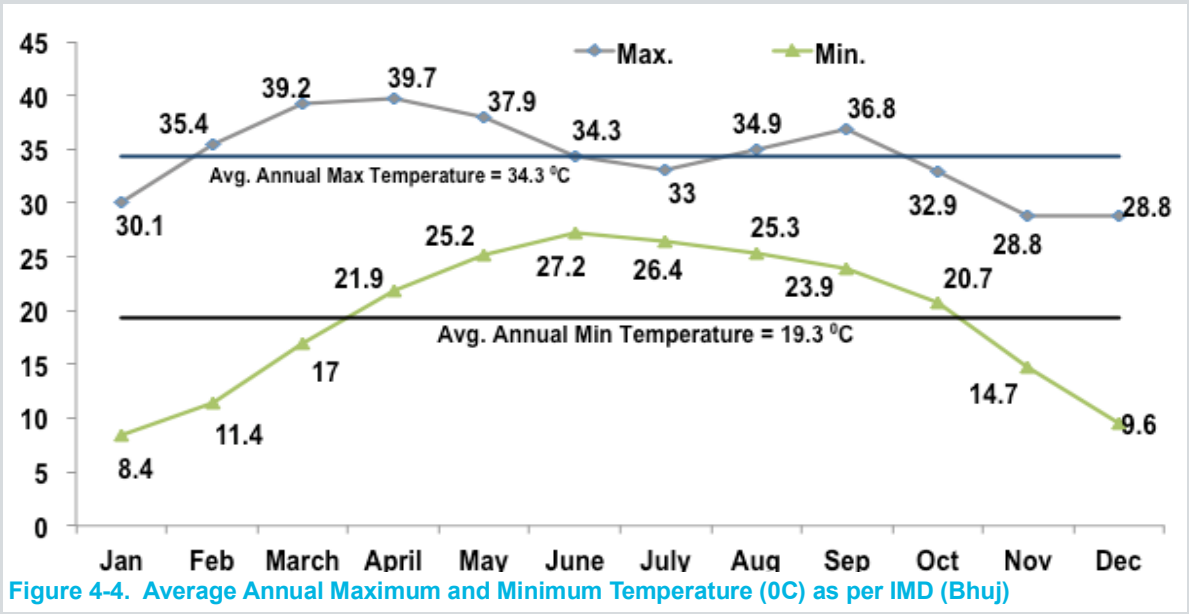


Figure 4-4. Average Annual Maximum and Minimum Temperature (0C) as per IMD (Bhuj)

The analysis of the last 100 years (1891 to 1996) data on annual mean maximum and minimum temperature showed that the mean maximum temperature increased by 0.5°C, while the mean minimum temperature has declined by 0.5°C as is presented in Figure4.4

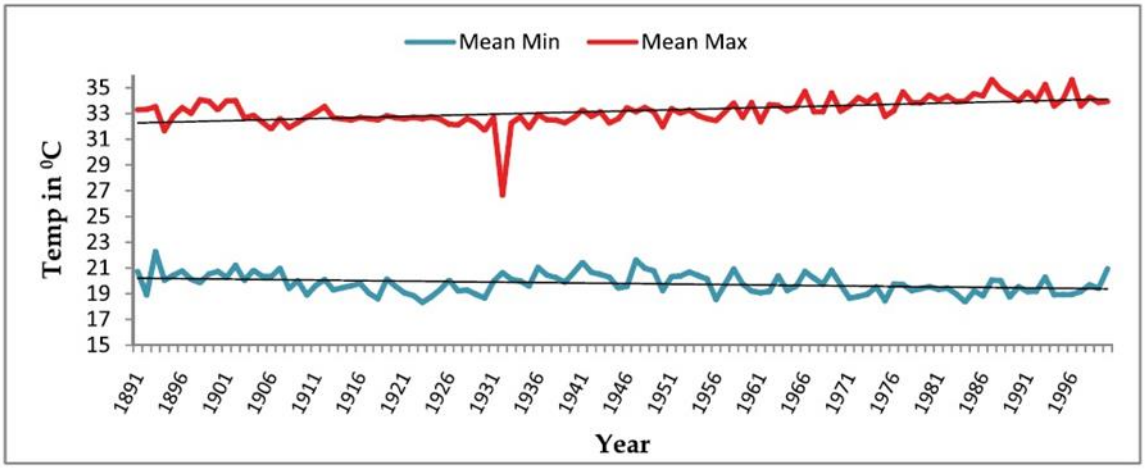


Figure 4-5. Yearly Mean Max & Min temperature trend for Kachchh (1891-2000)

Source: Trends of Changing Climate and Effects on Eco-Environment of Kachchh District, Gujarat: 2011

4.4.1.3 Rainfall

Based on the information from IMD, the total annual rainfall in these three districts namely Bhuj, Patan and Banaskhanta are respectively 540.4 8 mm, 402.7 mm and 578.8 mm, respectively.

4.4.1.4 Relative Humidity:

The region has reasonably dry climate except during monsoon season when moisture levels are high in the surrounding air. The summer season is the driest part of the year when humidity levels go below 30% especially

during March and April. July to September, being the rainiest months, experience humidity level of 73% to 82% respectively in the daytime.

4.4.1.5 Wind

The annual average wind speed recorded at IMD Deesa at 0300 UTC during the period 1971 – 2000 vary from 0.7 – 2.0 m/s. The highest wind speed (2.0 m/s) was recorded in June followed by 1.7 m/s in June. The lowest monthly wind speed (0.7 m/s) was recorded in October and November. Annual wind rose prepared from this data indicates that 15% of the year winds are from northeast followed by winds from southwest 13% of the time . Winds rarely flow from North Northwest (NNW) and East Southeast (ESE) direction. Annual wind rose suggest that the highest wind speeds (7 m/s) are from the Southwest (SW) direction.

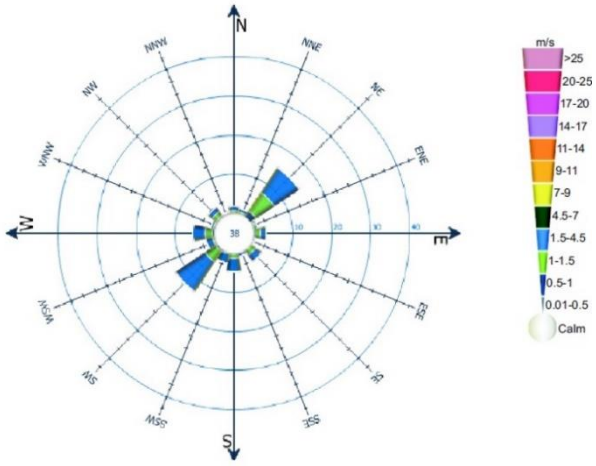


Figure 4-6. **Annual Windrose of Deesa**

4.4.2 Ambient Air Quality

The study area can be characterized as a rural area comprising of habitation, agricultural lands and forests and no industrial setup was found to be present within 500m of the site. Existing sources of generation of particulate matter and gaseous air pollutants is primarily because of the transportation of vehicles through adjoining road. considering this context, the ambient quality is expected to be well within the National Air Quality Standards for all parameters.

A review of the historical data collected through the State and National Air Quality Monitoring Program over the period 2012- 2015 presented in Table 4.2 indicates that particulate levels (PM10 and PM2.5) are higher than the standards especially in the industrial areas of Baruch, Kandla. In residential localities the air quality is well within standards.

Table 4-2: Air Quality of Bhuj (2011-12, 2012-13, 2013-14 & 2014-15)

	NAMP & SAMP Observations combined for 2011-12					NAMP & SAMP Observations combined for 2012-13					NAMP & SAMP Observations combined for 2013-14					NAMP & SAMP Observations combined for 2014 - 15			
Area	**PM10**	**PM2.5**	**SOx**	**NOx**	**CO**	**PM10**	**PM2.5**	**SOx**	**NOx**	**CO**	**PM10**	**PM2.5**	**SOx**	**NOx**	**CO**	**PM10**	**PM 2.5**	**SO2**	**NOx**
Bhuj Mundra																84	30	13.2	20.4

	NAMP & SAMP Observations combined for 2011-12			NAMP & SAMP Observations combined for 2012-13				NAMP & SAMP Observations combined for 2013-14					NAMP & SAMP Observations combined for 2014 - 15			
Lunwa-Bhachau	12.56	28.0	1349	162	12.56	29.68	1360	104.0	29.0	14.0	19.0	3.0	96.0	33.0	14.6	19.8
Gandhidham-Kandala Belt				52.0	9.14	17.4	1190									
IFFCO Township	9.49	18.0	1104					71.0	26.0	11.0	16.0	1.0	81.0	29.0	13.8	19.8

Source: Trends of Changing Climate and Effects on Eco-Environment of Kachchh District, Gujarat: 2011

Air quality assessment was carried out once a year by Gujarat Pollution Control Board during the period 2006-2010. The results of the analysis are presented in Table 4.3 Since the Suspended particulate matter and Respirable Suspended particulates were analysed (Standards for SPM and RSPM, have been discontinued), it was not possible to ascertain the compliance to standards especially w.r.t. dust. However, from the results indicated in Table 9 it can be inferred that dust levels in the air is high. However, the gaseous pollutants are within the National Air Quality Standards.

Table 4-3: Air Quality of Patan district

City	location	Particulate Matte (PM)					Suspended Particulate Matter					Sulphur Oxides					Nitrogen Oxides				
		2006	**2007**	**2008**	**2009`**	**2010**	**2006**	**2007**	**2008**	**2009`**	**2010**	**2006**	**2007**	**2008**	**2009`**	**2010**	**2006**	**2007**	**2008**	**2009`**	**2010**
Patan	Char Rasta	462.0	208.0	426.0	310.0	214.0	271.0	44.0	198.0	108.0	42.0	3.0	15.0	16.0	4.16	8.30	12.0	4.0	19.0	34.86	21.50

4.4.3 Ambient Noise Quality

The study area can be characterized as a rural area, since there are no industrial activities or major settlement along any of the alignments the source of noise is primarily from the transportation vehicles. Therefore the ambient noise quality along the transmission corridor is representative of residential areas

4.4.4 Geomorphology

Geomorphologically, Kachchh (Kutch) is categorized into four major major E-W trending zones

A. Coastal Zone - demarcating the southern fringe

B. Kachchh Mainland - divided into the central portion comprising rocky upland, northern hill range and coastal plains,

C. Banni Plains (less than 5m MSL)-marked by raised fluviomarine sediments, mud flats and salt pans and

D. the two Ranns Great Rann (~ 2m MSL) in the north and Little Rann in the east comprising vast saline wasteland.

The mainland of Kachchh is an undulating country with rugged broken ground and broad plains and is marked by hill ranges and isolated peaks. There are three hill ranges in the mainland namely Dhinodhar, Jura and Vavar, which rise to 387m and 274m amsl. The other uplands in the main land area are in Wagad area in the east forming part of Bhachau and RaparTalukas. The Pachham, Khadir and Bela islands in the Great Rann in the north also form highlands with maximum elevation of 458 m amsl. All the hill ranges follow a general east-west trend. Kachchh district has about 350 km long coastline and its coastal plain is about 35-45 km wide and attains the elevation up to 80 m amsl. The coast is generally flat and broken by small and big creeks, viz., Kori, Boacha and Godia. The Rann forms a unique and conspicuous landform and has been divided into the Great Rann in the north and Little Rann in the east. The Rann mainly comprises marshy land, salt/mud flats and is devoid of vegetation and habitation and has a very hostile environment. The total area of Rann is about 25000 sq. km. The extensive low lying area south west of Pachchham island resembles Rann except for some patches of scanty vegetation. It is known as Banni plain and covers an area of about 2000 sq. km. About 777 sq. km of Banni plain is reported to be superior grassland.

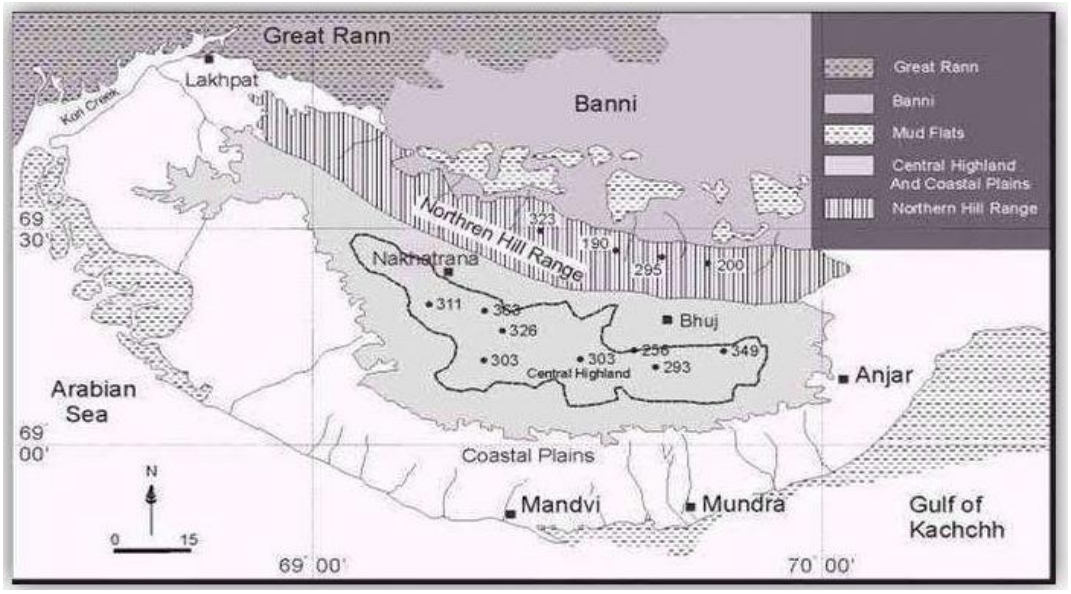


Figure 4-7. Geomorphic Map of Kachchh (Kutch)

Source-GROUNDWATER BROCHURE KACHCHH DISTRICT

http://www.jsce.or.jp/report/12/indian/report/pdf/indo2.pdf

The district of Banaskatha, Geomorphologically the district can be divided into three major zones a) Alluvial plain: It is a vast sandy tract characterised by gently sloping, slightly rolling to undulatory topography owing to presence of sand dunes. it is the most prominent unit and covers the most part of the district. b) Sedimentary Pedeplain: It is a featureless, gently sloping sedimentary pedeplain bordering the alluvial plain which merges with the Rann of Kachchh. It consists of marine sedimentary formations of Jurassic and tertiary period. It falls in the western part of the district in Santhalpur Taluka. c) Rann and Bets: These are small isolated and continuous patches of marshy land which are contiguous to the Rann of Kachchh. The terrain is monotonously flat and low lying with elevations less than 8 mmsl with or without salt encrustations. Bets are the small island in the Rann. These are found in the western part of the district.

The district of Patan, geomorphologically is a little different from the other two districts namely Kachchh and Banaskhanta. The geomorphological units include i) Alluvial plain: It is a vast sandy tract characterized by gently sloping, slightly rolling to undulatory topography owing to presence of sand dunes. It is the most prominent unit and covers most part of the district. Ii) Sedimentary Pedeplain: It is a featureless, gently sloping sedimentary pedeplain bordering the alluvial plain which merges with the Rann of Kachchh. It consists of marine sedimentary formations of Jurassic and tertiary period iii) Rann and Bets: These are small isolated and continuous patches of marshy land which are contiguous to the Rann of Kachchh. The terrain is monotonously flat and low lying with elevations less than 8 m AMSL with or without salt encrustations. Bets are the small island in the Rann. These are found in the western part of the district.

4.4.5 Soil[7]

Soils of the districts fall in five broad categories. I) Saline and alkali soils: These are typically deep, grey calcareous sandy clay loams of low permeability. II) Calcareous sandy loams: These are generally Deep, light grey or brown sandy loams of moderate to good permeability and drainage. III) Calcareous sandy soils: These are mostly pale yellow and brown sands & loamy sands of good depth and high permeability. iv) Non calcic brown soils: These are characterized by pale brown to brown deep loamy sands and sandy loams of adequate to good permeability. v) Non calcic red brown soils: These are of mixed colluvial and alluvial derivations from rocks of the Aravalli system. Mostly deep loamy sands to sandy loams with adequate to good hydraulic conductivity. In general, the soils are poor to medium in fertility and water retention capacity. Most soils have good aeration, porosity and permeability.

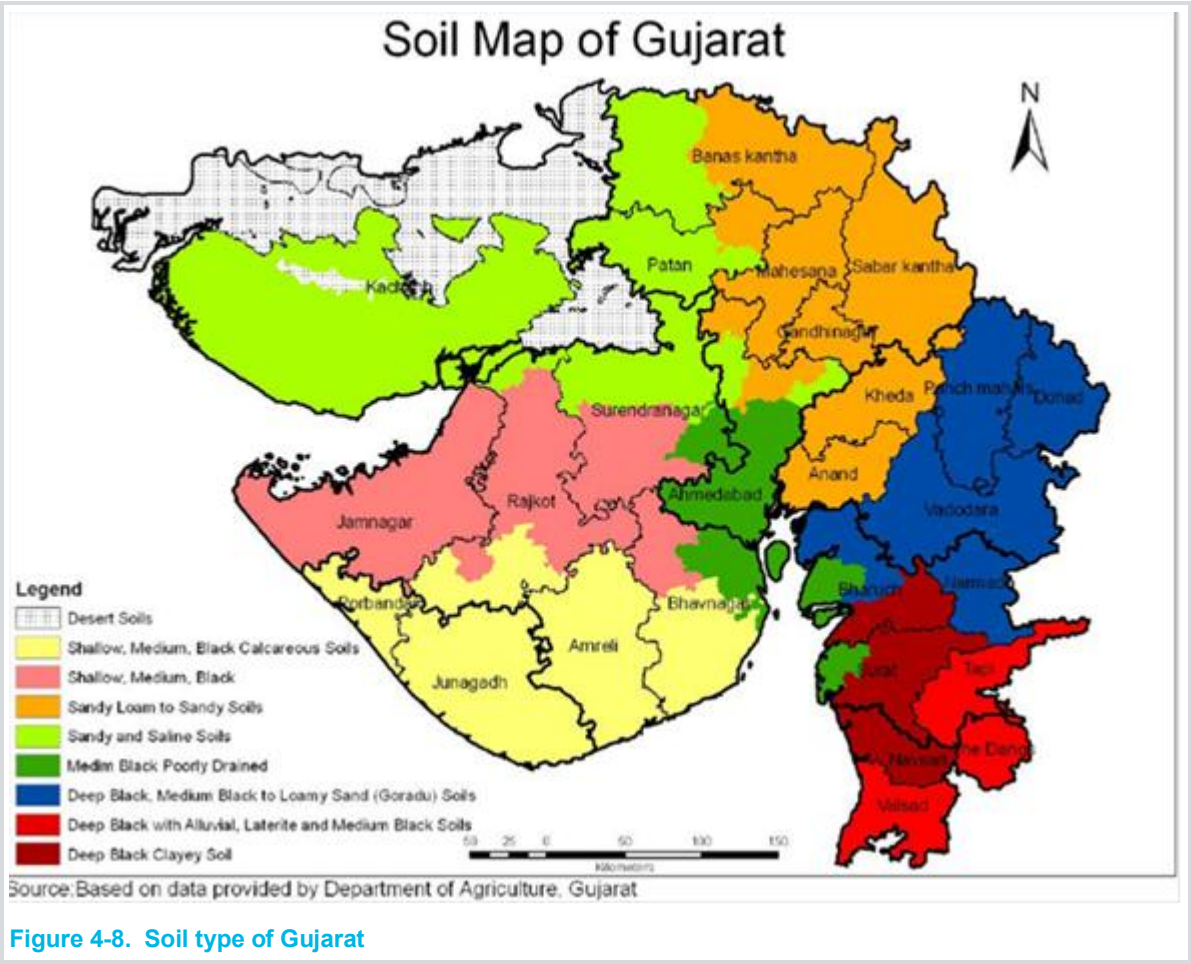


Figure 4-8. Soil type of Gujarat

4.4.6 Land Use

The land use and land cover has been monitored within a radius of 500 m from the alignment of both the lines. The Lakadia to Banaskantha line primarily passes through multi cropped land and forest land and Rann of Kachh.

8 no of towers present in the Reserve forest. Tower footing no 35A/2LA+0 to 35A/8LD+0 2)50A/1LA+0 to 50A/5LA-1.5 falls within the Reserve forest. 56/9LA+0 to AP-57LD+0 no of tower does not cross the transmission line but comes under 500 meters study area

28 no of towers present in the Rann of kachh. Tower footing no 35/1LA+6 to 35A/26LA+6 2) 55/4LA-1.5 to 55/5LA+4.5 falls within the Rann of kachh.

[7] http://www.gujenvis.nic.in/PDF/soil.pdf

Most of the stretches of transmission line passes through, Agricultural land.

No major habitation was observed within the 500 m of the transmission line.

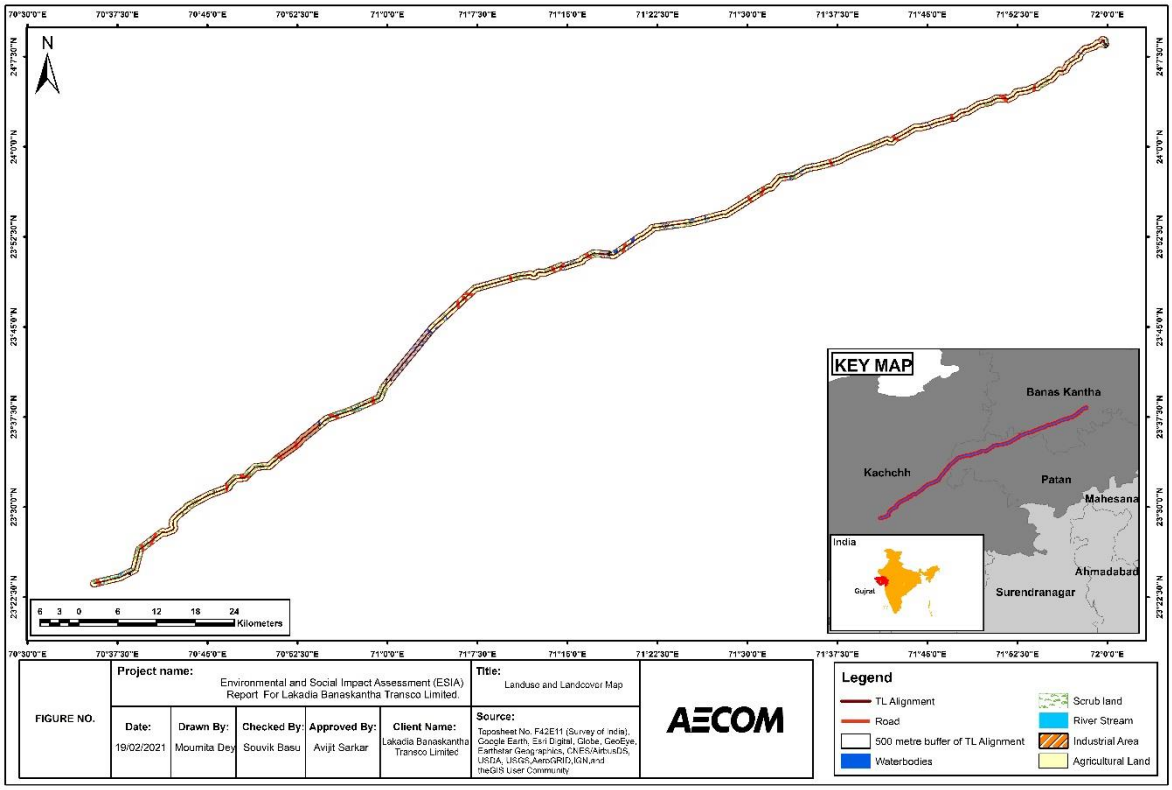


Figure 4-9. Land Use Map

For details land use map given in the Appendix G

4.4.7 Ground water Resource

In Banaskhanta the occurrence of groundwater can be divided in two groups i) ***Ground water in fissured formation (Hard rock)****:* The occurrence and movement of ground water is governed by secondary porosity i.e. thickness, extent of weathering, size and interconnections of fractures/joints. These formations generally do not form good aquifer system. The depth of dug wells range from 15-30 mbgl and of borewells from 100-120 mbgl. Depth to water level in the dug wells varies from 5 -14mbgl and in borewells from 15 - 60 mbgl. The yield of wells range from 30-120m^3 /day with an average of 75m3/day. ii) Groundwater in porous formations (Sedimentary): These sediments are mainly consisted by Coarse sand, gravel, kankar, silt, clay and clay stones. Groundwater occurs both under phreatic and confined conditions in arenaceous horizons within sedimentary. The occurrence and movement of groundwater is mainly controlled by intergranular pore spaces. Both confined and unconfined aquifers are present.

As per the studies carried out by Central Ground Water Board (CGWB) for estimation of Groundwater potential, it has been confirmed by the Board, that all taluks (Chansama and Patan in Patan District, Deesa and Kankrej in Banaskhanta districts) through which the alignment passes are demarcated as “Over Exploited” except for Deesa which is designated as “Critical” . The stages of ground water development in taluks in the Project Influence Area are Mehsana 117.78 %, Chansama 104.76%, Patan 95.91%, Deesa 92.64% and Kankrej 105.4%. There is no chance of any further development of Ground water.

The depth to water was monitored by the Central Groundwater Board and it was found that in the pre- monsoon period (2012) the depth to groundwater is 2-5 m bgl along the alignment between Adipur Jn and Anjar. In regions near Bhuj the water level was 5-10 m bgl (below ground level). However, in the post – monsoon (2012) groundwater levels indicate that they are 5-10 m bgl across the entire alignment. Overall ground water development of the district is 79.34% and the district is categorized as semi-critical.

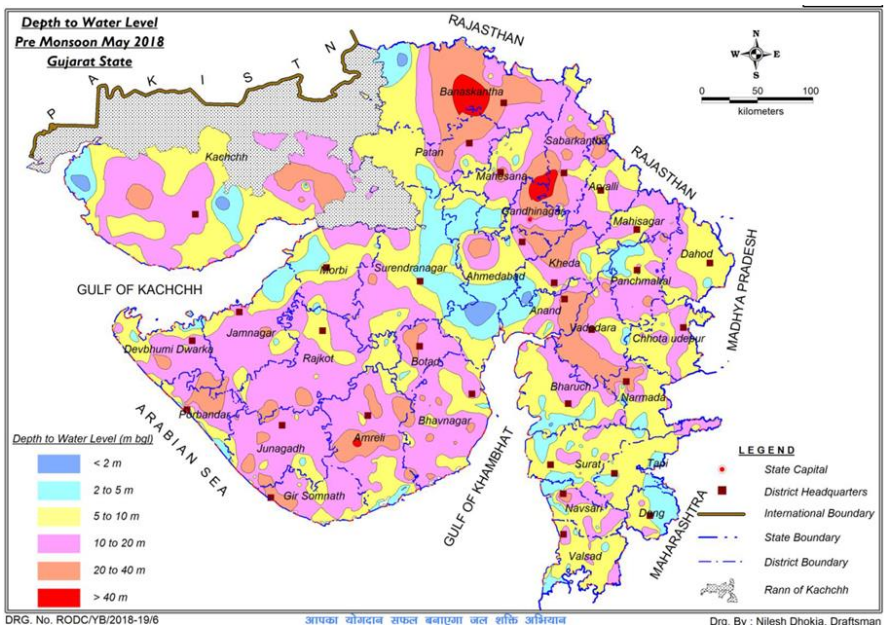


Figure 4-10. Depth of Water level during pre-monsoon

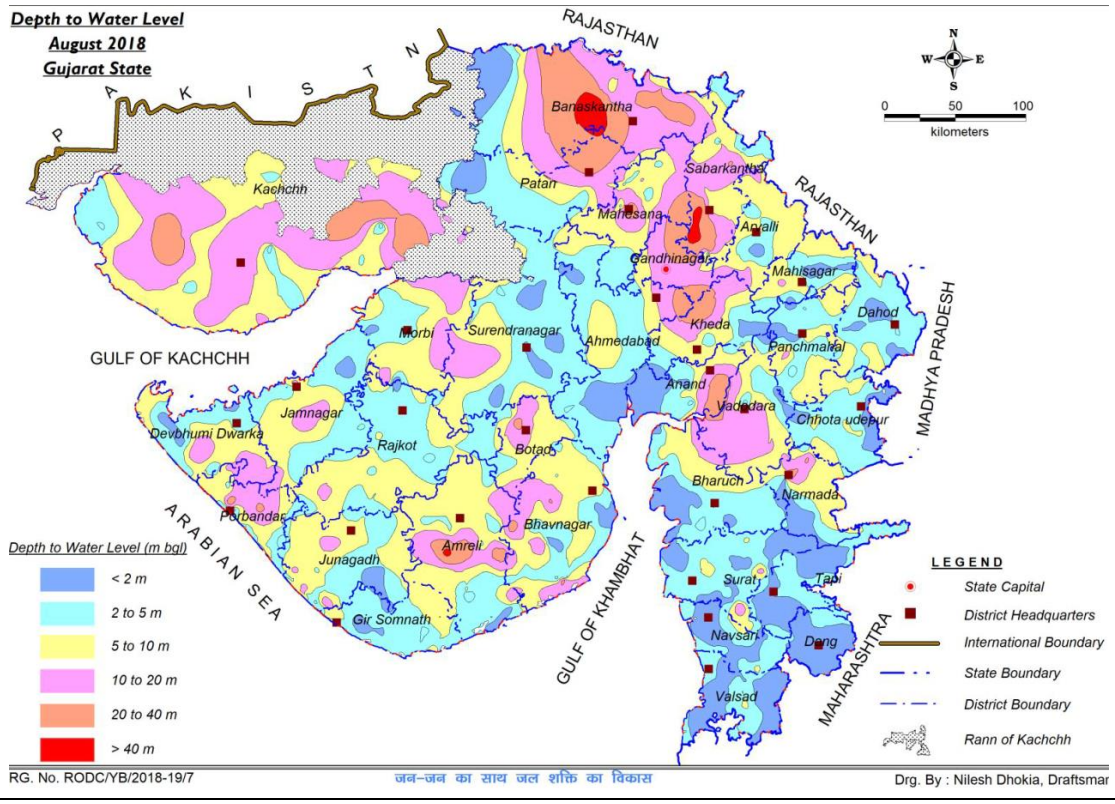


Figure 4-11. Depth of Water level during pre-monsoon

4.4.8 Groundwater Quality

Ground water quality of both Patan were observed to be similar. In the Phreatic aquifer the North eastern zone characterized by fresh water of bicarbonate type with TDS less than 1000 ppm, the Central zone with water of mixed, bicarbonate-chloride type with TDS up to 3000 ppm, while the south western zone with water of chloride type containing TDS more than 3000. In the confined aquifer however, the ground Water quality in the deeper aquifers (within about 300m depth) which may also be called confined aquifer is generally fresh (TDS< 2000 ppm) in the north eastern and central parts and is good for drinking as well as Irrigation purpose. Deterioration of ground water quality is observed from

recharge area in the north-east to discharge area in south west. In Banaskhanta district the ground water quality deteriorates from east to west. High concentration of Fluoride is observed in parts of the district. In Banaskhanta also, quality of ground water gradually deteriorates from east (recharge zone) to west and south west (discharge zone). While high electrical conductivity has been reported in Kankrej Taluk, higher values of nitrates have been found in Deesa.

4.4.9 Surface Water

The time of site visit one canal present in the alignment of tower and within 500m two salt pan was present. Canal water mainly use for irrigation

4.4.10Natural Disaster

4.4.10.1 Earthquake

The whole of Gujarat region is vulnerable to earthquake and falls in Zone III to Zone V of the seismic zonation map of India signifying moderate to very high-risk zones (**Figure 4.12**). Kachchh is seismically active area, falling in the highest magnitude zone of V, where several devastating earthquakes have taken place (Table 4.3). These areas are thus prone to moderate damage. There is a marginal fault line which crosses the alignment in Banaskhanta district. The wind hazard vulnerability map also indicates that the project influence area lies in the moderate damage zone and the basic wind speed is (Vb =44m/sec). It is the unstable structural framework of the crust of the area.

Table 4-4: Earthquakes in Gujarat during the Last Few Decades

Date and Time	Location Magnitude and Intensity	Details
27.06.1819	Bhuj	Accompanied by a loud noise
19.04.1845	Lakhpat	Sixty-six shocks some which were destructive
31.10.1940	Dhrol-Jamnagar area VI.	Maximum observed intensity This earthquake might be the same as the previous event reported in Kachchh for which no date (day and month) or origin times are available.
26.01.2001	Bhachau, Rapar Richter scale 7.9	The most severe earthquake of the century, felt all over the country, lead to severe damage in Kachchh, Ahmedabad, Jamnagar, and Surat District. More than20000 people killed and 167000 reported injured. Total property damage was around 500 billion rupees
28.01.2001	Suvi-Rapar area, Mw 5.8:	A moderate to strong aftershock struck Gujarat, at 06:32 AM local time causing considerable panic in Gujarat. Tremors were also felt in adjoining parts of Maharashtra & Rajasthan.

Source: Trends of Changing Climate and Effects on Eco-Environment of Kachchh District, Gujarat: 2011

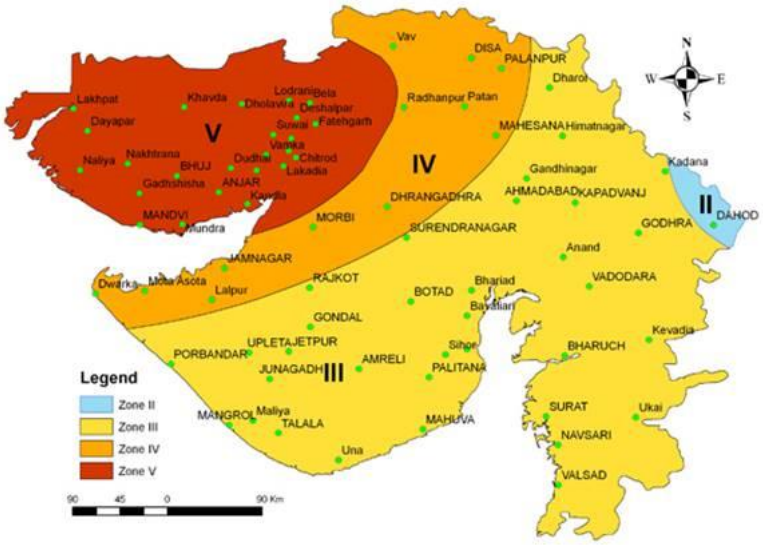


Figure 4-12. Earthquake Hazard Map-Gujarat

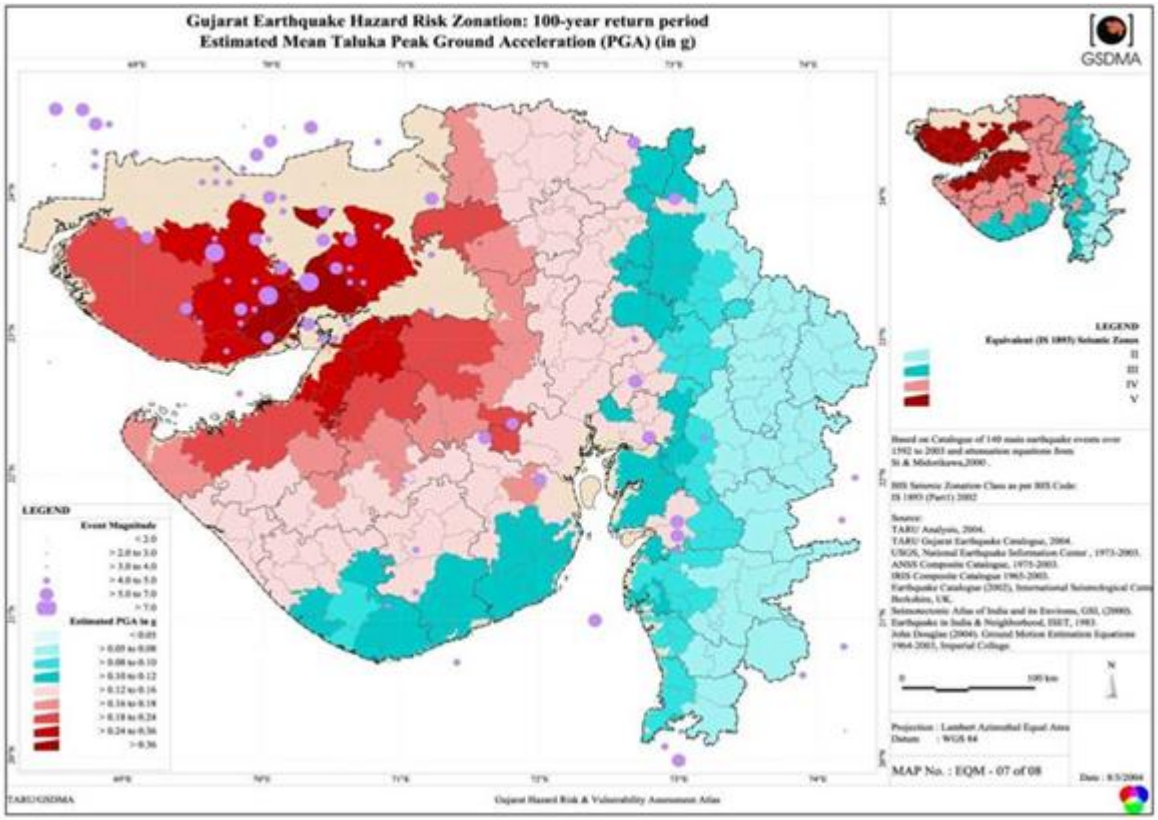


Figure 4-13. Gujarat Earthquake Hazard Risk Zonation: 100 year return period Estimated Mean Taluka Peak Ground Acceleration (PGA) (in g)[8]

4.4.10.2 Floods

Figure 4.14 shows the Hazard Risk and Vulnerability Atlas prepared by GSDMA and the estimated inundation based on Probable Maximum Surge (PMS) at highest high tide level. The Authority has declared Kachchh as one of the tsunami prone areas of Gujarat. The oldest record of tsunami is available from November 326 BC earthquake

[8] ***g*** (the acceleration due to Earth's gravity, equivalent to g-force) as either a decimal or percentage; in m/s^2(1 *g* = 9.81 m/s^2)

near the Indus delta /Kachchh region that set off massive sea waves in the Arabian Sea**.** However there has been no occurrence of tsunami in the Kachchh region in the recent past.

Table 4-5: History of Tsunami in Kachchh

Sl. No.	Date	Location	Longitude	Latitude	Reference
1	326 BC	Indus Delta/Kachchh Region	-	-	Lisitzin (1974)
2	16.06.1819	Kachchh	26.6 E	71.90 N	Macmurdo (1821)
3	19.06.1845	Kachchh	23.6 E	68.37 N	Nelson (1846)

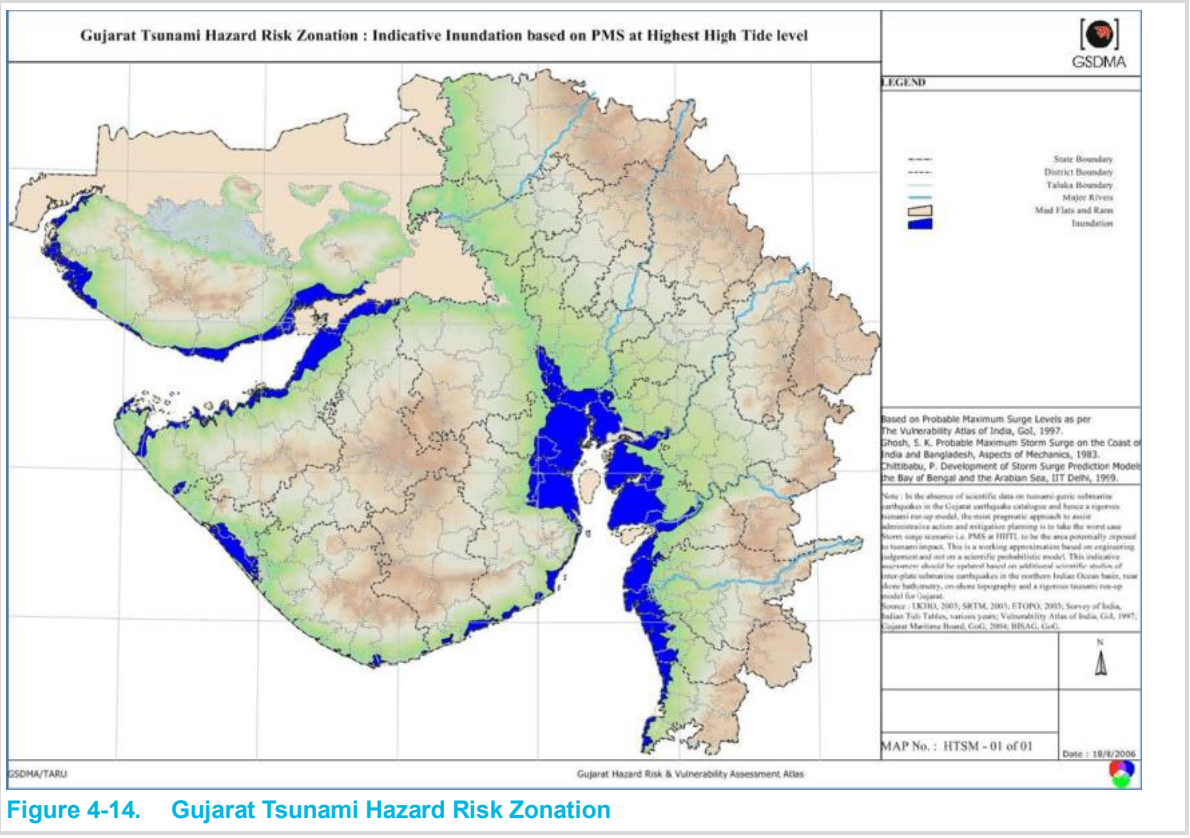


Figure 4-14. Gujarat Tsunami Hazard Risk Zonation

4.4.10.3 Cyclone

Gujarat falls in the region of tropical cyclone. With the longest coastline of 1600km in the country, it is highly vulnerable to associated hazards such as floods, storm surges etc. **Figure 3.5** shows the wind and cyclone hazard map of Gujarat with the project site being marked on the map which shows that the project site lies in a very high damage risk zone with V_b = 50 m/s.

The 1998 cyclone was one of the severest cyclones affecting Gujarat, which hit Saurashtra coast. The death toll was over 3,000 and around 46 lakh people in 33 talukas in the Gujarat State were affected. The worst hit district was Kachchh followed by Jamnagar, Rajkot, Porbandar, Valsad and Junagarh. **Table 4-6** gives a list of most intense cyclones experienced in Kachchh District and nearby areas.

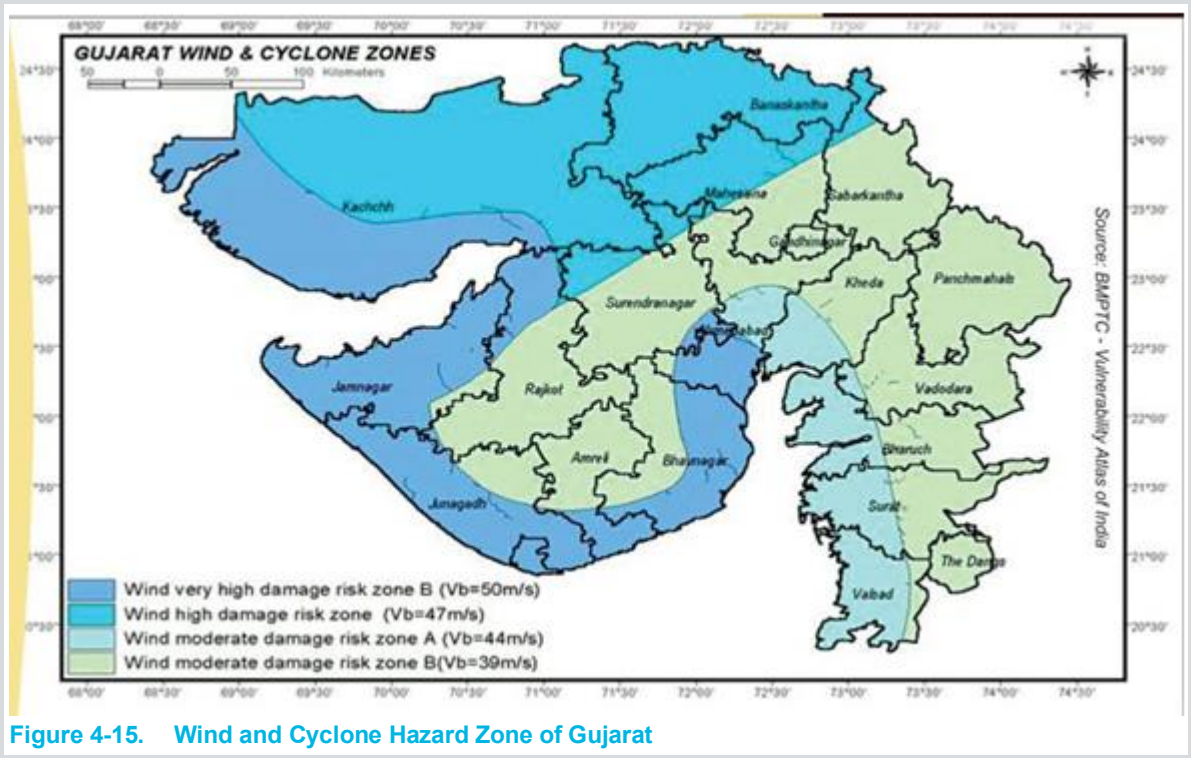


Figure 4-15. Wind and Cyclone Hazard Zone of Gujarat

Table 4-6: History of Cyclones in Gujarat

Sl. No.	Cyclone	Date	Observed/Estimated Maximum Wind Velocity	Landfall/Devastation
1	Very severe Cyclonic Storm over the Arabian sea	June 4-10, 1998	167 Kmph	Gujarat & Rajasthan states were affected. Porbander of Gujarat state was the most affected areas. Loss incurred due to storm was estimated to be about Rs.1855.38 Crores in Kandla
2	Very severe Cyclonic Storm over the Arabian sea	May 16-22, 1999	195 kmph	This system caused severe damage in Kutch and Jamnagar district of Gujarat 453 people died. Loss of property estimated to about Rs. 80 crores. In Rajasthan one person died and 5104 cattle heads perished. 5133 houses were partially damaged

Source: Indian Meteorological Department, New Delhi

4.4.11 Climate Vulnerability

The State Action Plan for Climate Change adopted by Government of Gujarat shows the following Climate Change Projections

- The historical data (past 30 years) analysis indicates an increase of mean maximum temperature over Gujarat by 0.11°C. The global as well as regional modelling results show a rise in the range of 1.5 to 2.5°C for the period of 2030.
- Historical data for the 40-year period (1969-2008) over Gujarat shows an increase in rainfall over all stations specifically over Saurashtra and Southern Gujarat. The rainfall extremes also show an increase over the same regions.
- Cyclones over Indian coastlines are projected to increase in intensity in future though the number of cyclones occurring does not show an increase

The RFP (Request for Proposal) is floated after approval of MOP & CEA. RFP doc. has been finalized & apporved by taking consideration of all safety requirement for earthquake Kutch zone V, Tsunami & floods. All the design is as per technical specification mentioned in RFP, which are line with the relevant regulatory & safety requirements. LBTL has followed all the design & technical requirement of RFP.

4.5 Ecological Environment

An Ecology and Biodiversity study along with the ROW of 765KV Lakadia-Banaskantha line, located in Kutch, Patan and Banaskantha District, Gujarat was conducted to recognise the possible impacts of the said transmission line on existing biodiversity resources. The study has been carried out in post-monsoon season during month of November 2020. This information will further enable to measure probable ecological impacts that can be created from the present transmission line project activities. Understanding of the substantial risks and impacts is imperative to implement mitigation procedures. Based upon the ecological survey, a mitigation measures would be suggested to managed properly the present ecological conditions and minimize or nullified project related impacts.

Survey Methodology

The baseline survey was conducted in last week of November between 25th to 28th November 2020 throughout the transmission line (5km of each side from the centre of the line). Prior to that secondary data regarding sensitive ecological habitat (National Park, Wildlife Sanctuary, Protected Forest like Community Reserve, Conservation Reserve, Ecological Sensitive Area, Migratory Corridor, Critically Endangered, Endangered and range restricted species etc.), Forest types and forest cover, Wetlands, Important Bird Areas has been collected from Forest Department, different reports and research publications. A total of 20 transects were selected based on topography, land use, habitat and vegetation pattern. Floral and Faunal species were assessed by transect method by travelling a known distance (1 ± 0.05km), along or near the ROW, and observed floral and faunal species along the length were noted. Also, Evaluation of faunal species was also done by using indirect method such as scats, pug marks, prey kills, calls, nests, feathers, skin molts and road-kills. Primary data was collected through most of the diurnal period from early morning till late evening. Books like Trees and shrubs of India, the book of Indian Trees, Birds of the Indian Sub-continent, Indian Mammals- A field guide, Snakes of India, The Book of Indian reptiles and Amphibians were also consulted. Field identification has been based on professional experience, and following, standard field guides and identification keys were made use of. Flora and Fauna was checked for their IUCN status (International Union for Conservation of Nature, Red List Version 3.1) and faunal species status in the Schedules of Wildlife Protection Act, 1972. GPS locations of transects laid is given in following table and Figures.

Table 4-7: Geographic Coordinates of the Transect Locations

Sr. No.	Transect	Start point	End point	Nearest Wells/ Habitat Type
1	TL1	23°24'34.85"N, 70°38'47.86"E	23°24'7.26"N, 70°38'47.63"E	Agriculture Land, Some scrub land and a small waterbody
2	TL2	23°38'25.24"N, 71° 0'15.65"E	23°37'51.67"N, 71° 0'10.63"E	Scrub Land, Little Runn of Kutch
3	TL3	23°39'57.63"N, 70°58'44.74"E	23°39'33.78"N, 70°58'36.90"E	Little Runn of Kutch, Small Water Body
4	TL4	23°44'24.13"N, 71° 4'42.22"E	23°44'8.23"N, 71° 4'7.24"E	Little Runn of Kutch, Water Bodies, Narmada Canal
5	TL5	23°44'7.18"N, 71° 7'44.49"E	23°43'45.09"N, 71° 7'15.77"E	Agricultural Land, Very small scrub land, Water Body
6	TL6	23°42'49.33"N, 71° 4'22.16"E	23°42'34.76"N, 71° 3'56.70"E	Open scrub land, Small Agricultural Land, Little Runn of Kutch
7	TL7	23°50'53.79"N, 71°19'22.98"E	23°51'11.09"N, 71°18'53.15"E	Agricultural Land, Salt Pan, Settlement
8	TL8	23°54'47.45"N, 71°22'32.95"E	23°54'16.18"N, 71°22'27.35"E	Salt Pan, Water Body (Runn)
9	TL9	23°55'30.88"N, 71°27'29.55"E	23°55'1.92"N, 71°27'14.67"E	Salt Pan, Water Body (Runn), Agricultural Land
10	TL10	23°57'29.29"N, 71°33'36.21"E	23°57'20.88"N, 71°32'59.19"E	Agricultural Land, Settlement and Small Water Body, Vo Nadi
11	TL11	23°57'59.49"N, 71°36'43.60"E	23°57'38.83"N, 71°36'17.21"E	Agricultural Land, Settlement and Small Water Bodies
12	TL12	23°59'10.52"N, 71°40'18.31"E	23°58'56.85"N, 71°39'48.06"E	Agricultural Land, Settlement and Small Water Bodies

Sr. No.	Transect	Start point	End point	Nearest Wells/ Habitat Type
13	TL13	24° 1'20.63"N, 71°41'29.79"E	24° 0'58.88"N, 71°41'4.80"E	Agricultural Land, Small Water Body
14	TL14	24° 0'22.02"N, 71°38'59.74"E	24° 0'28.80"N, 71°39'27.10"E	Agricultural Land, Small Water Body, Settlement
15	TL15	24° 2'44.81"N, 71°46'59.86"E	24° 2'11.90"N, 71°47'2.65"E	Settlement area, Agricultural Land
16	TL16	24° 4'29.74"N, 71°50'41.89"E	24° 4'28.08"N, 71°50'15.85"E	Scrub Land, Agricultural Land
17	TL17	24° 5'17.75"N, 71°54'2.41"E	24° 4'53.90"N, 71°54'26.57"E	Barren Land, Agricultural Land, Settlement
18	TL18	24° 7'18.66"N, 71°55'38.01"E	24° 6'49.32"N, 71°55'59.30"E	Agricultural Land, Settlement
19	TL19	24° 7'51.25"N, 71°57'40.49"E	24° 8'8.18"N, 71°57'10.54"E	Agricultural Land, Settlement, Canal
20	TL20	24° 8'27.96"N, 71°59'36.75"E	24° 8'51.29"N, 71°59'10.01"E	Agricultural Land, Scrub land, Settlement

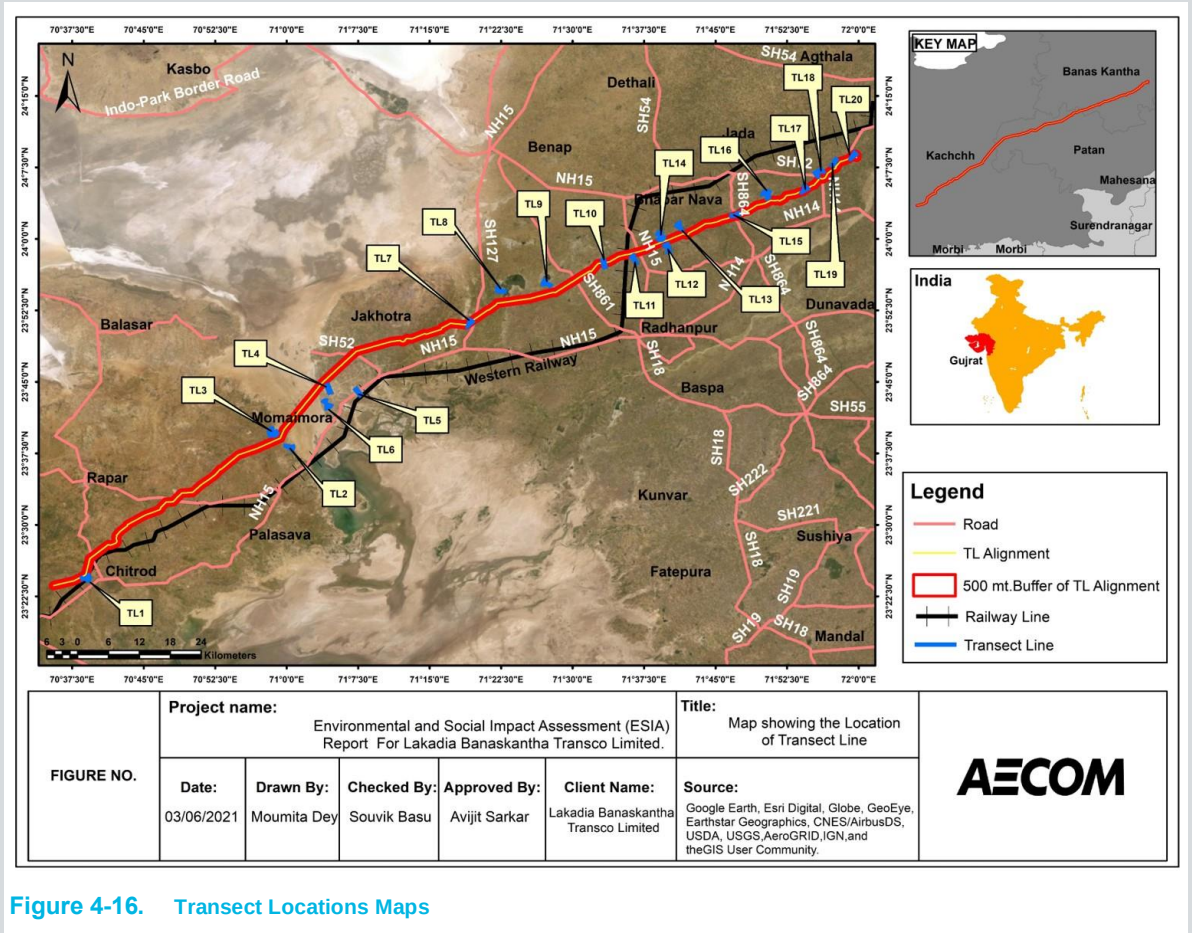


Figure 4-16. Transect Locations Maps

4.5.1 Biogeographical Zone

As per classification of Indian Biogeographic zones published by Wildlife Institute of India (Rodgers, et al. 2002), the project site falls under Biogeographic Zone 3 - the Indian Desert and the Biogeographic Province Kachchh Desert- 3B (Figure 4-17). Globally, the region falls in Indo-Malay Realm and Deserts and Xeric Shrublands Biome represents a large expanse of scattered dry forest.

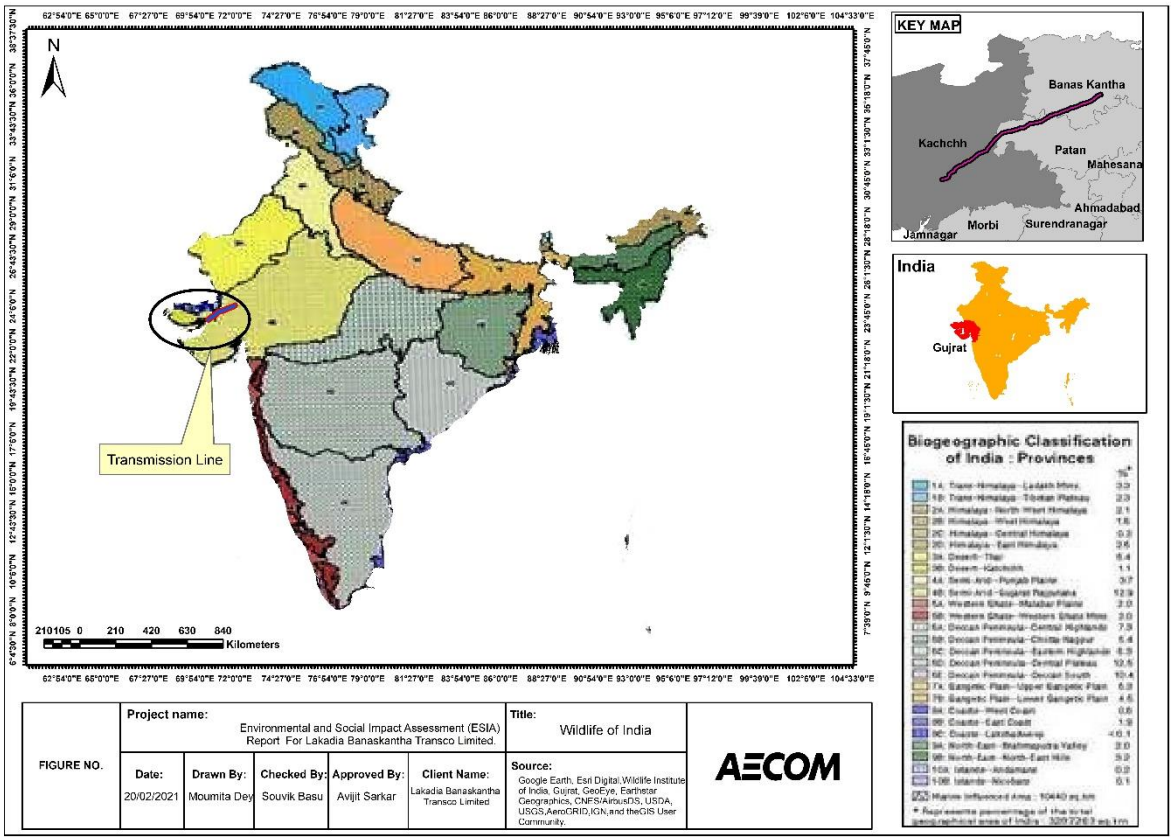


Figure 4-17. Biogeographic Zones of India

4.5.2 Details Forest Along the Alignment within AOI

Forest of Kachchh district classified under the Type 6B- Northern Tropical Thorn Forest, as per the forest classification of Champion and Seth (1968). These forests also known as Open scrub thorn forest due to poor canopy formation. This can be further divided in to 5/D-Dry deciduous Scrub, 6/E4 -Salvadora scrub, 6B/C-Desert Thorn Forest, 6B/DS2-Tropical Euphorbia scrub, 6B/ DS1- *Zizyphus* sp. scrub and *Capparis* sp. association 5/E3 -Babul (*Acacia nilotica*) forest, 5/DS5-Dry Savannah type vegetation (*Acacia nilotica- Salvadora* sp. association, 6/E2-Gorad (*Acacia Senegal*). However, due to the invasion of *Prosopis juliflora* in these forests, has changed the floral composition and vegetation structure. The transmission line wise protected/reserve/social forest area are given below:

765KV Lakadia-Banaskatha Transmission Line: Within this segment of the transmission line 25.1315ha forest land is present under four Forest Division namely Kutch-East Division, Kutch SF Division, Patan Division and Banaskantha SF Division in Kutch, Patan and Banaskantha District. Within eleven villages namely Kairai (0.2903ha), Sanwa (15.104ha), Patanka (4.3885ha), Daldi (3.9867ha), Dahisar (0.1545ha), Chichodra (0.2713ha), Chachasna (0.1251ha), Warsara (0.1868ha), Kantheriya (0.1551ha), Padardi (0.1872ha) and Khimana (0.282ha) the forest land is present.

4.5.3 Protected Areas Along the Alignment with in AOI

The transmission line has been passed through legally protected area like Wild Ass Sanctuary, Reserve forest and social forest area. Project Area under Protected Area (Wild Ass Sanctuary) 9.749ha of which forest land is 3.887ha and non-forest land is 5.862ha. No part of the project area falls under any Conservation Reserve, National Park and Ecologically Sensitive Zone. For forest clearance and wildlife clearance the proposal has been already submitted in “Parivesh” portal of MoEF&CC. Stage I Forest proposal has been granted for the project. Also, the wildlife proposal has already been recommended in NBWL meeting on 11th March 2021.

The details about nearby internationally recognized areas are given below:

Wild Ass Sanctuary IBA (IBA Code IN097):

Wild Ass Wildlife Sanctuary is in the Little Rann of Kutch in the Gujarat state of India. It is spread over an area of 4954 km². The wildlife sanctuary was established in 1972 and came under the Wildlife Protection Act of 1972. The 765 KV D/C Lakadia-Banaskantha Transmission Line, passes through a small portion (9.749ha) at northern tip of Wild Ass Sanctuary.

Kutch Desert Wildlife Sanctuary:

Kutch Desert Wildlife Sanctuary is situated in the Great Rann of Kutch, Kutch district, Gujarat, India, it was declared a sanctuary in February 1986. It is spread over an area of 7506.22 km^2. 765 KV D/C Bhuj to Lakadia Transmission Line, is situated south and approximately 15.5 km away from the Kutch Desert Sanctuary.

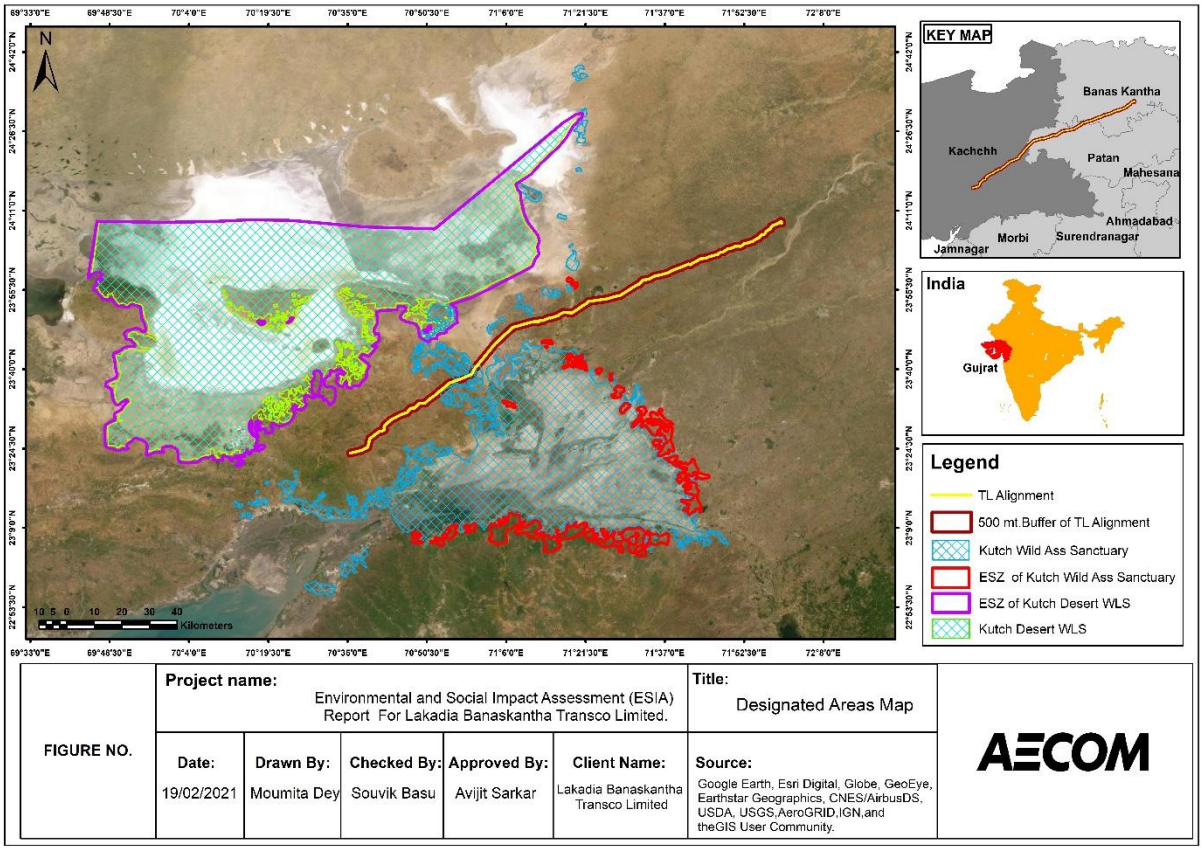


Figure 4-18. ESZ area along the transmission line

4.5.4 Flora

Sixty-nine (69) floristic species were recorded collectively at the sampling sites. The study area comprises of 20 tree species belonging to 10 families, 10 shrubs species belonging to 8 families and 38 herbs species belonging to 16 families. Most common species were *Azadirachta indica, Prosopis cineraria, Prosopis juliflora, Salvadora oleoides. Ziziphus nummularia, Blumea sp., Aristida* sp. Table 4-8 presents the floristic species recorded at the sampling sites, along with the botanical family to which each species is assigned, its type and its status as per the IUCN Red List.

Table 4-8. Floristic Species recorded in the Study Area

S. No.	Species	Botanical Family	Type	IUCN Status*
1	*Azadirachta indica*	Meliaceae	Tree	LC
2	*Ailanthus excelsa*	Simaroubaceae	Tree	NE
3	*Acacia nilotica*	Fabaceae	Tree	NE
4	*Acacia catechu*	Fabaceae	Tree	NE

S. No.	Species	Botanical Family	Type	IUCN Status*
5	*Acacia leucophloea*	Fabaceae	Tree	NE
6	*Balanites aegyptica*	Zygophyllaceae	Tree	NE
7	*Acacia auriculiformis*	Fabaceae	Tree	NE
8	*Mangifera indica*	Anacardiaceae	Tree	NE
9	*Ficus benghalensis*	Moraceae	Tree	NE
10	*Prosopis cineraria*	Mimosaceae	Tree	NE
11	*Prosopis juliflora*	Mimosaceae	Tree	NE
12	*Salvadora oleoides*	Salvadoraceae	Tree	NE
13	*Senegalia polyacantha*	Fabaceae	Tree	NE
14	*Senegalia senegal*	Fabaceae	Tree	NE
15	*Tecomella undulata*	Bignoniaceae	Tree	NE
16	*Vachellia jacquemontii*	Mimosaceae	Tree	NE
17	*Vachellia nilotica*	Mimosaceae	Tree	NE
18	*Vachellia tortilis*	Mimosaceae	Tree	NE
19	*Ziziphus jujuba*	Rhamnaceae	Tree	LC
20	*Artocarpus heterophyllus*	Moraceae	Tree	NE
21	*Cocos nucifera*	Arecaceae	Shrub	NE
22	*Citrus aurantifolia*	Rutaceae	Shrub	NE
23	*Calotropis gigantea*	Apocynaceae	Shrub	NE
24	*Calotropis procera*	Apocynaceae	Shrub	NE
25	*Capparis decidua*	Capparaceae	Shrub	NE
26	*Euphorbia nivulia*	Euphorbiaceae	Shrub	NE
27	*Leptadenia pyrotechnica*	Apocynaceae	Shrub	NE
28	*Salvadora persica*	Salvadoraceae	Shrub	NE
29	*Ziziphus nummularia*	Rhamnaceae	Shrub	NE
30	*Punica granatum*	Lythraceae	Shrub	NE
31	*Achyranthes aspera*	Amaranthaceae	Herb	NE
32	*Aeluropus lagopoides*	Poaceae	Herb	NE
33	*Aerva javanica*	Amaranthaceae	Herb	NE
34	*Aerva pseudotomentosa*	Amaranthaceae	Herb	NE
35	*Ammania baccifera*	Lythraceae	Herb	LC
36	*Blumea sp.*	Asteraceae	Herb	-
37	*Celosia argentea*	Amaranthaceae	Herb	NE
38	*Cenchrus biflorus*	Poaceae	Herb	NE
40	*Chloris barbata*	Poaceae	Herb	NE
41	*Citrullus colocynthis*	Cucurbitaceae	Herb	NE
42	*Cocculus hirsutus*	Menispermaceae	Herb	NE
43	*Convolvulus prostratus*	Convolvulaceae	Herb	NE
44	*Cyperus sp.*	Cyperaceae	Herb	-
45	*Dactyloctenium sp.*	Poaceae	Herb	-
46	*Datura innoxia*	Solanaceae	Herb	NE
47	*Echinops echinatus*	Asteraceae	Herb	NE
48	*Eragroatis sp.*	Poaceae	Herb	-

S. No.	Species	Botanical Family	Type	IUCN Status*
49	*Euphorbia caducifolia*	Euphorbiaceae	Herb	-
50	*Grewia tenex*	Tiliaceae	Herb	-
51	*Fagonia cretica*	Zygophyllaceae	Herb	NE
52	*Lycium edgeworthii*	Solanaceae	Herb	NE
53	*Heliotropium marifolium*	Boraginaceae	Herb	NE
54	*Indigofera cordifolia*	Fabaceae	Herb	NE
55	*Indigofera* sp.	Fabaceae	Herb	-
56	*Launaea procumbens*	Asteraceae	Herb	NE
57	*Oligochaeta divaricata*	Asteraceae	Herb	NE
58	*Pergularia daemia*	Apocynaceae	Herb	NE
59	*Senna italica*	Caesalpiniaceae	Herb	NE
60	*Cymbopogon martinii*	Poaceae	Herb	-
61	*Cynodon dactylon*	Poaceae	Herb	-
62	*Solanum trilobatum*	Solanaceae	Herb	NE
63	*Solanum virginianum*	Solanaceae	Herb	NE
64	*Tephrosia purpurea*	Fabaceae	Herb	NE
65	*Tribulus terrestris*	Zygophyllaceae	Herb	LC
66	*Vernonia cinarescens*	Asteraceae	Herb	NE
67	*Aristida adscensionis*	Poaceae	Herb	-
68	*Aristida funiculata*	Poaceae	Herb	-
69	*Aristida histricula*	Poaceae	Herb	-

4.5.5 Fauna

This section of the report presents the higher faunal species, namely vertebrates, comprising mammals, birds, reptiles and amphibians, having reported ranges that include the Study Area. The detailed species-tables are provided as annexures to this report. Each annexed table gives the scientific and common names of each species, the conservation status assigned to it by the International Union for Nature and Natural Resources (IUCN) and the Schedule of the Wildlife Protection Act, 1972 (WPA) under which it is listed. Names of the species observed (in **bold** font) or recorded from consultation (in **bold** font with asterisk mark) as part of the primary data appear in each table.

Mammals

At least thirty-four (34) species of mammals have reported ranges that include the Study Area. With respect to the IUCN Red List, one (01) of these species is designated as endangered and two near threatened. With respect to the WPA Schedules, eight (08) of these species are listed under Schedule I. Six (06) species of mammals were observed and six (06) recorded from consultation as part of the primary data. Though some portion of the project Area will be fall under Protected Area (Wild Ass Sanctuary), however, during the field visit no Wild Ass has been observed. It was reported that in rare cases the wild ass stray to the fringe areas of the sanctuaries where the transmission line is located.

Appendix A lists the mammal species of the Study Area.

Birds

One hundred sixty-seven (167) species of birds have reported ranges that include the Study Area. These include eighty (80) species which are resident with respect to the Study Area and Eighty-seven (87) species, which are migratory with respect to the Study Area. With respect to the IUCN Red List, out of 80 resident bird species one

vulnerable (Sarus Crane) and one near threatened birds (Black-necked Stork) have reported ranges in study area. Out of 87 migratory birds' species one endangered, four vulnerable and five near threatened birds' species have reported ranges along the study area. With respect to the WPA Schedules, three (03) bird species from resident and five (05) birds species from migratory birds of the Study Area are listed under Schedule I. Forty-eight (48) species of birds, consisting of thirty-six (36) resident species and twelve (12) migratory species, were recorded as part of the primary data. Though within the 10km (5km of each side from the centre of the line) study area through the line no such globally significant concentration of migratory species and/or congregatory species have been reported and not observed during field visit. However, it has been observed that at southern part of the 765KV Lakadia-Banaskantha Line, about 6km (approx.) away, waterbody (2.5km^2) around Adesar Bridge, birds flying between Little Rann and Great Rann have to cross this corridor and hence the risk of collision is very high in this 5-km stretch. Both species of flamingos, Great White Pelican, Dalmatian Pelican, Demoiselle Crane, Eurasian Spoonbill feeding in this wetland are at very high risk of collision as they are often disturbed by vehicular traffic on the road. At the time of field visit in December 2020, 6 Greater Flamingo, 11 Lesser Flamingo, 36 Eurasian Spoonbill, 14 Great White Pelican has been observed along with Egret's, Pochard's etc. As per previous study[9], near Adesar, parallel to the road four parallel transmission lines is present, where Flamingo collision were reported. Also, in the southern side about 13km away from the transmission line at Nanda Bet (20.32km^2) small habitat of Greater Flamingo, Lesser flamingo, Great White Pelican, Dalmatian Pelican, Demoiselle Crane, Black headed ibis, Darter, Grey Heron were reported.

Appendices B and C list the resident and migratory bird species respectively of the Study Area.

Reptiles

At least twenty-five (25) species of reptiles have reported ranges that include the Study Area. With respect to the IUCN Red List, one (01) of these species is designated as vulnerable. With respect to the WPA Schedules, one (01) of these species is listed under Schedule I. Two (02) species of reptiles were observed and five (05) recorded from consultation as part of the primary data.

Appendix D lists the reptile species of the Study Area.

Amphibians

At least six (06) species of amphibians have reported ranges that include the Study Area. With respect to the IUCN Red List, none of these species are designated as globally threatened. With respect to the WPA Schedules, none of these species are listed under Schedule I. No species of amphibians were observed as part of the primary data and however two (02) recorded from primary consultation.

Appendix E lists the amphibian species of the Study Area

Invasive Alien Species

At least two (02) species, comprising one (01) floristic species and one (01) faunal species, reported from the Study Area, are designated as invasive alien species with respect to the Study Area. Both these species were recorded as part of the primary data.

The invasive alien floristic species is *Prosopis juliflora* (Bilayati Banwal), which native range is Central and South America. The IUCN status of this species is Not Evaluated (NE).

The invasive alien faunal species is *Columba livia* (Kabootar), which native range is Europe. The IUCN status of this species is Least Concern (LC).

4.5.6 Habitat Profile of the Study Area and Critical Habitat Assessment

Habitats are classifiable into natural, modified habitats and critical habitat. Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified the area's primary ecological functions and species composition.

[9] Anika Tere B.M. Parasharya, 2011, Flamingo mortality due to collision with high tension electric wires in Gujarat, India. Journal of Threatened Taxa3(11): 2192–2201.

Modified habitats are areas that contain a considerably large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified the area's primary ecological functions and species composition. Modified habitats may include areas managed for agriculture, forest plantations, reclaimed coastal zones, and reclaimed wetlands. Definition of the modified habitat also includes significant biodiversity value, as determined by the risks and impacts identification process required in Performance Standard 1. LBTL should minimize impacts on such biodiversity and implement mitigation measures as appropriate.

Critical habitat (as per IFC PS 6, 2012) are the areas with high biodiversity value, including (i.) habitat of significant importance to Critically Endangered and/or Endangered species; (ii.) habitat of significant importance to endemic and/or restricted-range species; (iii.) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv.) highly threatened and/or unique ecosystems; and/or (v.) areas associated with key evolutionary processes.

To assess possible triggers of critical habitat as defined in IFC's Performance Standard (PS) 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC, 2012a) and the associated guidance note (IFC, 2012b), the baseline data on habitats and species described was assessed as described in the **Table 4-9.**

The habitat-profile of the Study Area is composed of natural, as well as, modified habitats. Each of these types include both, terrestrial and seasonal (monsoon) riverine habitats. The habitats of the Study Area are fragmented mainly by metalled roads, dirt roads, foot-trails and canals, while the aerial envelope of the study area is mainly interrupted by power distribution lines, pylons and transmission towers. Types of habitats in the Study area are described in detail in this section below:

Table 4-9Habitat Identification as per IFC 2012 PS 6

Land Use Class.	Characteristics	Habitat Type	Justification
Scrub Land grasslands, sandy plains and saline flats	The scrub land is mostly found in non-cultivated lands mostly hard wood short tree, shrubs and herbs. Hard wood plants like *Prosopis cineraria, Acacia nilotica, Zizyphus numularia, Acacia catechu, Prosopis juliflora*, etc. are commonly found in the natural scrublands.	Natural	This type of vegetation is naturally growing here without any human intervention.
Homestead Plantation and Orchards	In some regions of the study area small orchards and private plantation, having commercial value, has been found. Commonly planted trees are *Mangifera indica*, *Punica granatum*, *Artocarpus heterophyllus*, *Cocos nucifera*, *Citrus aurantifolia.*	Modified	All trees/ shrubs planted are for domestic use purpose like fuel wood, fodder, food and no succession have been observed and human planted habitat cannot be considered as a Natural Habitat
Roadside Plantation	At some portion on the study area roadside plantation has been found. In case of roadside plantation only tree species were planted, and the common planted trees were *Ficus benghalensis. Azadirachta indica, Acacia auriculiformis.*	Modified	All trees are mainly used for roadside shed tree and timber. The habitat planted by human cannot be considered as a Natural Habitat
Agricultural Land	Different agricultural activities are found in and around the study area. However, seasonally the agricultural crops are rotated. Agricultural fields are mainly used for growing Greengram (*Vigna radiata*), Wheat (*Triticum aestivum*), Cotton (*Gossypium hirsutum, G. arboreum*), Bajra/Pearl millet (*Pennisetum glaucum*), Castor (*Ricinus communis*), Groundnut (*Arachis hypogaea*), Mothbean (*Vigna aconitifolia*), Cumin (*Cuminum cyminum*), Sorghum (*Sorghum bicolor*) etc. The common weed occurring in the agricultural lands are *Cynodon dactylon*, *Aristida adscensionis, Aristida funiculate, Aristida histricula* etc.	Modified	Due to relatively minimal succession in agricultural land, components of agricultural lands cannot be considered Natural Habitat.
Wetland Habitat	The wetland natural habitats of the study area consist of seasonal freshwater or saline-water.	Natural	Wetlands confined mostly within natural banks and minimum alteration have been done. Also,

Land Use Class.	Characteristics	Habitat Type	Justification
			aquatic vegetation and aquatic faunal components are naturally growing here without any human intervention.

Pictures of Natural habitat






Pictures of Modified habitat






Table 4.10. Screening of Critical Habitat in and around the 5km radius of project area as per IFC PS6 (2012)

Sr No.	Criterion	Observations
1	Criterion 1: Habitat of significant importance to Critically Endangered and/or Endangered* species;	No Critically Endangered species recorded. One endangered mammal Indian Pangolin (*Manis crassicaudata*) and one endangered bird Saker Falcon (*Falco cherrug*) have reported range include the study area. Indian Pangolin: Confirmed records of Indian Pangolin are very rare due to its low-density occurrence and elusive nature. During field survey this animal have not been observed and local people also not stated regarding the presence/observation of this animals. Thus, the presence of this animals did not meet the thresholds stipulated for the Study Area to qualify as a CH with respect to any of the concerned species Saker Falcon is a very rare winter visitor in Gujarat. As per previous records[1] Saker Falcon very irregularly spotted in Little Runn of Kutch area. So, this bird may use the project area as a migratory route. However, Firstly, this bird is a high elevation flyer and secondly the gap between two wires of 765KV transmission line is 15m. So, there are very little chances of electrification or collision. During field survey this bird have not been observed and consultation with local people evidence of this birds not found. Thus, the presence of this birds did not meet the thresholds stipulated for the Study Area to qualify as a CH with respect to any of the concerned species
2	Criterion 2: Habitat of significant importance to endemic and/or restricted-range species	Endemic or Restricted Range species are species which occur only within a pre-specified limited area. *Equus hemionus khur* (Indian Wild Ass), a subspecies of *Equus hemionus* (Asiatic Wild Ass), is endemic to a restricted range which includes the Study Area. However, during the field visit no Wild Ass has been observed. It was reported from local consultation that very rare cases the wild ass stray to the fringe areas of the sanctuaries where the transmission line is proposed. The entire global population of *Equus hemionus khur*, estimated to be 4000 individuals, is distributed in and around the Little Rann of Kachchh (Wild Ass Sanctuary), which is 24km away from the project area. The species itself is designated as Near Threatened (NT) as per the IUCN Red List, but no evaluation is available for the sub-species. Considering all the aforementioned aspects, it is improbable that the Study Area qualifies as a potential CH with respect to this species.
3	Criterion 3: Habitat supporting globally significant concentrations of migratory species and/or congregatory species	Migratory Species are defined as species of which a significant proportion of members cyclically and predictably move from one geographical area to another, including within the same ecosystem. The Study Area is located within the Central Asian Flyway, as also, in proximity to the East Asia - East Africa Flyway. Thus, the Study Area is very likely to be situated in the annual cyclical flight-paths of the various winter, summer, passage migratory or nesting birds migrating either to or through the region in which it is situated. At least Eighty-seven (87) such Migratory Species, all birds, have reported ranges that include the Study Area, which may serve as a wintering/summering destination, staging site or flight-path for these species. However, it has to be noted that the gap between two wires of 765KV transmission line project is 15m. So, there are very little chances of electrification or collision during migration.

Sr No.	Criterion	Observations
		Congregatory species include species that gather in globally significant numbers at a particular site at a particular time in their life cycle for feeding, breeding or mid-migration resting. However, in and around the Study Area small waterbodies within Runn area, which may not support occurrence of migratory and/or congregatory waterfowl. In and around the 10km project area no such globally significant concentration of migratory species and/or congregatory species have been reported and also not observed during field visit.
4	Criterion 4: Highly threatened and/or unique ecosystems	No such significant concentration of highly threatened, Biome restricted, rare species observed in this area. Also, due to project activity no highly potential significant risk were observed for which the quality of area will decrease.
5	Criterion 5: Areas associated with key evolutionary processes	1. No isolated areas were observed with populations that are phylogenetically distinct. 2. High endemism of floral and faunal species not observed, 3. No such landscapes was found which have high spatial heterogeneity, 4. Specific juxtapositions of soil types were not found, 5. No such biological corridors which ensure species migration and gene flow and help in conservation of metapopulation were observed.

* As listed on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species. The determination of critical habitat based on other listings is as follows: (i) If the species is listed nationally / regionally as as critically endangered or endangered, in countries that have adhered to IUCN guidance, the critical habitat determination will be made on a project by project basis in consultation with competent professionals; and (ii) in instances where nationally or regionally listed species' categorizations do not correspond well to those of the IUCN (e.g., some countries more generally list species as "protected" or "restricted"), an assessment will be conducted to determine the rationale and purpose of the listing. In this case, the critical habitat determination will be based on such an assessment.

[1] Mori, D & Shah, Y. 2017, Records of Saker Falcon Falco cherrug from Gujarat, India. Indian Birds, 13(6):158-159.

A Critical Habitat Screening (CHS) conducted for the Study Area identified potential CH triggers with respect to the Study Area as per the CH criteria of critically endangered or endangered species, endemic or restricted range species, migratory and/or congregatory species, as also, key evolutionary processes. Significant globally concentration of Floral and faunal species under IUCN-designated Critically Endangered (CR) / Endangered (EN) species, Migratory species, Congregatory species or Endemic/ Restricted Range species have not been recorded during study period from direct observations and consultation with local peoples. Thus, as per criteria for critical habitats as defined in PS6 Guidance Notes (GN6) (IFC, 2012b) the CHS identified no potential CH triggers as per the other CH criteria.

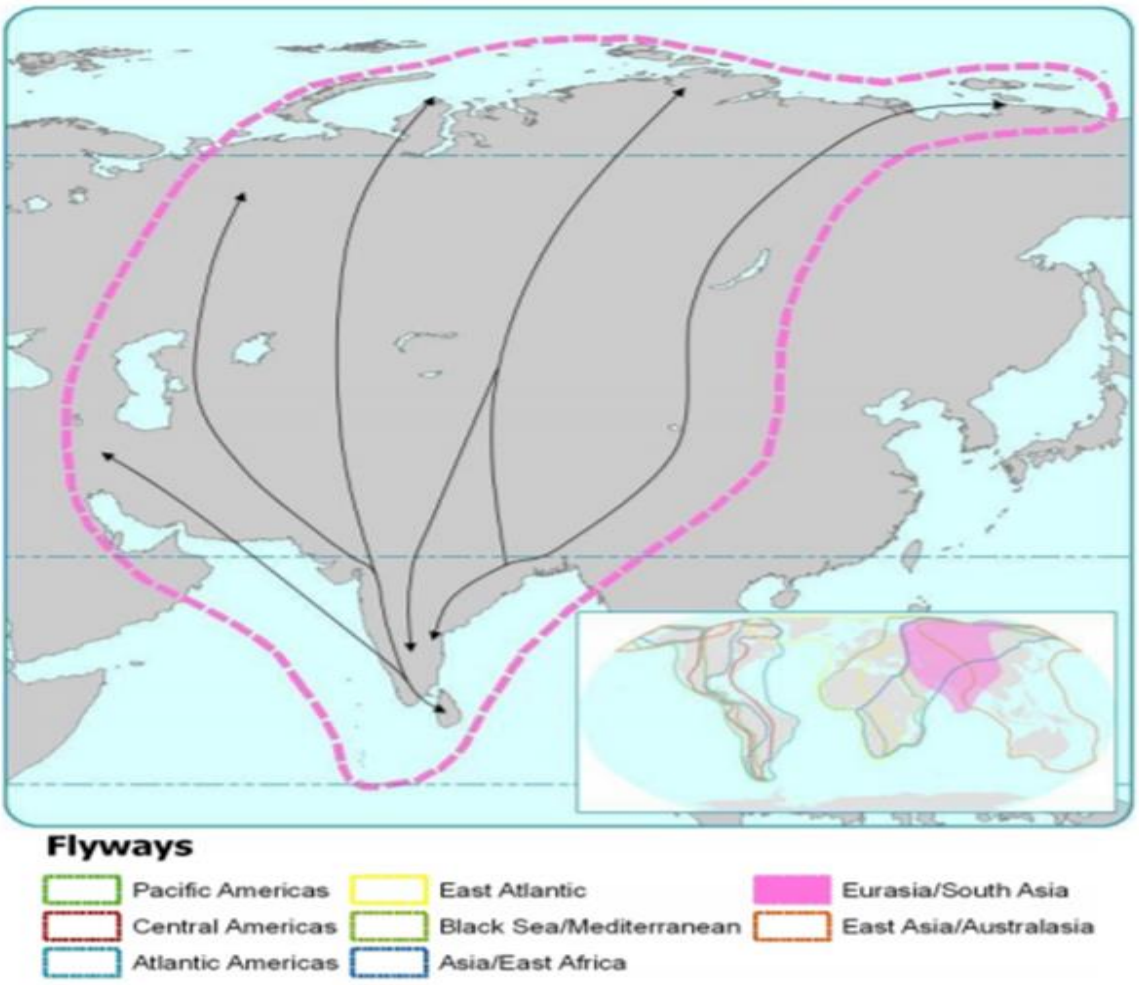


Figure 4-19. The Central Asian Flyway

Source: Birdlife International (2020). Birdlife Data Zone: Central Asia/South Asia.

4.6 Socio Economic Environment

This section deals with the baseline socio-economic environment of the associated proposed transmission line from Lakadia PS- Banaskantha PS 765kV D/c line.

4.6.1 Settlement Within Area of Influence

The AOI is spread across 62 villages which falls under three District, 7 Blocks/Tehsils. Out of the 62 villages, core villages comprised of 49 and 14 were identified along the 500-metre corridor of the Transmission line. **Table 4.11** provides details of the villages that falls within the AoI.

Table 4.11. Settlement along the AOI

Sl. No	District	Block	Core Village	Sl. No	Buffer Village	Block
1.	Kachchh	Bhachau	Shivlakha			
2.	Kachchh	Rapar	Bhutakiya**	1	Khandek	Rapar
3.	Kachchh	Rapar	Chitrod	2	Moda	Rapar
4.	Kachchh	Rapar	Dedarwa	3	Bharidia (Bhutakia)	Rapar
5.	Kachchh	Rapar	Govindpur (Kharol)**	4	Vallabhpar	Rapar
6.	Kachchh	Rapar	Hamirpur Moti	5	Govindpar	Rapar

7.	Kachchh	Rapar	Khirai	6		
8.	Kachchh	Rapar	Kidiyanagar			
9.	Kachchh	Rapar	Momayamora			
10.	Kachchh	Rapar	Mora**			
11.	Kachchh	Rapar	Sai			
12.	Kachchh	Rapar	Sanwa			
13.	Kachchh	Rapar	Tindalwa Mota			
14.	Kachchh	Rapar	Tindalwa Nana**			
15.	Banaskantha	Bhabhar	Chachasna	6	Buretha	Bhabhar
16.	Banaskantha	Bhabhar	Chichodra	7	Dhenkwadi	Bhabhar
17.	Banaskantha	Bhabhar	Gosan			
18.	Banaskantha	Deesa	Mudetha	8	Vasada	Deesa
19.	Banaskantha	Kankrej	Chimangarh	9	Nathpura	Kankrej
20.	Banaskantha	Kankrej	Fatepura	10	Varasada	Kankrej
21.	Banaskantha	Kankrej	Isarva			
22.	Banaskantha	Kankrej	Raviyana			
23.	Banaskantha	Kankrej	Kantheriya			
24.	Banaskantha	Kankrej	Kashipura			
25.	Banaskantha	Kankrej	Khimana			
26.	Banaskantha	Kankrej	Khodla			
27.	Banaskantha	Kankrej	Nekoi			
28.	Banaskantha	Kankrej	Padardi			
29.	Banaskantha	Kankrej	Rajpur			
30.	Banaskantha	Kankrej	Tervada			
31.	Banaskantha	Kankrej	Warsara**			
32.	Patan	Radhanpur	Lotiya	11	Santhli	Radhanpur
33.	Patan	Radhanpur	Sathali**			
34.	Patan	Radhanpur	Thikaria (Hasenpur)**			
35.	Patan	Saltanpur	Babra			
36.	Patan	Saltanpur	Bakutra	12	Ganjisar	Santalpur
37.	Patan	Saltanpur	Bavarda	13	Daisar	Santalpur
38.	Patan	Saltanpur	Dahisar	14	Zandala	Santalpur
39.	Patan	Saltanpur	Daldi	15	Sidhada	Santalpur
40.	Patan	Saltanpur	Datrana			
41.	Patan	Saltanpur	Dhokavada			
42.	Patan	Saltanpur	Gadha			

43.	Patan	Saltanpur	Jamvada (Badarpura)
44.	Patan	Saltanpur	Jhandala**
45.	Patan	Saltanpur	Korda
46.	Patan	Saltanpur	Madhutra
47.	Patan	Saltanpur	Patanka
48.	Patan	Saltanpur	Rampura
49.	Patan	Saltanpur	Vauva

4.6.2 Methodology for Socio Economic Assessment

The socio-economic baseline for this project has been developed based on the secondary literature review and primary sources which includes inferences drawn from the consultation with different stakeholder including the local community.

4.6.2.1 Review of Secondary Information

Review and assessment of the available secondary data and information for the study area was undertaken to substantiate the findings from the stakeholder consultations. This also allows for a comparative assessment of the project area vis-à-vis the villages and block level socio-economic baseline information. For secondary review, following documents and literature have been reviewed:

- Village Directory Data (2011);
- Primary Census Abstract Data (2011);
- District Statistical Handbook-2011 for Kachchh, Banaskantha and Patan District

4.6.2.2 Primary data collection through stakeholder consultation

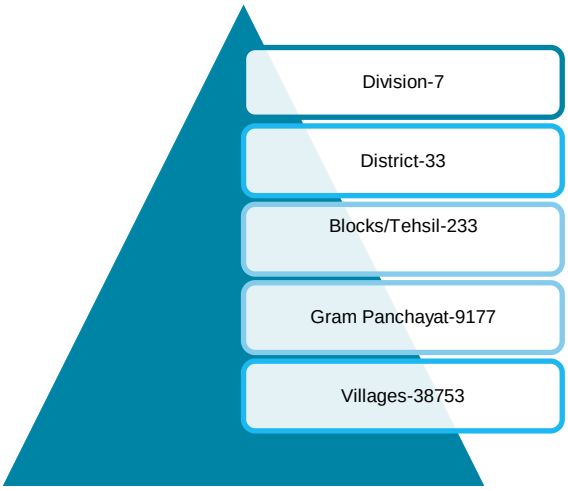
Key group of stakeholders who were consulted during the study process were affected landowner, local community, Headman/Sarpanch, EPC Contractor etc. The main objective of the consultation was to gain understanding of the area, the demographic profile, the livelihood activities, cropping pattern, land value and understanding the development needs of the area in general. The following stakeholder were consulted during the study:

- Consultation with Local Community
- Consultation with Headman/Sarpanch
- Consultation with Contractor

4.6.3 Administrative Set Up of AOI

4.6.3.1 State Profile:

Located on the western coast of India, it has the longest coastline of 1,600 Km and is bounded by the Arabian Sea to the west and south west and by Pakistan in the North. It has a population of approximately 6.03 Crore (4.99% of Indian Population). The State of Gujarat is surrounded by the States of Rajasthan and Madhya Pradesh towards the north east and east, Maharashtra and the Union Territories of Daman, Diu and Nagar Haveli, towards the south. Gandhinagar, the capital city of Gujarat is located close to Ahmedabad, the commercial capital of the State which is also the most populated District in the State, with 7.20 million people. The State has diverse climatic conditions with mild and pleasant winters and hot and dry summers and heavy monsoon. The state currently has 33 districts.



As per Gujarat Population Census Data shows that it has total Population of 6.03 Crore which is approximately 4.99% of total Indian Population. Literacy rate in Gujarat has seen upward trend and is 79.31% as per 2011 population census. Of that, male literacy stands at 87.23% while female literacy is at 70.73%. The sex ratio in the State is 920, which is significantly lower than that of India which stands at 933 (946 rural & 900 urban) females per 1000 males as per census 2011 data. Table 4.3 provides the demographic profile Gujarat state

Table 4-12Demographic Profile of Gujarat State

Attribute	2011	2001
Population	60,439,692	50,671,017
Male	31,491,260	26,385,577
Female	28,948,432	24,285,440
Population Growth	19.28%	22.48%
Sex Ratio	919	920
Child Sex Ration	890	883
Total Child Population (0-6 Age)	7,777,262	7,532,404
Male Population (0-6 Age)	4,115,384	4,000,148
Female Population (0-6Age)	3,661,878	3,532,256
Literacy	78.03 %	69.14%
Male Literacy	85.75 %	79.66 %
Female Literacy	69.68 %	57.80 %

'Source: https://*www.census2011.co.in/census/state/gujarat.html*

As per Gujarat Population Census Data shows that it has total Population of 6.03 Crore which is approximately 4.99% of total Indian Population. Literacy rate in Gujarat has seen upward trend and is 79.31% as per 2011 population census. Of that, male literacy stands at 87.23% while female literacy is at 70.73%. The sex ratio in the State is 920, which is significantly lower than that of India which stands at 933 (946 rural & 900 urban) females per 1000 males as per census 2011 data.

4.6.3.2 District Profile: Banaskantha

Banas Kantha district falls in the north- western part of the State and is the fourth largest district in Gujarat in terms of area. It lies between 23° 55' and 24° 43' North latitudes and 71° 16' and 73° 0' East longitudes. The area covered by the district is 10,743 sq. km i.e. 5.47 % geographical area of Gujarat. The density of the district is 290 persons per sq. km compared to 308, the density of the State of Gujarat. In the north it is bounded by Marwar and Sirohi area of the Rajasthan State, in the east by a part of Sirohi and Sabar Kantha district, in the south-east by the district of Mahesana, to the south by the district of Patan and in the west by the Rann of Kachchh which forms frontier with Pakistan. It is divided into 12 talukas. Palanpur town is the district headquarters.[10]

4.6.3.3 District Profile: Kachchh

Kachchh falls in the north-western part of Gujarat. It lies between the parallels of latitude 22° 44' to 24° 42' and the meridians of longitude 68° 10' to 71° 55'. It is bounded on north and north- west by Pakistan, on the north-east by Rajasthan state, on the east by Banas Kantha and Patan districts, on the south-east by Surendranagar district, on the south by the gulf of Kachchh and Rajkot district and on the south-west by the Arabian Sea. It is largest district in terms of area and consist longest coastline of about 406 km., in the state. The total area of the district is 45,674 sq.km i.e. it covers 23.27 % of total geographical area of Gujarat. The district is characterised by treeless and barren Rann, rocky hills and low-lying plains. 51 percent area of Kachchh is occupied by high saline unproductive desert (Greater Rann of Kachchh-GRK and Little Rann of Kachchh-LRK) and 34.73% of the area is under agriculture. The coverage of forest area is 15.67%. The district has 17.31% of their cultivable land as unutilized land, 21.07% land is waste land. Pastureland forms 3.58% of geographical area.[11] Kachchh district has 10 Talukas, 632 Gram Panchayats, 6 Municipalities, 14 towns and 924 villages. Of the 924 villages, 877 and habitated villages and 47 are Uninhabited villages. [12]

4.6.3.4 District Profile: Patan

Patan is one of the districts forming part of the north Gujarat region of the Gujarat State. The Patan district falls under north Gujarat agro-climatic zone and north-west Gujarat agro-climatic zone and one of the major archeological cities of Gujarat. It is situated between the north latitude 230 .35' to 240 .5' and between east longitudes 710 .40' to 720 .30'. Its east-west distance is 146.72 km and north-south distance is 84.568 km. It is bounded to the north and north-west by Banas Kantha district, to west and south-west by the Little Rann of Kachchh, to the south by the Surendranagar district and to the east by the Mahesana district. The total geographical area of Patan district is 5792.00 sq. km i.e. 2.95% of the total geographical area of Gujarat state and density of 232 persons against the density of the Gujarat is 308. It is the 13th largest district in area in the State.[13]

Table 4-13 District Profile of AoI

Attribute	Banaskantha	Kuchchh	Patan
Population	31,20,506	20,92,371	13,43,734
Male Population	16,10,379	10,96,737	69,43,97
Female Population	15,10,127	99,56,34	69,93,37
Sex Ratio	936	908	915
Child Sex Ratio	898	921	890
% Literary	54.6	70.59	72.3
% Male Literacy	61.4	79.40	82.9
% Female Literacy	38.5	60.87	61.05
%Schedule Tribe Population	9.1	1.16	

[10] DCHB, Kachchh District, Directorate of Census Operations, Gujarat

[2] DCHB, Kachchh District, Directorate of Census Operations, Gujarat
[3] DCHB, Kachchh District, Directorate of Census Operations, Gujarat

%Schedule Caste Population	10.4	12.3	5.27

4.6.4 Socio Economic Profile of AOI

This section provides the socio-economic profile of the villages along the AoI. As mentioned in section 4.4.2 comprised of 63 villages falls under the AOI of the proposed project.

4.6.4.1 Demography

The demography of the AoI as can be seen in the table 4.6 below is characterised by a total population of 1,06,228 individuals from the villages under the project footprint and 5,666 individuals from the buffer areas from the total 2,540,4 households. The average household size is 5.7 individuals per households. The average sex ratio in the study area is 956 females per thousand males much higher than the district and State (911) sex ratio of females per thousand males. A look at the gender wise population male population accounted 51.3% of the total population and female 48.7%. The Average Child Sex ratio in the study is 990 per female child much higher than the district sex ratio. The data corroborate with the finding's consultations with the local community whereby it was reported that male and female population are almost equal while in some villages female population is more than the male population. **Table 4.13** gives an overview of the district and Block demographic profile and **Table 4.14** provides an overview of the demographic details of the villages study area.

Table 4-14 Block Demographic Profile of the AOI

District/Block	Total Households	Total Population	Total Male Population	Total Female Population	Average of Sex Ratio	Average of Child Sex Ratio
Banaskantha	**41.7**	**44.1**	**44.6**	**43.6**	**936**	**950**
Deesa	24.3	23.6	23.6	23.7	942	962
Kankrej	66.1	67.1	67.3	67.0	922	882
Bhabar	9.7	9.3	9.2	9.4	944	1007
Kachchh	**27.3**	**26.5**	**25.9**	**27.0**	**1004**	**1019**
Rapar	27.3	26.5	25.9	27.0	1004	1019
Patan	**31.0**	**29.4**	**29.4**	**29.4**	**947**	**971**
Radhanpur	9.0	9.0	9.0	9.1	962	1150
Saltanpur	91.0	91.0	91.0	90.9	946	951
TOTAL			**51.3**	**48.7**	**956**	**990**

4.6.4.2 Literacy Profile

As per the census data 2011, the literacy rate in the study area stood at 55.6% much lower than the state literacy rate (78.3%). Of this the male literacy (68.2%) and female literacy rate (42.4%).

At the Block level, Deesa under Banaskantha District has an overall literacy rate of 67% of which male literacy rate is 79% and female literacy rate is 54%. Rapar Block under Kachchh District recorded the lowest literacy rate (52.6) among the Block in the study area.

At the village level Patanka (39.9) has a dismal literacy rate while Fatepura (Kankrej Tehsil) and Rampura (Saltanpar) has the highest literacy rate (82%) and 85% much higher than the district and state literacy rate.

Consultation with the local community on the status of education, reveal that standard VIII is the benchmark for many school going boys and girls post which many would drop out from their schools for economic reason and some drop out due to their lack of interest in studying. People in the study area prefer to send their children for education outside their village mainly to nearby town and cities for better education as compared with the education in their villages. Table 4.15 provides details regarding the status of literacy rate in the study area

Table 4-15 Demographic Profile of Settlement within the AOI

District	Block	Name	Total Households	Avg HH	Total Population	% Male Population	% Female Population	Sex Ratio	Child Sex Ratio	% Schedule Caste	% Schedule Tribe	% Literacy Rate	% Male Literacy rate	%Female Literacy
Kachchh	Rapar	Momaymora	274	5.0	1381	52.2	47.8	915	804	10.8	0.0	53.2	66.6	38.9
Kachchh	Rapar	Hamirpar Moti	585	5.5	3224	49.4	50.6	1024	1011	7.2	0.0	50.9	64.0	38.0
Kachchh	Rapar	Sanva	992	5.1	5106	51.6	48.4	938	886	15.1	0.7	46.1	58.9	32.6
Kachchh	Rapar	Khirai	223	4.6	1031	46.3	53.7	1161	934	14.1	2.6	56.4	69.7	45.3
Kachchh	Rapar	Sai	662	4.7	3108	47.6	52.4	1101	967	10.4	0.0	55.1	64.0	47.3
Kachchh	Rapar	Tindalva Mota	316	5.6	1777	50.2	49.8	992	1130	15.5	0.1	49.0	59.6	37.9
Kachchh	Rapar	Kidiyanagar	1211	5.6	6833	52.4	47.6	909	887	12.1	0.2	48.3	63.1	32.1
Kachchh	Rapar	Dedarva	91	5.2	477	50.5	49.5	979	1167	0.0	0.0	52.8	64.8	40.1
Kachchh	Rapar	Chitrod	848	4.8	4100	48.2	51.8	1074	991	23.5	0.2	51.7	62.0	42.2
Banaskhantha	Bhabar	Chachasana	159	6.1	964	52.2	47.8	917	1000	6.0	0.0	61.5	82.9	37.6
Banaskhantha	Bhabar	Chichodara	257	5.3	1361	49.6	50.4	1016	1190	7.9	0.0	54.3	65.4	43.0
Banaskhantha	Bhabar	Gosan	280	5.3	1487	52.2	47.8	916	913	7.7	0.0	56.4	65.6	46.4

Banaskantha	Deesa	Mudetha	2237	5.5	12230	52.0	48.0	924	900	8.5	0.0	57.2	69.3	44.2
Banaskantha	Kankrej	Khodla	363	5.2	1878	52.7	47.3	899	895	0.0	0.0	59.7	73.0	44.8
Banaskantha	Kankrej	Khimana(Palodar Na Vas)	1661	5.4	9028	52.8	47.2	894	868	3.9	0.1	61.2	72.6	48.6
Banaskantha	Kankrej	Raviyana	348	5.2	1826	52.4	47.6	908	855	11.4	0.0	63.9	78.9	47.5
Banaskantha	Kankrej	Chimangadh	301	5.5	1660	51.7	48.3	935	881	20.1	0.0	65.3	76.5	53.4
Banaskantha	Kankrej	Padardi	513	6.2	3192	51.3	48.7	948	925	5.7	0.0	58.4	73.7	42.4
Banaskantha	Kankrej	Nekoi	182	6.3	1138	52.4	47.6	909	901	6.4	0.0	58.7	70.7	45.5
Banaskantha	Kankrej	Isarva	422	6.2	2605	50.9	49.1	963	942	3.7	0.0	59.9	74.6	44.7
Banaskantha	Kankrej	Tervada	1448	6.3	9057	51.8	48.2	930	864	10.0	0.0	51.9	65.6	37.4
Banaskantha	Kankrej	Fatepura	71	5.2	366	51.9	48.1	926	806	0.0	0.0	82.9	88.7	76.8
Banaskantha	Kankrej	Kashipura	104	6.6	691	51.8	48.2	930	928	0.0	0.0	56.1	71.6	39.4
Banaskantha	Kankrej	Kantheriya	117	6.1	719	52.0	48.0	922	886	3.6	0.0	57.3	72.0	41.6

Banaskantha	Kankrej	Rajpur	276	5.1	1419	53.1	46.9	884	730	3.7	0.1	58.9	71.1	45.5
Patan	Radhanpur	Lotiya	346	5.2	1795	50.6	49.4	975	1322	3.7	0.0	58.9	70.3	46.6
Patan	Saltanpur	Dhrandva	167	5.0	836	50.6	49.4	976	1125	2.6	0.0	53.6	65.0	41.5
Patan	Saltanpur	Gadha	326	5.1	1657	51.1	48.9	956	942	1.6	0.0	56.8	70.3	42.7
Patan	Saltanpur	Rampura	113	5.5	623	52.3	47.7	911	815	0.0	0.0	85.1	93.1	76.6
Patan	Saltanpur	Korda	741	5.4	3998	53.0	47.0	889	869	4.6	0.4	57.7	66.2	48.2
Patan	Saltanpur	Jamvada	285	4.7	1332	50.5	49.5	982	1096	0.0	0.0	61.0	77.7	43.6
Patan	Saltanpur	Patanka	210	4.7	991	52.0	48.0	924	876	6.9	0.0	39.9	51.4	27.6
Patan	Saltanpur	Dhokavada	540	4.8	2597	49.7	50.3	1010	1085	8.3	0.0	45.2	57.6	32.8
Patan	Saltanpur	Vauva	639	5.1	3242	50.0	50.0	999	1037	7.5	0.1	44.4	57.5	31.1
Patan	Saltanpur	Bakutra	396	5.1	2027	50.7	49.3	972	924	7.4	0.1	48.7	63.3	33.8
Patan	Saltanpur	Bavarda	220	5.0	1102	50.9	49.1	964	1143	14.0	0.0	70.7	86.2	54.2

Patan	Saltanpur	Babra	278	6.0	1668	52.8	47.2	893	981	7.7	0.0	48.9	60.1	36.2
Patan	Saltanpur	Daldi	254	5.4	1370	51.4	48.6	946	832	4.1	0.0	59.5	73.6	45.0
Patan	Saltanpur	Datrana	430	5.2	2257	50.4	49.6	983	845	13.9	0.0	47.6	61.1	34.3
Patan	Saltanpur	Madhutra	852	4.8	4075	50.2	49.8	991	973	8.8	0.4	46.0	58.7	33.2
TOTAL CORE			**19738**	**5.4**	**106228**	**51.3**	**48.7**	**950**	**927**	**8.7**	**0.1**	**54.5**	**67.2**	**41.2**
Kachchh	Rapar	Khandek	442	5.3	2347	52.0	48.0	922	947	24.5	0.0	53.2	65.3	40.0
Kachchh	Rapar	Moda	411	5.0	2053	48.5	51.5	1063	1101	16.4	0.2	47.6	58.7	37.1
Kachchh	Rapar	Bharidia (Bhutakia)	494	5.2	2571	50.3	49.7	988	954	13.7	0.0	51.2	62.6	39.8
Kachchh	Rapar	Vallabhpar	252	5.7	1443	50.2	49.8	993	1063	2.8	0.0	65.9	82.3	49.1
Kachchh	Rapar	Govindpar	132	4.3	565	50.1	49.9	996	1429	16.1	0.0	55.0	69.0	40.1
Banaskhantha	Bhabar	Buretha	184	5.9	1086	50.9	49.1	964	974	10.5	0.0	60.5	77.1	43.1
Banaskhantha	Bhabar	Dhenkwadi	143	4.7	666	52.6	47.4	903	961	7.5	0.0	46.6	56.2	36.0
Banaskantha	Deesa	Vasada	334	5.8	1951	51.1	48.9	959	1024	2.8	0.0	77.3	89.4	64.5
Banaskantha	Kankrej	Nathpura	533	5.8	3091	51.7	48.3	936	858	9.1	0.0	62.4	78.0	46.0

Banaskantha	Kankrej	Varasada	657	5.5	3634	52.0	48.0	923	1016	6.6	0.0	52.7	63.9	40.4
Patan	Radhanpur	Santhli	365	5.0	1819	51.3	48.7	948	978	1.6	0.0	59.3	71.4	46.5
Patan	Saltanpur	Ganjisar	410	5.5	2248	52.4	47.6	910	936	3.2	0.0	67.9	77.4	57.5
Patan	Saltanpur	Daisar	287	4.6	1308	52.0	48.0	924	1030	1.8	4.5	71.0	75.0	66.5
Patan	Saltanpur	Zandala	423	5.1	2139	51.5	48.5	943	870	0.6	0.0	49.8	64.5	34.5
Patan	Saltanpur	Sidhada	599	5.0	2971	54.0	46.0	851	747	6.7	0.0	70.1	80.8	57.9
TOTAL BUFFER			**5666**	**5.3**	**29892**	51.5	48.5	**941**	950	8.3	0.2	59.6	71.7	46.7
GRAND TOTAL			**25404**	**5.4**	**136120**	**51.3**	**48.7**	**948**	**932**	**8.6**	**0.1**	**55.6**	**68.2**	**42.4**

4.6.4.3 SC and ST Community

As can be seen from **Figure 4-20**, the AOI is characterised by Schedules Caste (SC) representation of approximately (8.7%) and Schedule Tribes (1%) much lower proportions of ST and SC population in comparison with that of the State, district levels. A comparative analysis of the presence of SC and ST community along the study area reveal that buffer area has a higher number (11.8%) of Schedule caste and Schedule tribe population as compared to the Core area settlements (8.7%). Consultation with the project proponent reported that the Transmission line corridor does not pass through any ST families. The major communities inhabiting the area are Anusuya, Sitar, Thakur, Prajapati, Naik, Sadhu, Bhil, etc.

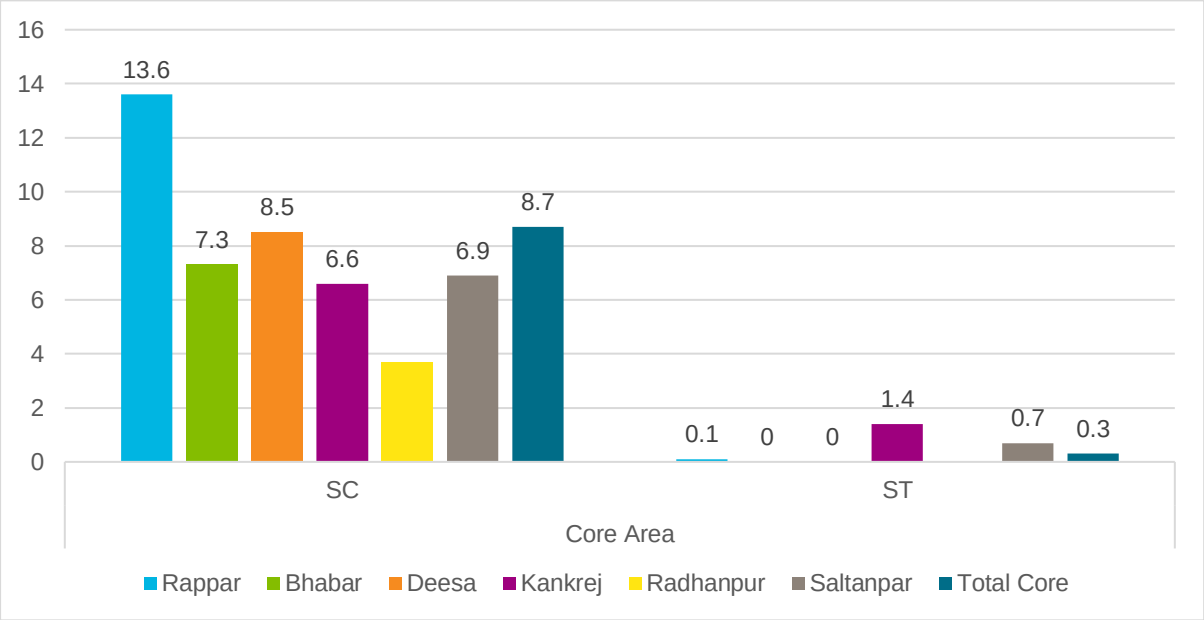


Figure 4-20. Comparative Overview of the ST and SC in Study Area

Source: Census Data 2011

4.6.4.4 Gender

Women population in the study area is comprised of 48.7% of the total population, the average sex ratio in the study village is 948, female literacy rate in the study area is recorded at 42.4% as compared fir male literacy rate 68% much lower than the state average literacy rate (58%). Analysis of the workforce participation of the surveyed population indicates that majority of the women are not participating in the workforce and the consultations also revealed that majority of the women are engaged in unpaid domestic work and marginal work. As reported during consultation women are allowed to enegaged in econominc activities within and outside their village. Their engagement are mainly in agriculrure farms mainly durng peak seasn. As per the census data, about 76.5% of the women from the study area are marginal workers.

Table 4-16Gender Disaggregated Profile of Study Area

Attributes	% Male	% Female
% Population	51.3	48.7
% Literacy rate	68.2	42.4
% Total WPR	65.4	34.6
% Main Worker	77.4	22.6
% Marginal Workers	23.5	76.5

4.6.4.5 Occupation and Livelihood

The study area is characterised by Worker Participation Ratio [14](WPR) of 42.4% of which male WPR 65.4% and female WPR is 34.6%. The female WPR is found to be much lower than the national female average WPR (23%). Of the total working population in the study area (77.8%) is comprised of main working population (engaged in an economic activity for more than 180 days in a year). The main working population comprises of those engaged as cultivators and agricultural labourers. These are basically farmed based activities. Marginal workers in the study area comprises of 22.2%. Below 2% of the working population are engaged in household industries and 'Other' activities such construction labourers in industries their neighbouring villages industries (solar plant etc), small businesses and service sector etc.

District wise analysis of employment scenario in the core areas shows that the WPR is highest in Banaskantha (48.6%) whereas Patan in the Buffer areas has the highest WPR (43.4%). Figure 4-21 provides a comparative analysis of the occupation profile of the study area.

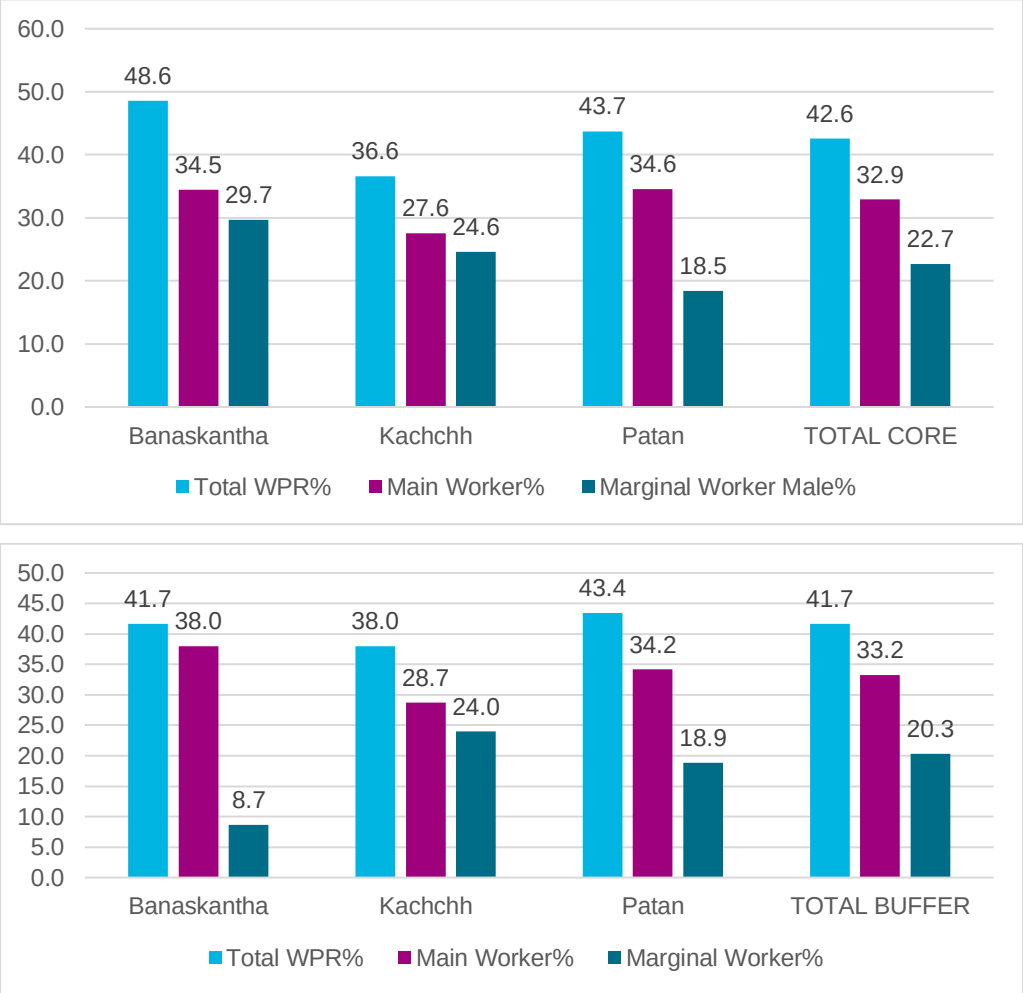


Figure 4-21. Comparative Analysis of the of the Occupation Profile

Source Census Data 2011

As reported during consultation with the local community, agriculture is the main occupation followed by daily wages both farm and non-farm. Women were also reported to work as daily labour in agriculture farms within and outside the village. It has been observed during site visit that women were seen cultivating the land (using traditional agriculture implements). Beside agriculture, livestock is another major livelihood activity of the people in the study area. These includes cattle, buffaloes, goat, sheep, and horses Consultation with the local community reveal that livestock rearing contribute about 70% of the household income and women play a major role in livestock rearing. **Table 4.17** provide details information of the working population in the study area.

[14] Work Participation Ratio is defined as the percentage of total workers (main and marginal workers) to total population

Table 4-17Occupational Profile of the Study Area

District	Block	Name	Total Population	Total WPR%	Male WPR%	Female WPR%	Total Main Worker%	Male Worker%	Female Worker%	Marginal Worker%	Male Marginal Worker%	Female Marginal Worker%
Kachchh	Rapar	Momaymora	1381	33.1	79.0	21.0	23.6	85.6	14.4	28.7	62.6	37.4
Kachchh	Rapar	Hamirpar Moti	3224	35.7	73.8	26.2	32.8	77.3	22.7	8.0	33.7	66.3
Kachchh	Rapar	Sanva	5106	38.7	67.6	32.4	25.1	91.3	8.7	35.1	23.9	76.1
Kachchh	Rapar	Khirai	1031	39.6	61.8	38.2	28.2	82.8	17.2	28.7	9.4	90.6
Kachchh	Rapar	Sai	3108	36.6	67.3	32.7	30.5	78.4	21.6	16.5	11.7	88.3
Kachchh	Rapar	Tindalva Mota	1777	40.1	64.1	35.9	25.2	93.1	6.9	37.3	15.4	84.6
Kachchh	Rapar	Kidiyanagar	6833	41.7	66.1	33.9	34.1	77.2	22.8	18.3	16.3	83.7
Kachchh	Rapar	Dedarva	477	32.5	88.4	11.6	24.1	98.3	1.7	25.8	60.0	40.0
Kachchh	Rapar	Chitrod	4100	31.6	76.0	24.0	24.4	89.8	10.2	22.9	29.4	70.6
Banaskhantha	Bhabar	Chachasana	964	59.4	50.4	49.6	33.5	83.0	17.0	43.6	8.4	91.6
Banaskhantha	Bhabar	Chichodara	1361	58.8	49.1	50.9	36.7	74.8	25.2	37.5	6.3	93.7
Banaskhantha	Bhabar	Gosan	1487	56.0	51.8	48.2	48.7	56.6	43.4	13.0	19.4	80.6
Banaskantha	Deesa	Mudetha	12230	39.5	68.1	31.9	35.5	72.5	27.5	10.1	29.8	70.2
Banaskantha	Kankrej	Khodla	1878	41.9	71.7	28.3	37.0	78.3	21.7	11.7	21.7	78.3
Banaskantha	Kankrej	Khimana(Palodar Na Vas)	9028	37.9	72.4	27.6	32.1	83.8	16.2	15.4	9.5	90.5
Banaskantha	Kankrej	Raviyana	1826	49.4	62.1	37.9	47.5	61.7	38.3	3.9	71.4	28.6
Banaskantha	Kankrej	Chimangadh	1660	58.7	54.3	45.7	47.5	56.8	43.2	19.0	43.8	56.2

Banaskantha	Kankrej	Padardi	3192	41.3	61.5	38.5	27.7	78.0	22.0	32.8	27.8	72.2
Banaskantha	Kankrej	Nekoi	1138	51.4	53.0	47.0	37.1	65.4	34.6	27.9	20.9	79.1
Banaskantha	Kankrej	Isarva	2605	55.7	51.2	48.8	36.0	71.1	28.9	35.4	14.8	85.2
Banaskantha	Kankrej	Tervada	9057	47.2	60.1	39.9	29.7	86.6	13.4	37.1	15.1	84.9
Banaskantha	Kankrej	Fatepura	366	66.1	49.6	50.4	30.1	90.0	10.0	54.5	15.9	84.1
Banaskantha	Kankrej	Kashipura	691	45.9	65.6	34.4	21.4	98.0	2.0	53.3	37.3	62.7
Banaskantha	Kankrej	Kantheriya	719	34.8	78.0	22.0	27.3	98.0	2.0	21.6	5.6	94.4
Banaskantha	Kankrej	Rajpur	1419	33.7	73.2	26.8	23.5	94.3	5.7	30.3	24.8	75.2
Patan	Radhanpur	Lotiya	1795	48.4	58.8	41.2	45.5	60.3	39.7	6.1	35.8	64.2
Patan	Saltanpur	Dhrandva	836	61.5	50.4	49.6	25.0	86.6	13.4	59.3	25.6	74.4
Patan	Saltanpur	Gadha	1657	55.7	51.0	49.0	50.6	54.9	45.1	9.1	11.9	88.1
Patan	Saltanpur	Rampura	623	26.5	92.7	7.3	24.9	93.5	6.5	6.1	80.0	20.0
Patan	Saltanpur	Korda	3998	48.9	68.9	31.1	33.7	75.2	24.8	31.2	54.9	45.1
Patan	Saltanpur	Jamvada	1332	56.4	50.6	49.4	45.9	59.2	40.8	18.6	12.9	87.1
Patan	Saltanpur	Patanka	991	40.9	74.8	25.2	40.7	74.7	25.3	0.5	100.0	0.0
Patan	Saltanpur	Dhokavada	2597	35.9	75.3	24.7	29.1	85.6	14.4	18.9	31.3	68.8
Patan	Saltanpur	Vauva	3242	38.9	73.7	26.3	38.2	74.3	25.7	1.7	40.9	59.1
Patan	Saltanpur	Bakutra	2027	38.3	69.9	30.1	37.6	69.7	30.3	1.9	80.0	20.0
Patan	Saltanpur	Bavarda	1102	33.8	87.1	12.9	33.7	87.3	12.7	0.5	50.0	50.0
Patan	Saltanpur	Babra	1668	26.6	98.0	2.0	23.0	99.2	0.8	13.3	89.8	10.2

Patan	Saltanpur	Daldi	1370	56.4	49.5	50.5	32.9	74.1	25.9	41.7	15.2	84.8
Patan	Saltanpur	Datrana	2257	38.0	71.1	28.9	23.3	94.7	5.3	38.7	33.7	66.3
Patan	Saltanpur	Madhutra	4075	49.7	56.7	43.3	35.2	67.5	32.5	29.1	30.4	69.6
TOTAL CORE			**106228**	**42.6**	**65.0**	**35.04**	**32.9**	**77.0**	**23.0**	**22.7**	**24.05**	**76.0**
Kachchh	Rapar	Khandek	2347	43.8	65.4	34.6	38.8	69.0	31.0	11.6	37.8	62.2
Kachchh	Rapar	Moda	2053	50.8	54.0	46.0	25.2	89.4	10.6	50.3	19.1	80.9
Kachchh	Rapar	Bharidia (Bhutakia)	2571	36.2	73.7	26.3	26.6	93.3	6.7	26.5	19.1	80.9
Kachchh	Rapar	Vallabhpar	1443	42.1	62.0	38.0	39.8	61.7	38.3	5.6	67.6	32.4
Kachchh	Rapar	Govindpar	565	29.6	98.2	1.8	23.4	99.2	0.8	21.0	94.3	5.7
Banaskhantha	Bhabar	Buretha	1086	47.6	57.1	42.9	47.6	57.1	42.9	0.0	0.0	0.0
Banaskhantha	Bhabar	Dhenkwadi	666	47.1	60.2	39.8	45.3	61.3	38.7	3.8	33.3	66.7
Banaskantha	Deesa	Vasada	1951	26.4	96.7	3.3	25.9	97.8	2.2	2.1	45.5	54.5
Banaskantha	Kankrej	Nathpura	3091	45.3	63.0	37.0	38.4	73.4	26.6	15.3	5.1	94.9
Banaskantha	Kankrej	Varasada	3634	42.1	68.4	31.6	32.7	79.5	20.5	22.2	29.5	70.5
Patan	Radhanpur	Santhli	1819	49.3	58.4	41.6	39.9	68.2	31.8	19.0	16.5	83.5
Patan	Saltanpur	Ganjisar	2248	48.3	61.2	38.8	28.5	94.9	5.1	40.9	12.6	87.4
Patan	Saltanpur	Daisar	1308	31.6	95.9	4.1	28.7	98.1	1.9	9.2	73.7	26.3
Patan	Saltanpur	Zandala	2139	53.0	57.4	42.6	38.1	74.4	25.6	28.2	13.8	86.2
Patan	Saltanpur	Sidhada	2971	29.8	85.4	14.6	28.8	86.7	13.3	3.4	50.0	50.0
TOTAL BUFFER 29892				**41.7**	**67.1**	**32.9**	33.2	**78.8**	**21.21**	**20.3**	**21.3**	**78.7**

GRAND TOTAL	**136120**	**42.4**	**65.4**	**34.6**	**77.8**	**77.4**	**22.6**	**22.2**	**23.5**	**76.5**

4.6.4.6 Agricultural Profile of AOI

Agriculture happens to be the main source of subsistence for the majority of people. According to the 2011 Census, 37% of the population in the core are are engaged as cultivator and 23% as agricultural labour. Along the Buffer area Cultivator comprises of 29% and agricultural labour as 36%. Th major portion of cultivable land is occupied by castor, mustard, wheat, bajra, pulses, cottons, cumin, chilies, tomato, and cauliflower.

Table 4-18 Number of Persons Working as Cultivators and Agricultural Laborers in AOI

Study Area	Total Worker	Cultivator			Agricultural Labour		
		Total	**Male**	**Female**	**Total**	**Male**	**Female**
Core Villages	45204	16800	15234	1566	10541	6872	3669
%		*(37.2)*	*(90.7)*	*(9.3)*	*(23.3)*	*(65.2)*	*(34.8)*
Buffer Villages	12466	3619	3327	292	4674	3279	1395
%		*(29.0)*	*(91.9)*	*(8.8)*	*(37.5)*	*(70.2)*	*(29.8)*
Total	**57670**	**20419**	**18561**	**1858**	**15215**	**10151**	**5064**

15

Land Use Pattern

The land use pattern in the AoI is comprised of agricultural, cultural wasteland, forest and barren land. As can be seen from figure below, the land type in comprised mainly of the Barren Land (38%) of followed by waste land (16%) Barren uncultivable land comprises of 18.8% of the total area. Only 12% (6467.3 ha). Forest land in the study area comprises of 5%. The forest area is mainly found in Sanwa villages where it is observed that the line will cut through some reserved forest. Land under non-agricultural use is 9%, Fallow land comprises of 2% and land under trees and crop is very low (1%).

As reported during consultation, the most of the land are left uncultivated and this has been the trend so far, however the local community reported that in the current year (2020) most of the uncultivated land has been brought under cultivation due to good amount of rainfall received this year.

[15] Core villages comprises of the 62 village include the project footprint area (considered as the direct impacts due to acquiring rights of use/RoW for tower bases and land-use restrictions in transmission corridor).
[15] Buffer Villages comprises of 14 villages that are directly impacted and falls within a corridor of 500 meter on either side of the transmission line
[15] District Census Handbook Patan, Banaskantha and Kachchh

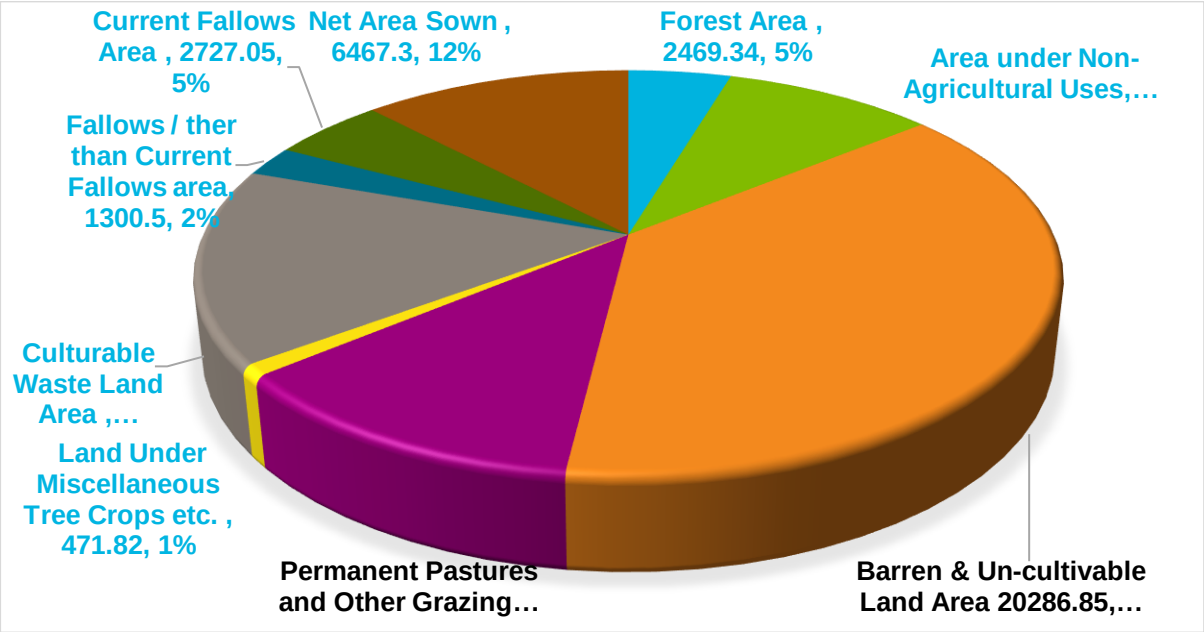


Figure 4-22. Land Type in the Study Area (in Hectare)

Land Price (Schedule rate and market price)

Land valuation in the AoI comprises of market rate and government rate. The market value of land varies according to the location and its proximity to nearby towns and industrial hubs. The prevailing government circle rate is reported to be much lower than the market value as the government land schedule rate (2011) is yet to be updated.

As per consultation with the local people, it has been found that market value of land in the study area is based on (i) land located near to highways fetch higher price and (ii) land located away from the village. whereas government categorisation of land value is based on irrigated land and unirrigated land.

From the different consultation with the local community following are the difference in the land prices (market value and circle rate)

Table 4-19 Different market price

Villages	Market Value		Government Circle Rate	
	Near Highway	**Outer Village**	**Irrigated (per Bigha)**	**Unirrigated (per Bigha)**
Khimana	INR 6 Lakhs/Bigha	INR 5 Lakhs/Bigha		
Rampura	INR 15 Lakhs/Bigha	INR 20 Lakhs/Bigha		
Chachasna	INR 3.5 Lakhs/Bigha	INR 3 Lakhs/Bigha		
Dasar	INR 2-3Lakhs/Bigha	INR 5-6 Lakhs Bigha	81,100	64,880
Sanwa	INR 3 Lakhs/Bigha	INR 4 lakhs/Bigha		

Source: Consultation with Local Community

Land Holding Pattern

As reported during consultation with the local community in the study area, the average land holding size of farmer vary from 5-8 hectares (10-20 acres) for small farmers and 20 hectares in the case of large farmers. The ownership of land is mainly with male members. The practice of sharecropping is common in the area. Under sharecropping, the people who do not have land or possess marginal land, generally taken the land on lease to carry out agriculture. These are considered vulnerable groups. The landowner provides all the inputs and the produce are distributed among the landowner and the cultivator. As observed during site visit, two type of sharecropping is prevalent in the study area

- People who do not have land or possess marginal land, generally lease out land to carry out agriculture. The landowner provides all the inputs supply and the produce are share 80:20
- Another form of sharecropping is that when one party provides the land and labour and the third party provides the water. Under this kind of arrangement, each party get 1/3 of the produce

Both these practices are very common in the study area, and the presence of sharecropper were reported during consultation in Khimana along the tower footing. For ROW corridor, the exact presence of the sharecroppers could not be ascertained since the process of acquiring easement rights/right of use along the ROW corridor is still ongoing.

Irrigation

In Patan Both canal and tube well irrigation facilities are available in the district. The canal irrigation water has 18.03 percent share of total irrigation area of the district. Availability of the canal water is very good and available for full period of cropping. Most of the irrigation is done by tube well (72.04%). As far as underground water resources are concerned, about 50 percent of the total water of the district is not suitable, thus making the use of underground water for crop production with agronomic management.

For a district like Kachchh, rainfall irrigation is a fundamental necessity for its agricultural development. The area under canal irrigation, through Narmada project, is increasing at a much faster pace over past years; however, there remains the problem of irregular and insufficient water supply16. As per the 2011 census data, the total net sown area in the study area is 72765.04 hectare of which 23.1% is irrigated and 76.9% is unirrigated land.

As per consultation with the local community reveal that farmers usually have an informal contract with third party contractor for providing irrigation facilities. The irrigation service provider would supply irrigation water from the Narmada canal (10-15 km), Branch Canal and distributor (3 km) to villages as far as with the help of diesel pump set and a pipe water. The agreement/term of payment is ¼ of the crop produce is shared with the irrigation provider for providing irrigation system. Though few farmers had tried to explore used of borewell however the depth of the ground water accompanied with its high salinity make it unfit for irrigation facilities.

[16] District Census Handbood, Kachchh,2011

Cropping Pattern

In the Patan district nearly 90 percent of soil is highly sandy. The alluvial soils are found in the talukas of Santalpur and Radhanpur. The type of soil is saline and can yield crops only under optimum rainfall conditions. Medium black soil is met with but only in patches in the low-lying portions of Harij and Chanasma. The main Kharif crops in district are Bajri, Jowar, Mung, Math, Sesame, Rapeseed etc. Wheat is the main Rabi crop. The taluka of Radhanpur and Santalpur constitute the chief wheat growing area. In good rainy season potatoes are grown mainly in riverbeds.

In Kachchh mostly three types of farming systems are observed i.e. rain fed farming, irrigate farming through open well/canal and irrigate farming through tube well. Along the study area, farmers practice double cropping pattern. The primary crops grown are Bajra, Groundnut, Cotton, Castor, Wheat Pearl Millet, and sesame amongst Kharif crops (monsoon crops from June/July to September/October). In Rabi the major crops grown include Groundnut, Cumin, Wheat, Mustard and Coriander. (winter crops from November to April/May).

As observed during site visit, Cotton, Castor, Mustard are the seen growing on the agricultural farms. The average yield of the crops is provided below.

In Banaskantha the major food crops which are less remunerative. The main kharif crops in the district are bajri, jowar, moong, math, tal, rapeseed etc. Wheat is the main Rabi crop. In the study area due to meagre irrigation facilities, Bar is grown abundantly.

Table 4-20 Crop pattern in the different district

Crop	Agricultural Season	Kachchh Productivity (kg/ha[17])	Patan Productivity (kg/ha)	Banaskantha Productivity (kg/ha)
Mustard	Sept/Oct - Jan/Feb	3676	1562	1394
Cotton	Jun/July-Sept/Oct	3492	374	3837
Castor	Jun/July-Sept/Oct	2368.3	1651	2298
Bajra	Jun/July-Sept/Oct	107	968	1271
Jowar	Jun/July-Sept/Oct	150	1071	-
Groundnut	Jun/July-Sept/Oct	3974	-	-
Pearl Millet	Jun/July-Sept/Oct	541	-	-
MungBean	Feb/March-Jun/July	570	-	-
Cumin	Sept/Oct-Jan/Feb	812		1778
Wheat	Jun/July-Sept/Oct	2368.3	3238	2695

[17] As per District Agriculture Office, Gandhigram

Sesame Seed	Sept/Oct-Jan/Feb	761.3	421	346

Source: District Census Handbook

4.6.4.7 Social Infrastructure

Drinking Water:

The major source of drinking water is government supplied tap water. As per the census data 2011, 100% of the villages in the study area are connected through Tap water, most of which these tap waters are functioning throughout the year. For tube well the water table is found at the depth of 870-1000m. As reported during consultation that villages are facing drinking water crisis due to irregular supply of tap water and soil salinity problem as a result the villager are facing difficulty in getting access to clean drinking water.

Electricity

About 100% villages in the study area have access to electricity for domestic purposes. The electricity is reported to be available throughout the day. For agriculture purposes, electricity is available for 8 hr a day both during summer and winter season

Banking Facilities

95% of the villagers in the AoI have access to banking facilities such as Commercial bank, 80% of the villages have access to Agricultural cooperatives. However, for commercial banking ththe local community have to travel more than 5 kms and beyond 10 km for accessing this service. Self-help group is found to be active in all the villages within the study area.

4.6.4.8 Common Property Resources

Common Property Resources are assets that are neither private nor state property, but common property. In the 21st century, due to resource constraint ere CPR are geographically localized resources that are common property to well-defined groups of people, but to which people not belonging to the groups do not have a right of access. It has now become customary to refer to such assets as "common-property resources.18 Along the AoI, no record of common property resources was reported.

4.6.4.9 Sensitive Receptor along the Alignment within AOI

Potential Area of sensitivities along the alignments includes nearby settlements and houses located near the ROW corridor, agriculture fields.

- Review of GIS satellite imagery, the TL corridors will pass through few houses located at a distance of 70 metres from the 765-kV DC line. This is identified as the area of sensitivity regarding health and safety of those residing near to the corridor. Other sensitivity areas include small temples and schools located near to the ROW corridor.
- The tower footing and the ROW corridor will cause long term restriction of land use and diminution of land value. As mentioned earlier, villagers along the ROW undertake double cropped cultivation, hence the damage to agricultural crops is anticipated during construction and stringing activities

Existing mitigation measures adopted while executing construction near houses & settlement, the community. Details of the impacts analysis and mitigation measure has been discussed in section **5.4.13** of the report.

4.6.5 Cultural and Heritage Site

In Kutch is famous for its rich living heritage of handicrafts – embroideries, bandhani tie-dye, block printings, metal crafts, woodwork, pottery and some rare arts thrive in the district. Some of these historical places, the archaeological site at Dholavira offers an insight into the 5000-year old Indus Valley Civilisation, the palaces of Bhuj house incredible art treasures, and scores of fortified villages are worth visiting for their heritage in Bhachau

[18] Cengage, Common Property Resource, December 1st, 2020
https://www.encyclopedia.com/social-sciences/encyclopedias-almanacs-transcripts-and-maps/common-property-resources

Tehsils, Tomb of Jesal Toral in Anjar, Koteshwar Mahadev in Lakhpat, Puanrodadh Monuments in Nakhatarana, Aina Mahal, and Ramkund Step well in Bhuj.

In Patan District, the major significant cultural, religious and archaeological monuments are located Patan Taluka,Sidhpur, Sami etc. Some of these historical places such as Panchasara Parshvanath Jain Derasar is one of the largest of more than 100 Jain temples in Patan, Rann ki Vav etc. are located in the main city of the district.

Banaskantha has large presence of pilgrimages like Ambaji & Kumbharia. Apart from Ambaji, Banas Kantha has other interesting places like Kumbharia which is a religious place for Jains.

Along the project sites, except in Deesa taluka (One significant site the Bhiladiyaji Jain Temple located in Bhildi, Deesa Talukas is found to be located near to the project site (93.8 km)) no records of presence of cultural heritage sites in the project area, except the local temple and mosque. Consultation with the local community in Loriya reveal that major cultural heritage is located mainly in town areas and far from the villages. Discussion with site representatives also reveal that the TL corridor does not pass through any cultural, religious, historical sites.

5. Anticipated Impacts and Mitigation Measures

This section identifies, predicts, evaluates and provides mitigation measures for the probable impacts on different environmental and social parameters due to construction and operation of the proposed 765 KV LBTL transmission line in Kutch District of Gujarat. Survey and assessment of the existing baseline environmental and socio-economic scenario has been done through primary & secondary data collection, reviewing the process and as per the statutory requirements. The environmental impacts that the proposed project is likely to usher during construction and operation phases are identified and assessed in this section along with recommended mitigation measures. Superimposing impacts on the existing baseline scenario will enable formulation of a suitable and site-specific Environmental Managemental Plan in the subsequent section of the report.

Identification of anticipated significant environmental impacts due to the activities during the pre-construction/detailed design, construction and post-construction as well as operation stages of the proposed power plant project was carried out using the checklist method during the course of ESIA exercise and later during EIA study. Such anticipated impacts without any mitigation measure had been characterized as being of varied intensities – minor, medium and major and were mostly of adverse nature. Beneficial impacts, although few, were characterized as significant. During ESIA study, identification of significant environmental impacts due to the activities during various stages of the proposed transmission line were identified through a detailed matrix developed and presented in subsequent sections.

Identification of anticipated significant environmental impacts of the proposed project has been followed by formulation of measures toward mitigating them. Enhancement measures for beneficial impacts and compensation to project affected persons have also been proposed. The mitigation measures, in addition to the EIA regulatory requirements have also taken into consideration the compliance requirements of environmental and social risk management standards/guidelines of Institutional Funding Agencies like IFC E&S Performance Standards and EHS Guidelines.

The alignment of the transmission line has been done in line with the statutory requirements under the Electricity Act and Central Electricity Authority, Ministry of Power and Ministry of Environment, Forest and Climate Change (MoEF), GoI guidelines. The alignment does not pass through any ecologically sensitive area such as biosphere reserve, national park and wildlife sanctuary there is no archaeological/ cultural/ historically important monument or place within the 10 km radius. The project site involves 3.8423 hector of forest land.

As described earlier the emissions and discharges are only expected during the construction period. However, construction and demolition and hazardous waste would be generated during the election, and string activities. In case of operations emissions and discharges are negligible. Hazardous waste, E-waste and Battery waste would be generated through the entire lifecycle of the project.

5.1 Impact Assessment Methodology

Impact identification and assessment starts with scoping and continues through the remainder of the process.

- **Impact prediction:** to determine what could potentially happen to resources/receptors because of the Project and its associated activities.
- **Impact evaluation:** to evaluate the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity, value and/or importance of the affected resource/receptor.
- **Mitigation and enhancement:** to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts.
- **Residual impact evaluation:** Evaluation of the significance and scale of the environmental impacts predicted to remain after the application of mitigation measures outlined in this ESIA study

5.2 Impact Criteria and Ranking

Once all project environmental aspects were comprehensively identified for the different activities of the project, the level of impact that may result from each of the activity-component interactions has been assessed based on subjective criteria.

For this, three key elements have been taken into consideration based on standard environmental assessment methodologies:

- **Severity of Impact:** Degree of damage that may be caused to the environmental components concerned.
- **Extent of Impact:** Geographical spread of impact around project location and corridors of activities; and
- **Duration of Impact:** Time for which impact lasts taking project lifecycle into account.

These elements have been ranked in three levels viz. 1 (low), 2 (moderate) and 3 (high) based on the following criteria provided in Table 5.1.

Table 5.1. Impact Prediction Criteria

Impact Elements	Criteria	Ranking
Intensity	• Impact resulting in long term and/ or medium damage to the natural environment. • Major impact on community and occupational health (e.g. serious injury, loss of life) on account of accidental events and related operational activities.	3
	• Impact resulting in short term change and / or damage to the natural environment. • Temporary loss of land, source of livelihood for affected communities • Impact on terrestrial habitat, endangered species, drainage pattern and community resources. • Moderate impact on occupation and community health & wellbeing (e.g. noise, light, odour, dust, injuries to individuals)	2
	• Impact causing temporary change in air shed, surface water quality, loss of some species etc. • Limited impact on human health and well-being (e.g. occasional dust, odour, light, and traffic noise).	1
Extent	• Where the extent of impact is beyond the AoI to cover impacts that affect nationally important environmental resources or affect an area that is nationally important/protected or have macro-economic consequences	3
	• Impacts extend beyond the area of influence to affect regionally important environmental resources or are experienced at a regional scale as determined by administrative boundaries.	2
	• when impact due to the proposed Project related activities is restricted within Area of Influence which has been determined as 5 km.	1
Duration	• when impacts would occur during the development of the Project and cause a permanent change in the affected receptor or resource that endures substantially beyond the Project lifetime	3
	• when impacts would continue for an extended period of time; this is based on the understanding that there will be recovery of the effected environmental component to its best achievable pre-project state within 1 to 5 years	2
	• when impact is likely to be restricted for a duration of less than 6 months; This is based on the understanding that there will be recovery of the effected environmental component to its best achievable pre-project state within 1 year;	1

A positive or beneficial impact that may result from this project has not been ranked and has been depicted in the form of ++.

5.3 Impact Significance

The significance of impact has been determined based on a multiplicative factor of three element rankings. Table 5.2 depicts impact significance in a scale of LOW-MEDIUM-HIGH and would be used for delineation of preventive actions, if any, and management plans for mitigation of impacts.

Impact significance has been determined considering measures which have been factored in the design and planning phase of the project. Legal issues have been taken into account, wherever appropriate in the criterion

sets, to aid in LBTL effort to comply with all relevant legislation and project HSE requirements. Additionally, the results of quantitative impact prediction exercise, wherever undertaken, have also been fed into the process.

Table 5.2. Criteria Based Significance of Impacts

Severity of Impact (A)	Extent of Impact (B)	Duration of Impact (C)	Impact Significance (A X B X C)	
1	1	1	1	**Negligible**
1	1	2	2	**Low**
1	2	1	2	
2	1	1	2	
1	1	3	3	
1	3	1	3	
3	1	1	3	
1	2	2	4	
2	1	2	4	
2	2	1	4	
1	2	3	6	**Medium**
1	3	2	6	
2	3	1	6	
3	1	2	6	
3	2	1	6	
2	1	3	6	
2	2	2	8	
3	1	3	9	**High**
3	3	1	9	
1	3	3	9	
2	2	3	12	
2	3	2	12	
3	2	2	12	
2	3	3	18	
3	2	3	18	
3	3	2	18	
3	3	3	27	
Beneficial Impact -			**++**	**Positive**

The impacts on each of the environmental components and its significance during the different stages of the project is presented in Table 5.3 and discussed in detail in the following section. This is followed by a point wise outline of mitigation measures recommended.

5.2.1. Residual Impacts

Residual impacts refer to those environmental and social impacts predicted to remain after the application of mitigation outlined in the ESIA. The predicted residual effects are considered for each Project phase (Construction, Operation, Decommissioning/post-decommissioning, and Unplanned Events).

Table 5.3. Anticipated Impact of Important Environmental Components – Natural and Socio-economic Environment

Environmental Aspect / Activity	Physical Environment		Physico-Chemical Environment							Ecological Environment		Human Environment								
	Land Use	Topography & Drainage	Soil/ Sediment Quality	Air Quality	Noise & Vibration	Surface water resource	Surface water quality	Ground water resource	Ground water quality	Terrestrial Flora & Fauna	Aquatic Flora & Fauna	Aesthetic & Visual Impact	Job & economic opportunity	Social & Cultural Structures	Economy & Livelihoods	Infrastructure & Services	Resettlement	Cultural Resources	Community Health & Safety	Occupational health & safety
Pre- Construction Phase																				
Obtaining of right of use Land by Company for transmission lines															■					
Removal of Crops/ Trees										■		■								
Procurement of Soil for filling of the sub-station land											■									
Levelling and Compaction of the soil				■	■														■	■
Storage and Handling of Fuels (Unplanned Release)			■				■		■											■
Construction Phase																				
Building and operation of Construction camp and facilities	■	■	■	■	■	■	■			■			■		■				■	
Strengthening and Widening of Access Road				■	■												■		■	
Transport of Raw Material, Manpower				■	■														■	
Development of Foundation for tower footing				■	■			■				■	■						■	■
Erection of tower				■	■							■	■						■	■
Stringing of conductor				■	■		■			■					■				■	■

Environmental Aspect / Activity	Physical Environment		Physico-Chemical Environment							Ecological Environment		Human Environment								
	Land Use	Topography & Drainage	Soil/ Sediment Quality	Air Quality	Noise & Vibration	Surface water resource	Surface water quality	Ground water resource	Ground water quality	Terrestrial Flora & Fauna	Aquatic Flora & Fauna	Aesthetic & Visual Impact	Job & economic opportunity	Social & Cultural Structures	Economy & Livelihoods	Infrastructure & Services	Resettlement	Cultural Resources	Community Health & Safety	Occupational health & safety
Generation of Sewage and Discharge							■		■										■	
Storage and Handling of Chemicals/Fuels (unplanned release)							■		■											■
Waste Handling and Storage			■					■				■							■	■
Testing and Commissioning							■		■											■
Operation Phase																				
Operation of Transmission Line													■						■	
Maintenance of Transmission Line										■			■							■
Management of Non-Hazardous Waste (O&M)			■				■		■		■								■	■
Management of Hazardous Waste (O&M)			■						■		■								■	■

5.4 Impact Assessment (Detailed Design Construction and Operation)

5.4.1 Potential Impact on Land Use

Potential impact on land use during preconstruction and construction phase may arise due to below mentioned activity

Construction Phase

- Procurement of land for substation construction
- Obtaining Right of Use of land for transmission line
- Land lease for setting up construction camp
- Strengthening and widening of access road

Impact Due to Procurement of Land /Obtaining Right of Use

Total land requirement of the project is 378400 sqmt of which 88800 acres would be obtained for the transmission line and. For transmission line 88800 acres acres would be required however, this land would not be procured but a right of use would be obtained from the landowners. As per the site surveys and consultation with the community, majority of the land parcels are double crop agricultural land.

The establishment of transmission line such impacts are not envisaged because the person can continue to cultivate the land. However, there would be some restriction imposed on the conversion of land to other land use e.g. residential, commercial, and industrial over the entire lifecycle of the project

Intensity of Impact	**1**	**Extent of Impact**	**1**	**Duration of Impact**	**3**
Impact Significance = 3 i.e. Low					

Mitigation Measures

The following measures will be implemented to mitigate potential impact on land use.

- Land would be obtained limited to the tower footing and RoW required for the project as pe the norms stipulated in the IS Codes for different capacities of transmission lines.
- LBTL would ensure full compensation is paid to landowners prior to taking possession of land for transmission line;

Residual impact

With implementation of the precautionary and the mitigation measures mentioned impacts on land use would be further reduced.

Impact Due to Land Lease for Setting Up Construction Camp

A contractor camp has been setup on land leased for the purpose. The Contractor has taken total 12.0 acres land at Radhanpur from one landowner on lease basis. As per the consultation this land was permeant fallow which would be returned to the owner in its original condition. Thus, there would be no permanent change in land use., however, the said area is very small. Change in land use is assessed to be negligible.

Intensity of Impact	**1**	**Extent of Impact**	**1**	**Duration of Impact**	**1**
Impact Significance = 1 i.e. Negligible					

Impact Due to Strengthening and Widening of Access Road

For the construction of the transmission line no movement of heavy vehicle is envisaged. Most of the equipment and material would be carried by tractor trolley or headloads. However, no resettlement is envisaged. Thus, the impact due strengthening and widening of access road is assessed to be negligible.

Intensity of Impact	**1**	**Extent of Impact**	**1**	**Duration of Impact**	**1**
Impact Significance = 1 i.e. Negligible					

Mitigation Measures

The following measures will be implemented to mitigate potential impact on land use.

- Minimum required amount of land for construction camp and strengthening and widening of access road would be taken
- Payment of compensation prior to taking possession of land and RoW clearance.
- Lease land would be restored in the previous condition after completion of lease period.

Operation Phase

During the operation phase the no long term changes has been made.

5.4.2 Potential Impact on Topography and Drainage

Impact on land topography and drainage pattern would arise due to below mentioned activity

Construction Phase

- Setting up construction camp

Impact Due to Filling of Land for Construction of proposed Substation

In case of transmission line, no filling or cutting is envisaged so the impact has been scoped out.

Intensity of Impact	**1**	**Extent of Impact**	**1**	**Duration of Impact**	**3**
Impact Significance = 3 i.e. Low					

Mitigation Measures

The following measures will be implemented to mitigate potential impact on topography and drainage.

- No micro-drainage channel shall be blocked.
- Regular cleaning of drains would be done to restrict the blockage in the drain, ensuring free flow of water.

Residual impact

With implementation of the precautionary and the mitigation measures mentioned for the land filling and to avoid or minimise impacts of land filling would be negligible.

5.4.3 Potential Impact on Soil Quality

Construction Phase

Impact Due to Storage and Handling of Fuel and Chemical During Preconstruction and Construction Activity

Fuel (oil) used by the construction equipment would be stored within construction camp during preconstruction period as well as construction activities to refuel the earth moving vehicle. Accidental release of fuel oil can contaminate the soil of that area and also can contaminate the groundwater. Soil contamination during the construction phase may result from leakage and spillage of oil, lubricants, fuel from heavy equipment or leakage from chemical/fuel storage Fuel, chemical or any other hazardous materials e.g. paints, solvents transformer oil

are usually, as practice stored in the open. Leakage or spillage during handling can cause soil contamination. Maintenance of vehicle, equipment and machinery would cause accidental spillage. Following measures would reduce the chances accidental spillage of oil into open area (soil) and associated impact is negligible.

Intensity of Impact	**1**	**Extent of Impact**	**1**	**Duration of Impact**	**1**
Impact Significance = 1 i.e. Negligible					

Mitigation Measures

The following measures will be implemented to mitigate potential impact due to accidental spillage of fuel

- Drip tray would be used during refuelling
- Maintenance of earth moving vehicle would be carried out in designated place with concrete floor
- Oil, chemical Storage area would be covered and concrete floor and bund.
- Oil and chemical container would be stored with secondary containment like dyke or embankment.
- Presence if adequate spill control kits & their appropriate use to contain and clean small spills and leaks
- The Contractor will prepare guidelines and procedures for immediate clean-up actions following any spillages of oils, fuels or chemicals;
- A site-specific Emergency Response Plan will be prepared by the Contractor for soil clean-up and decontamination; and
- The construction contractor will implement a training program to familiarise staff with emergency procedures and practices related to contamination events.

Impact due to Construction of tower

The construction of the lattice structure tower for transmission lines would require development of foundation up to a depth of 3 m. At four legs of the tower, topsoil will be stripped, and foundations will be dug up to a depth of 3 m depending upon different technical consideration. General practice shows that upon construction of the transmission tower, land below the tower is used for cultivations. Therefore, if the topsoil is not removed and reinstated properly impacts are envisaged on the soil quality due to construction of the transmission tower. Further movement of vehicle carrying men and material to the tower location over agricultural land can cause compaction.

The intensity of such impact is medium because the soil would regenerate over a period of time and is limited to a tower footing area. Thus, the impact is considered as low. However, with these mitigations measure the intensity of the impact can further be reduced.

Intensity of Impact	**2**	**Extent of Impact**	**1**	**Duration of Impact**	**1**
Impact Significance = 2 i.e. Low					

Mitigation Measures:

- Fuel storage and refuelling areas, the area should be made impervious.
- Excess excavated material should not be dumped by the contractor on any adjoining vacant land or agricultural land. The excess excavated material to be stored at a specified location so that it can be reused wherever possible or used for strengthening of shoulders or other lower order roads.
- Construction debris especially from concreting should be utilized in the backfilling wherever possible. All construction debris which cannot be reused should be disposed at pre-designated sites. The Contractor should identify site for temporary storage of the construction debris during the pre-construction in consultation with the local panchayat. The PIU should be informed about the location.
- Vehicular movement over agricultural land should be restricted.

Impact Due to Waste Handling and Storage

Soil may become contaminated due to improper handling and storage of waste. During the construction of the transmission line MSW would be bulk of the waste generated It is non-hazardous in nature. Construction waste e.g. will comprise of surplus or off-specification materials such as concrete, steel cuttings/filings, wooden planks, packaging paper or plastic, wood, plastic pipes, metals, etc would also be generated. Large quantities of which would be recyclable or inert. However, some hazardous waste would be generated from both transmission line e.g. Waste rags and cotton, in case of substation empty transformer oil drums, waste lube from machinery etc are hazardous waste. In addition, there are some possibly of generation of e-waste from substation e.g., off-spec equipment or damaged equipment. These hazardous waste and e-waste and unless handled stored and disposed of properly can lead to contamination of soil.

Even though the intensity of such impact is high it is only limited to the construction camp. As the contractor is responsible for cleaning the site before decommissioning the duration is considered as low and resultant impact is low. However, with these mitigations measure the intensity of the impact can further be reduced.

Intensity of Impact	**3**	**Extent of Impact**	**1**	**Duration of Impact**	**1**
Impact Significance = 3 i.e. Low					

Mitigation Measures:

The measures in place to properly manage waste and thereby minimize any impacts to soil and sediment quality are:

- Design of processes to prevent/minimise quantities of wastes generated, and hazards associated with the waste generated;
- Batteries containing liquid shall be kept on impervious surfaces;
- Training labourers for waste segregation and disposal in designated areas and use of sanitation facilities;
- Segregation of hazardous and non-hazardous waste and provision of appropriate containers for the type of waste type (e.g., enclosed bins for putrescible materials to avoid attracting pests and vermin and to minimise odour nuisance);
- Proper storage of the construction materials and wastes to minimise the potential damage or contamination of the materials.
- Implementation of construction materials inventory management system to minimise over-supply of the construction materials, which may lead to disposal of the surplus materials at the end of the construction period.
- Storage of wastes in closed containers away from direct sunlight, wind and rain;
- Storage of waste systematically to allow inspection between containers to monitor leaks or spills;
- Contractor to carry out site clearance and restoration of site to original condition after the completion of construction work; PIU to ensure that site is properly restored prior to issuing of construction completion certificate

Residual impact

With implementation of the precautionary and the mitigation measures mentioned for the storage and handling of chemicals and to avoid /minimise impacts to soil/sediment the residual impact would be negligible.

5.4.7 Potential Impact on Air Quality

Impact on air quality may be arise due to below mention activity

Construction Phase

- Transport of construction material including earth to proposed substation site
- Fugitive emission from earthwork in proposed substation and tower construction

Impact Due to Dust

During construction, the project is likely to generate dust (as particulates). There will be times during the construction phase especially during the construction of foundation of towers and filling of soil at the substation to raise the height when elevated dust concentrations may occur. Higher amounts of dust will be generated at material handling and storage areas. A large percentage of such dust emissions from construction sites have been found to comprise of particles which are coarse in size (>10 microns) and tends to settle down within 200 meters of the source of emissions. The smaller fractions (PM10) can however be carried over longer distances in a dust cloud. In the case wind velocity is higher and depending on prevailing wind direction maybe deposited in the adjoining settlements with a potential to cause soiling of residential premises, deposition on agricultural crops, etc. However, this will be a short-term impact lasting for a few months during the construction. Since the transmission lines avoid settlement areas and the minimum RoW for 765 kV is 62 meter respectively, the intensity of impact is low. The transmission line work is carried out at isolated locations away from habitat & densely populated area. Hence, little chance of dust affecting residents. Further, vendors take complete measures while executing work by sprinkling water before excavation to avoid dust flying

Impact Due to Emissions

The number of vehicle plying would not be significantly higher due to dispersion impacts from vehicular emissions decrease rapidly with increasing distance from the source. It is not expected to be significant at distances of more than 200 m from the source; they would not be significant Moreover these impacts would be limited to the construction period of approximately 18 months. Since these impacts would be restricted within the area of influence of the project the impact is of low significance

The implementation of the good construction practices would minimise adverse air quality impacts.

Intensity of Impact	**2**	**Extent of Impact**	**1**	**Duration of Impact**	**1**
Impact Significance = 2 i.e. low					

Mitigation Measures:

To reduce dust impacts, the following measures would be put in place:

- Periodic water-spraying/sprinkling and sweeping of unpaved and paved roads to minimise dust and remove mud and debris. Sprinkling of water in dust prone activities like transportation on unmetalled road, digging works, material handling etc would be taken up.
- Covering of vehicles carrying dusty materials to prevent materials being blown from the vehicles while travelling;
- Ensuring any temporary site roads are no wider than necessary to minimise their surface area and thus the fugitive emission;
- Storing dusty materials away from site boundaries and in appropriate containment (e.g. sheeting, sacks, barrels etc.).
- If the residents and pedestrians complain about the dust and gas, the consultant of the supervision and contractors would reconsider the construction technique.
- Burning of wastes generated at the construction sites, work camps and any other project activity related site shall be strictly prohibited;
- All stockpile materials which are likely to generate airborne fugitive dust will be covered with canvas or plastic sheets during windy season.
- Storage of excavated materials in dumping/disposal areas designated for this purpose.

Exhaust emissions would be minimized as follows:

- Enforcing speed limits for vehicles to 20 km/hr on unmade surfaces to minimise dust entrainment and dispersion;

- Vehicles and machineries would be regularly maintained to conform to the emission standards stipulated under Environment Conservation Rules, 1997.
- Monitoring would be conducted for air quality parameters and in case the parameters are on borderline or exceeds the environmental standards, stricter control measures will be adopted.
- Consideration would be made on using prefabricated materials where possible so that localised air pollution is minimised;
- Vehicles and equipment would be switched off when not in use;
- Avoiding fabrication work and shot/sand blasting work onsite.

Residual Impact

With implementation of the precautionary and the mitigation measures mentioned for prevention/reduction of dust generation and exhaust emission the residual impacts would be low.

Operational Phase

Operational phase air quality impacts are not envisaged from the project.

5.4.8 Potential Impact Due from Noise and Vibration During Construction

This section identifies and evaluates the potential impacts of the project activities due to noise generation during construction phases; and formulates the measures to mitigate and manage the identified impact.

The main sources of noise at preconstruction and construction sites are as follows:

Construction Phase

- Movement of heavy earth moving vehicle during levelling and compaction of earth at the proposed sub-station.
- Transportation of equipment. Construction materials
- Operation of Materials handling equipment, stationary equipment and other types of equipment etc.
- Traffic congestion due to stringing of conductor.
- Operation of the Winching machine

The construction activities such as transportation of raw materials for tower construction, operation of winching machine and construction machinery are likely to cause increase in the ambient noise levels. The principal source of noise during construction of transmission lines would be from operation of winching machine during stringing of transmission lines. The winching machine produces noise level of more than 70 dB (A). This can cause disturbance to the settlement, if located near (within 500 m) of the construction site.

The noise generated from the above-mentioned project activities is likely to be attenuated within 500m from the construction site. This may, however, cause discomfort the construction workers of site. There is no major settlement or sensitive receptor near the transmission lines isolated houses are only present which may be affected by the increase in noise. The construction activity will be a short-term activity. The scale of impact will be low. The potential impact on noise quality due to above mentioned construction activities is assessed to be low.

Intensity of Impact	**1**	**Extent of Impact**	**1**	**Duration of Impact**	**2**
Impact Significance = 2 i.e. low					

Operational Phase

Noise would be generated from the operation of transmission lines due to the corona effect, however, the same is not expected to cause any impact to the local community as it would be mostly be head within the RoW. Similarly, in case of substations noise would be generated from the operation of transformers, however, the same is not expected to cause any impact to the local community.

Mitigation Measures:

During construction work, the management measures shall include in the first place, use of state-of-the-art low-noise equipment wherever feasible. Material and equipment transportation vehicles shall ensure adoption of techniques for reducing noise generation including engineering control mechanism such as installation of mufflers and speed reduction in the residential area, therefore the vehicle noise impact would be minimized. Other measures include:

- Noise generating equipment e.g. DG sets, Winching machine should not be located near settlement to reduce the disturbance.
- Vehicle transporting construction material should avoid honking near settlements except for precautionary honking to alert the pedestrian/vehicles.
- Minimize noise from construction equipment by using portable street barriers to minimize sound impact to surrounding sensitive receptor.
- Conduct noise monitoring/ inspection according to the Environmental Management Plan (EMP)
- As planned the work would be carried out during the daytime only. Only in case of emergency nightwork would be carried out. In case of Night work the Management Plan for Night works (Appendix XXXX) shall be applied.
- Noise limits for construction equipment to be procured such as front loaders concrete mixers, cranes (moveable), vibrators and saws will not exceed 75 dB (A), measured at one meter from the edge of the equipment in free field, as specified in the Environment (Protection) Rules, 1986.

Residual Impact

With implementation of the precautionary and the mitigation measures mentioned for prevention/reduction in noise generation at source impacts would further reduce.

5.4.9 Potential Impact on Surface Water Quality

Impact on surface water quality may be arise due to below mention activity

Construction Phase

- Storage and handling of fuel
- Discharge of Sewage from Construction Camp
- Runoff corm construction site

Impact Due to runoff from construction site

The substation site would be raised using earth Thus, some amount of sand can be mixed with water and flow into the river, causing impacts like increased turbidity in the river water and change in sediment quality (discussed earlier). However, return water would be channelized thorough a designated channel where slit trap would be installed to trap the sand at the proposed site. This, along with the fact that it is temporary activity, the impact on water quality like increased turbidity would not be significant.

Intensity of Impact	**1**	**Extent of Impact**	**1**	**Duration of Impact**	**1**
Impact Significance = 1 i.e. Negligible					

Mitigation Measures

The following measures will be implemented to mitigate potential impact due to sand filling.

- Return water would be discharged in the river thorough designated channel.
- Silt trap would be installed before commencement of sand filling.

Impact Due to Discharge of Sewage

Sewage would be generated from the proposed power plant site and construction camp. However, it is proposed that sewage would be treated using septic tank and soak pit at the construction camp site Hence the impact significant is assessed to negligible.

Intensity of Impact	**1**	**Extent of Impact**	**1**	**Duration of Impact**	**1**
Impact Significance = 1 i.e. Negligible					

Impact due to discharge of wastewater from construction activity

Wastewater from the construction activities e.g. washing of concrete mixers, vehicles etc are likely to pose significant impact on the surface water quality if discharged without adequate treatment and mitigation measures. However, considering the construction activities to be of short duration and treatment of wastewater to be done before, the impact is assessed to be low and can be mitigated with following mitigation measures.

Intensity of Impact	**3**	**Extent of Impact**	**1**	**Duration of Impact**	**1**
Impact Significance = 3 i.e. Low					

Mitigation Measures:

- The effluent generated from washing of equipment/miller wash would be stored and treated in a sedimentation tank, to be installed on a temporary basis, because chemicals may be used at the time of washing the equipment. The effluent will be discharged following coagulation/flocculation and removal of supernatant (and their discharge in an environmental sound manner) from the sedimentation tank.
- Channelize all surface runoff from the construction site through storm water drainage system and provide adequate size double chambered sedimentation tank;
- Oil leakage or spillage will be contained and cleaned up immediately. Waste oil would be collected and stored for recycling or disposal;
- Adequate sanitary facilities, i.e. bio-toilets toilets and showers, would be provided for the construction workforce;

Residual impact

With implementation of the precautionary and the mitigation measures mentioned for prevention of surface water contamination the residual impacts would be negligible.

5.4.10 Potential Impact on Groundwater Resource and Quality

The potential sources of impact on Ground water resources are as follows:

Construction Phase

- Extraction of water for Construction purpose;
- Extraction of water for domestic use by construction workers

Impact on Groundwater Resource

During construction, ground water would be used primarily for concrete preparation and curing of concrete for tower foundation. In addition, water would be used for the purpose of domestic use. Maximum water requirement would be around 108.2KL/day for the civil works and 0.5 KLD for domestic consumption in labour camps etc. It has also been reported by CGWB that the groundwater that while Bhuj are in critical stage of groundwater development, Khankej in the district of Banaskatha and Rapar in the district of Bhuj are in “over-exploited“ stage. Extraction of water for construction purpose can cause considerable impact on the already stressed resources.

Impact on Groundwater Quality

Like surface water the generation of waste from the construction camp and construction waste also has potential to contaminate groundwater quality if the untreated wastewater is discharged from camps and collects in trenches and excavations.

Impact of Groundwater Quality

In parts of the Kutch district especially along the Rann of Kutch region the ground water is of inferior quality as reported by CGWB. Groundwater would be used for domestic purpose. Since, there are issues related to quality of the water, it can have adverse impacts of the health of the workers. Mitigations need to be adopted to prevent misuse of the natural resources. Also, the water used for domestic purpose need to be treated to conform to the IS: 10500 standards.

Considering both the availability of resource as week as the quality of water the scale of impact will be medium, duration will be short term- only during construction phase and extent of impact will be local- immediate vicinity of the project site. The potential impact on groundwater resource quality is assessed to be low.

Intensity of Impact	**2**	**Extent of Impact**	**1**	**Duration of Impact**	**1**
Impact Significance = 2 i.e. Low					

Mitigation Measures:

The Contractor needs to adopt the following measures to ensure that:

- Sourcing of construction and domestic do not result in stress and water competition with nearby communities:
- The Contractor shall make arrangement for drinking water which conforms to IS 10500; 2012 or bottled drinking water which conforms to IS 14543 (2004).
- In case the contractor uses groundwater for drinking purpose he shall install adequate treatment technologies for the purification and disinfection
- Permission from the Central Ground Water Board is required in case of abstraction of ground water.
- Carry out the precautions especially related to fuel and lubricant presented in the above section to prevent any contamination of the groundwater.

5.4.11Potential Impact on Ecology

The primary ecological concerns in transmission projects arise from loss or degradation of near-natural habitats along with the attendant loss of provisioning services,

5.4.11.1 Construction Phase

The construction related impacts of transmission liens are expected from:

- Erection of transmission tower and bays
- Removal of Vegetation from transmission lines and substation
- Passage through Protected Area
- Movement of Vehicles

Impacts due to erection of Transmission Tower

During the construction activities excavation approximately 3m depth and min 4m X 4m to max 8m x 8m is done for the erection of foundation. As a practice the excavate soil is stored around the excavation as a sort of bund. There are chances that mammalian species e.g. Wild Ass, blackbuck, Indian Gazelle, wild pigs etc. as well as domesticated livestock can fall into these excavations and get hurt. During the field visit no Wild Ass has been observed. It was reported that in rare cases the wild ass stray to the fringe areas of the sanctuaries where the

transmission line is located. The transmission line is not considered as high-risk project because of the inherent low risks that they carry. Even though the LBTL passes through the wild as sanctuary the risk to the wild ass from the project is low because of the embedded mitigation measures described below.

The project activities which can interfere with the movement of the wild ass during the development of the tower footing. The excavation for the development of the tower footing may cause the risk of the animal falling into the pits. LBTL, had informed that they usually try an ensure that the construction activities for development of the tower footing are completed in a day. However, if it extends beyond a day there are measures which are already been implemented by LBTL e.g., the area around the excavation is bunded with the soil excavated from the pit, temporary tape barricading is placed, night guard is posted at the location, lights are placed in the area so that the animal do not approach.

With these embedded mitigation measures the risk to the wild ass, wild pigs etc. from the project is reduced. Also, note that the actual habitat of the wild ass in in the Little Rann of Kutch which 24 km is approximately south from the transmission line. Since these excavations would be for a short period of time e.g., 2-3 days the duration is low and with embedded mitigation measures the overall impact is low.

Intensity of Impact	**2**	**Extent of Impact**	**2**	**Duration of Impact**	**1**
Impact Significance = 4 i.e. Low					

Impact due to removal of vegetation

The transmission line corridor traverses through a swathe of modified habitats, predominantly cultivated farmlands or plantations, interspersed with a few natural habitats, mainly patches of slightly degraded scrub and seasonal rivers/nala. Erection of tower and stringing of the transmission line will involve removal of trees, shrubs and herbs present along the transmission line corridors which will cause change in the modified habitat within the corridor leading to a loss of floral biodiversity at local level. As per Part -2 information recommended by DFO and Stage- I Forest Approval granted by RMOEF for the Project, about 145 no of trees are required to be felled during execution of the project which can lead to deterioration of the micro habitat of the avian species. However, the tree cutting in government land are carried out in under supervision of local administrative department. Also, cost of trees in forest land are included under the NPV (Net Present Value) determined by the forest department, under the provision of FC Act and NPV shall be paid by LBTL the time of Stage 1 forest approval compliance. Extraction cost for trees, if any raised shall be paid to Forest dept during execution of project. Mangrove are not available in the said project. As, none of the floral species expected to be present within the site is threatened as per IUCN Classification the significance of impact is low.

Intensity of Impact	**2**	**Extent of Impact**	**2**	**Duration of Impact**	**1**
Impact Significance = 4 i.e. Low					

Impact due to Passage through Protected Area

The transmission line has been passed through Wild Ass Sanctuary, Reserve forest and social forest area. Project Area under Protected Area (Wild Ass Sanctuary) 9.749ha of which forest land is 3.887ha and non-forest land is 5.862ha. No part of the project area falls under any Conservation Reserve, National Park and Ecologically Sensitive Zone. For forest clearance and wildlife clearance the proposal has been already submitted in “Parivesh” portal of MoEF&CC and Stage I Forest proposal has been granted for the project. Also, the wildlife proposal has already been recommended in NBWL meeting on 11th March 2021.. Since the regulatory permission takes care of the impact and has already suggested measures the significance of the impact is low.

Intensity of Impact	**2**	**Extent of Impact**	**2**	**Duration of Impact**	**1**
Impact Significance = 4 i.e. Low					

Impact on Wildlife due to Movement of Vehicles

As per the present project plans night time works, is not envisaged. However in case of night time work special attention has to be paid to movement of vehicles. In these areas there is considerable nocturnal movement of wildlife and runover by moving vehicle is quite common. However, no designated corridor is there and in consultation with local people noticeable movement of different types of deer, blue bull, wild boar is not reported. The movement of vehicles will be only happened construction phase for about 15-20days. Thus, the impacts are thus considered low in nature.

Intensity of Impact	**2**	**Extent of Impact**	**2**	**Duration of Impact**	**1**
Impact Significance = 4 i.e. low					

Mitigation Measures

- Degradation and loss of habitats caused by removal of natural vegetation could be minimized by removing only the most obstructive trees and shrubs and conserving the existing ground cover of the area as much as possible. There shall be no clearing of vegetation cover of lands which are not directly under construction footprints.
- Activities related to vegetation removal should be scheduled to avoid bird migration season i.e. winter.
- All the conditions mentioned in the Forest Clearance letter should strictly to be followed.
- The adverse impacts of vegetation removal could be mitigated through implementing compensatory plantations. The species which are removed should be planted in their original proportions and should include species of shrubs, climbers, herbs, grasses, that are currently forming the natural vegetation in the region. The cleared slopes could be seeded with propagates or seeds of quick-germinating species to help arrest soil erosion. After completion of the stringing work, natural regeneration of dwarf species will be allowed and maintained in consultation with the Forest Department.
- All such plantations should be done in accordance with the Compensatory afforestation scheme prepared by the State Forest Department and guidelines mentioned in Forest clearances.
- To mitigate the impacts of loss of bird nesting sites, alternate habitats for avifauna could be created and maintained. Such habitats can be made in the forest areas and human settlements adjoining the forest area through installation of artificial nests made of eco-friendly material. All these activities to be carried out in association with the concerned forest office.
- Ensure proper barricading across the excavation with Plastic mesh and LED flashers especially in areas where there is known movement of wildlife
- In case any wildlife is trapped in an excavation, contractors should be made aware not to harm the animal and intimate the Wildlife Division of the Forest Department for its rescue.
- Restrict movement of construction-related vehicles, especially heavy vehicles or machinery, strictly to pre-designated routes.
- To control the impacts of increased emission, vehicle emissions should be checked and maintained within prescribed standards. For heavy machinery, there shall be strict adherence to all standard dust, noise and vibration mitigation measures.
- Project personnel need to be educated for not spreading any plant seeds intentionally.
- As per the present project plans night time works is not envisaged however, in case of night time work special attention has to be paid to movement of vehicles.
- Activity within forest area should be completed in priority basis within a short time span to minimize the disturbance.
- Ensure that vehicles and machinery used in the construction activities comply with the prescribed standards.

This impact is of low significance there are similar habitats in the vicinity and the species can easily relocate to those areas. Also, trees within the transmission line corridors would be removed before construction and none of the floral species expected to be present within the site is threatened as per IUCN Classification.

The significance of these anticipated impacts is deemed to be low, owing to the presence of comparable alternative natural habitats and provisioning services in the vicinity of the Project area.

Residual Impact

Since the stress of LBTL has been on avoidance of impacts, no residual impacts are envisaged. As residual impacts on bio-diversity are not envisaged there is no requirement for developing Bio-diversity offsets and expected to result no net loss as per the IFC Performance standards.

5.4.11.2 Operational Phase

The impact on operation phase would be primarily from:

- Physical presence and operation of transmission system.
- Right-of-Way Maintenance

Physical presence and operation of transmission system

Bird mortality due to collision with ground wire and conductors of transmission lines and electrocution are common issues. However, in case of 765 KV line since the electrical separation is 15m it is more than the wing span (1m-3.5m) of the large birds e.g. Greater and Lesser flamingo and Domicile Crane found in this region the electrocution risk due to direct contact with conductors is eliminated. However, there may be possibility of electrocution from air gap breakdown between the two conductors and bird pollution from dropping of birds perched on transmission towers.

Scientific studies[19] have identified that birds flying between two wetlands across a transmission line are prone to collision. In case of 765KV Lakadia-Banaskantha Line, the Adesar Bridge is south of the line at a distance of approximately 6 km Migratory birds like Grater Flamingo and Lesser Flamingo, Great White Pelican, Dalmatian Pelican, Demoiselle Crane, Black headed ibis, have been reported. Flying between Little Rann and Great Rann, the birds have to cross this corridor and hence the risk of collision is high in this 15-km (approx.) stretch. Both species of flamingos feeding in this wetland are at high risk of collision as they are often disturbed by vehicular traffic on the road. Apart from that Great White Pelican, Dalmatian Pelican, Demoiselle Crane, Eurasian Spoonbill were also reported from this wetland. As per previous study[20], near Adesar, parallel to the road four parallel transmission lines is present, where Flamingo collision were reported. Also, in the southern side about 13km away from the transmission line at Nanda Bet habitat of Greater Flamingo, Lesser flamingo, Great White Pelican, Dalmatian Pelican, Demoiselle Crane, Black headed ibis, Darter, Grey Heron were reported. However, this is limited to segment of the line close to the Kutch Wild Ass Wildlife Sanctuary. Since this is a 765 KV line the electrical gap between the two line is 15 m. This is approx. 4.5 times the wingspan of these migratory birds. Thus, the electrocution risk is minimum. Further to reduce the collision risk Forest Department, Government of Gujarat has already suggested installation of Flight diverters within the Wild Ass Sanctuary. This is an embedded mitigation measures in the project in the Sanctuary area. It is also noted that within the 10km (5km of each side from the centre of the line) study area through the line, no such globally significant concentration of migratory species and/or congregatory species have been reported and not observed during field visit. This line also passes through the Rann of Kachchh for approx. 15Km which is only a small portion of the entire length of line of 176 km thus the extent is low. Moreover, there are no impacts on the transmission line during the operation stages on Wild Ass. Considering that in some portion of the length of the line embedded mitigation are proposed the intensity of impact are considered medium and resultant the impact is medium.

Intensity of Impact	**2**	**Extent of Impact**	**1**	**Duration of Impact**	**3**
Impact Significance = 6 i.e. Medium					

Mitigation Measures

- Bird Flight Diverters should be installed in Wild Ass Sanctuary and 15km (approx.) stretch of Runn of Kutch area and forest area. Apart from the Birds Flight Diverter some other devices, which will reduce the collision and electrocution risk, are as follows:

[19] Mitigation collion of birds Against transmission lines in Wetland Areas in Colombia, by marking the ground wire with Bird Flight Diverters, Suzana De La Zerda and Loreta Roselli

[20] Anika Tere B.M. Parasharya, 2011, Flamingo mortality due to collision with high tension electric wires in Gujarat, India. Journal of Threatened Taxa3(11): 2192–2201

1. Installation of Line Markers: Line markers are usually installed on the shield wire, which is associated with maximum collision risk to increase the visibility of the power lines. Commonly used line markers include the following:

2. Aerial spheres: Large spheres placed on the wires to increase visibility. For better reduction of risk – staggered placement, using different colors, using light with the spheres to increase visibility at night, anywhere between 5 to 30 m intervals, situated in the center of the span (60% of the span, excluding 20% on the sides of each pole)

3. Spirals and bird flight diverters: Spiral Vibration dampers reduce the line vibration and increase visibility of the line, placed 3m apart on shield wires.

4. Suspended Devices: The suspended devices can be swinging, flapping or fixed. They have a clamp that attached to the line so that the device dangles and based on its type, can move in the wind. They are glow in the dark designs that increase the visibility in the night as well. They can be placed 10-15m apart in a staggering position.

5. Use of blinking lights: Using blinking lights instead of steady burning white or red lights can reduce the risk of collision. Steady burning lights disorient migrating birds and may attract them. Certain species are known to circle such stationary lights, which increases the risk of collision.

- Monitoring of bird collision risk before/after establishing the transmission line: As the area fall under Central Asia and East Asia-Africa flyway, thus monitoring of migratory birds as well as resident birds will be suggested along the transmission line and depending upon the monitoring results Birds Flight Diverter should be installed as guided by the Forest Department. Any incidents or bird hits should be reported, and location-specific mitigation measures should be employed. Before establishing a transmission line, “bird-use” areas should be identified to guide appropriate routing of the transmission line. In places of bird use or collision risks, the transmission line should be rerouted in such a way that important habitats are avoided, or bird diverter should be installed. Also, monitoring of birds perching, specially raptors species, should be recorded after construction of transmission line and “high birds perching” area should be identified. To reduce the possible electrocution due to birds perching “Raptor Perch Deterrent Devices or Anti Perch Devices” like Pole Cap/ Cone, Bird Spider, Bird Spikes.
- Removing any carcasses from the site, thereby avoiding attracting scavenging raptors, into the area.
- Use of blinking lights: Using blinking lights instead of steady burning white or red lights can reduce the risk of collision. Steady burning lights disorient migrating birds and may attract them. Certain species are known to circle such stationary lights, which increases the risk of collision.

Right-of-Way Maintenance

Regular maintenance of vegetation within the ROW is necessary to be done to avoid disruption to overhead power lines and towers and to evade ignition of forest fires.

- Periodical removal or pruning of the vegetation, especially the trees and tall shrubs within the ROW, is likely to lead to complete loss or degradation of habitats of avifauna and also likely to limit the provisioning services being supplied by the concerned area.
- Regular maintenance related to clearing of woody flora within the ROW is likely to limit the regeneration of such species, which may ultimately result in alterations in the natural succession process and an increased likelihood of the establishment of invasive species.

As the maintenance work will be done regularly but very short period of time and locally within ROW, based on its need, the overall impact is low.

Intensity of Impact	**2**	**Extent of Impact**	**1**	**Duration of Impact**	**2**
Impact Significance = 4 i.e. Low					

Mitigation Measures

- To mitigate the adverse impacts of ROW maintenance through clearings, it is recommended to implement an integrated vegetation management approach (IVM) in the operations. Felling/pollarding/ pruning of trees within ROW will be done with permission of the local Forest Officer.

- The selective clearing of tall-growing tree species and encouragement of low-growing shrubs, herbs and grasses should be done. Vegetation maintenance should be kept limited to pruning and not to be removed completely.
- Use of machinery for vegetation maintenance should be strictly avoided and it should be done manually as far as possible.
- Use of herbicides to control fast-growing plant species within the ROW should be prohibited. Such species could be controlled through manual weeding.
- In order to prevent the ignition of either natural or induced forest fires within the transmission line ROW, fire-lines should be marked and maintained along the boundary of tower foundations and across the ROW corridor. Emergency preparedness plan for firefighting to be made in collaboration with local statutory bodies.

Residual Impacts

Implementation of these mitigation measures would help reduce the adverse impacts to a large extent.

5.4.12Socio Economic Impact

Economic Loss to private landowner's due land use restrictions

The total land for the entire length of the transmission line is comprised of 1180.19 ha of land, of which 1155.05 ha is non-forest land and mainly agriculture is carried out in the affected land owned by approximately 600 landowners. Details on the total number of landowners for ROW is not available as the process of getting consent from the landowner is still on-going and will be completed by August 2021. Compensation for the affected landowners is envisaged to be completed one month prior to commissioning. Restriction on land use will be mainly for construction any buildings/houses and trees plantation However, for cultivation, landowners can still carry out cultivation beneath the tower footing and ROW corridor, and impacts would not be pronounced as non-mechanised agriculture is not carried out in in this area. There will be no tree cutting/trimming or loss of structure along the RoW. and the land within the RoW is used for agriculture at present. The crops grown on these lands are not high enough to have any effect on the safety clearance distance, therefore cultivation will continue and no economic displacement is anticipated. However, there is restrictions on land use along the transmission line route for maintaining a safe clearance distance of 8.84 m from the transmission wires whereby no land use changes are permitted along the RoW route, thus restricts construction on these lands. Such restriction in future land-use changes diminishes the land value. Moreover, the alignment will pass and cut through roads and highways. The road facing plots which have a potential for non-agricultural use in the future will be restricted and will have a permanent implication on use of these lands for non-agricultural purpose. Presently no compensation has been provided to the landowners along the RoW

Existing Measures

- Compensation at the rate of 85% of land value would be paid to landowners for tower base area, before beginning of civil work. For RoW, compensation at the rate of 15% of land value would be paid to landowners, before beginning of civil work.
- Considering the implication of the impacts, the compensation fixed for the land value was reported to be much higher than the prevailing market rate and circle rate. As per the government circle rate per sqm of land is INR 50- 100 per sqm. The compensation for land price for 44 villages (out of 58) was fixed for INR 881 for unirrigated land and INR 970 and 1772 for irrigated land per sq. mt. The land prices for the remaining 14 is yet to be fixed by the District Collector and will be decided at a later stage. The compensation amount is divided between the landowner in case of multiple landownerships.
- As per consultation with the local community the land prices in the area is INR 300000 -500000 per bigha inside the village and INR 500000-1000000 for land near to highway.

As no land has been procured and considering existing land compensation procedure and amount the impact significate would be negligible.

Intensity of Impact	**1**	**Extent of Impact**	**1**	**Duration of Impact**	**3**
Impact Significance = 3 i.e. Low					

Mitigation Measure:

- A grievance mechanism shall be made available to the affected person
- All civil work for tower erection, footing and stringing would start after compensation amount is paid to the affected landowners (ROW corridor and Tower footing)

Income Loss to Landowners in Tower Base Area due to damages to crops during construction and stringing:

The tower base area will impact approximate 4.7 ha to land. Majority of the alignments passes through double cropped agricultural land. 600 number of private landowners from 58 villages will be impacted due to tower footing. No land would be acquired for the construction of tower footing, however easement rights for ROW and tower footing will be required. Thus, no physical displacement will take place, however, the project activities will be resulted in crop loss due to civil work for foundation and tower erection activities including creation of access to tower location, soil excavation and movement of equipment's; and stringing activities.

From the discussions with the landowners along the transmission line ROW, it is understood that the landowners were aware of the project. They are positive for the project and have no objection for providing easement land for tower and ROW. Reportedly as of 11.02.2021, 197 towers, have been erected of which 150 landowners have received compensation for crop loss (***see Annexure I compensation for crop loss***) during tower erection and foundation work. As per limited consultation with the local community and landowner there are existing TL in their neighbouring villages and farmers of those respective land parcel where the tower was erected would still be able to use the land under the tower for agricultural purpose. None of the farmers have opposed for the proposed project. As reported during consultation and as mentioned in socio-economic baseline section, there is a practice of sharecropping along the transmission line corridor. The project will impact the income sharecropper undertake cultivation along the ROW corridor. The situation is anticipated to get triggered during stringing activities in the case of crop loss. During the ESIA study, construction of tower footing is ongoing, and no sharecroppers has been reported along the tower footprint hence no compensation measures have been disbursed to any affected sharecroppers. As reported by the project representative, in case of any impacted sharecroppers during stringing, the affected person will be compensated for crop loss.

Figure 23 Picture depicting ongoing cultivation beneath the transmission tower

Existing Measure:

- The crop compensation was based on the crop damaged at the time of the construction or stringing activity. The compensation was calculated by multiplying the total area affected with average yield of the crop, and the market value of the crop as determined by the agriculture & horticulture department. Reportedly total approximate crop compensation is INR 28 crores.
- Mechanism and SOPs for identifying presence of sharecroppers along the TLs and compensation has been developed for the affected sharecroppers for the project

As the impact of construction activities along the tower base is limited to construction period (maximum 10-15 days) and crop compensation would be paid by the company based on the crop damaged at the time of the construction as determined by the agriculture & horticulture department. and the farmers can still undertake cultivation underneath the tower, hence the impact magnitude is assessed as negligible.

Intensity of Impact	**1**	**Extent of Impact**	**1**	**Duration of Impact**	**1**
Impact Significance = 1 i.e. Negligible					

Mitigation Measure:

- Sharecropper undertake cultivation along the ROW corridor and tower footing should be identified and compensation for crop loss during construction and stringing activities. Depending on the nature of agreement between landowners and land user, the crop compensation should be shared between the landowners and the sharecropper.
- Consider employment opportunities for the local community both for men and for women as per their existing skills for construction and operation
- As per the Ministry of Power 2015 notification, compensation for the base area in between the transmission tower (between four legs) @ 85 % of the land value as determined by the District Magistrate or any authority based on circle rate/ guideline value/ stamp value/ stamp act.

Influx of Labour:

The project will require 600 workers for construction. The unskilled labourers were recruited from the local villages mainly for foundation work, and semi-skilled and skilled labourers are reported to be workers from another district of Gujarat. Migrant labour from states like Jharkhand and Bihar were also being employed for constructions. A gang of 10-15 workers were clubbed in one unit for foundation and erection work. As the construction in one location completed, they move toward the next location. While the number of labourers is very small in comparison to the local community, however they lived in small makeshift/canvass camps at times near the villages.

Some of the significant issues related with migrant labour would include:

- Conflict amongst workers, and between workers and local community, based on cultural, religious or behavioural practices.
- Discontent amongst local community on engagement of outsiders.
- Security issues to local women from migrant workforce.
- Use of community facilities such as health centres, temples, transport facility etc. by migrant labour may lead to discontent with local community.
- In case contractors bring in unskilled migrant labour, there stands the risk of exploitation of a labourer. This can happen in the form of hiring underage labourers, low and unequal wage payments, forced labour and discrimination on basis of the basis of caste, religion or ethnicity

Existing Measure:

- The EPC contractors engaged for the project are responsible for ensuring adequate accommodation facilities for the labourers
- Used of Carbolic acid around the canvass/makeshift camp to prevent snake bite and another insect bite
- Thermal scanning for all worker prior to entering the premises for prevention of any infectious diseases

Mitigation Measure:

- As the labour camp temporary in nature and the movement of people will take place after every 10-15 days, there are chances of people getting infected to various disease and illness. A diseases management plan should be kept in place to avoid an outbreak/spread of infectious diseases
- Adequate monitoring should be undertaken to ensure the contractor's compliance to the applicable rules and regulations and provisions of the contractual agreement and construction phase ESMP for the remaining duration of construction
- health screening of migrant workers,
- Strengthen security personnel around labour camps in order to maintain adequate law and order and avoid any possible tensions between the migrant workforce and local community.
- Each worker and employee shall be provided a health and safety training as part of the induction process
- Create a labour management plan that will contain provisions to ensure non-discrimination and fair treatment for all workers. The labour influx management plan will also dictate the requirement of workers at different stages of construction cycle, thereby helping in management of employment issues.
- Access of local community and labourers to the grievance redressal mechanism for the project;

The impacts described above are primarily within the RoW or would only extend to the settlements in the immediate vicinity of the transmission line, therefore localize in nature. Moreover, the damage to crop and conflicts of the migrant labour with the community would be temporary. In addition, a planned labour camp for this project may further reduce the assessed potential impacts related to labour influx. Thus, socio-economic impact during the construction phase of the transmission lines is evaluated to be of low significance.

Intensity of Impact	**2**	**Extent of Impact**	**1**	**Duration of Impact**	**1**
Impact Significance = 2 i.e. Low					

5.4.13Potential impact on Community Health and Safety

According the satellite imagery, most of the tower passes through agricultural land field, thus, most the construction sites were within the agricultural fields. Review of GIS satellite imagery, the TL corridors will pass through few houses, small temples and schools located at a distance of 70 meters (ROW corridor) from the 765-kV DC line.

Others impacts includes deterioration in environmental quality due to construction activities; and Increased prevalence of disease arising from the influx of construction workers; and

Exiting Mitigation Measure

During construction being undertaken in agricultural season, the landowners were pre-informed a week prior to the start of any construction of the activities and were warned to keep distance from the tower foundation pits. The impact from construction works to the local community is limited.

Additional Mitigation Measures

- Local community and schools located near to the construction area to be been informed about heavy machine movement & construction work
- Proper barricading during excavation work should be undertaken
- In case village road will be used for movement of vehicles, the local community should be informed in for the same
- Placing reflective tapes on the boundary of construction area;
- Undertaking regular health check-ups of the workforce and reporting any major illnesses at the earliest to Block health officer for disease control and surveillance

Impacts due to deterioration of Environmental quality parameters

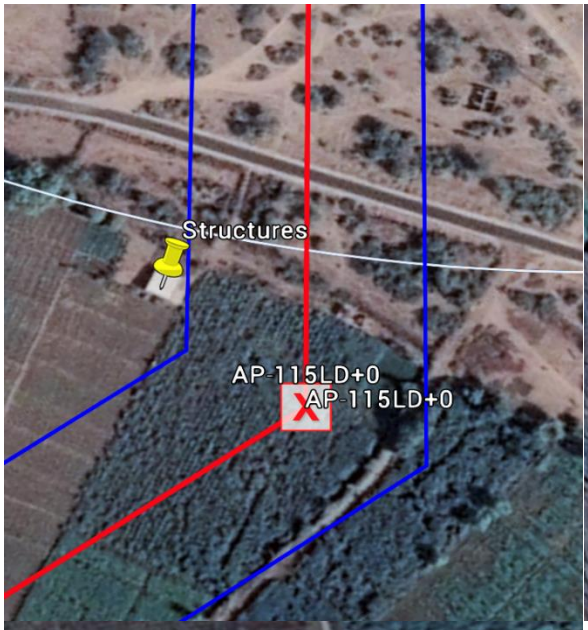
During the construction activities a deterioration of the environmental conditions can be experienced by the local community in terms of increased dust, contamination of surface water or ground water and high noise levels due to operation of construction machinery.

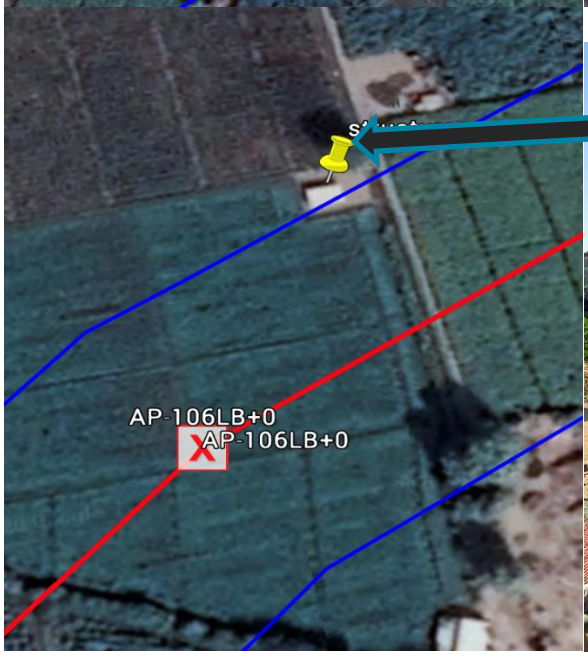
Reduction of air quality may potentially lead to health impacts associated with respiratory problems eye irritation and general disturbance to daily activities. Similarly discharges of wastewater from construction and discharge of domestic waste effluent from sanitary facilities for construction workers have the potential to cause contamination of surface water and groundwater resulting in gastro-intestinal problems of the community surrounding the construction sites.

Even though the intensity of the impact is medium the extent of impact is low as there would be isolated houses adjoining the RoW. It may be noted as a design principle transmission lien avoids larger settlements. Further, since the impacts would be limited to the construction stage only the significance of the impacts are low.

Community Health and Safety implications for Structure along the TL

Based on GIS analysis, approximately 3 structures have been identified as being within the alignment of the transmission line. As observed during site, one of the structures near to the angle point AP-106LB+0 the nature of these structures is makeshift structures (residential) of one land user/sharecropper. The nature and types of the remaining identified structures could not be identified





As observed during site visit, one of the identified structures was makeshift residential structures used by the sharecropper undertake cultivation along the ROW corridor. During the construction of transmission lines and stringing activities, there is a possibility for localised damage to structures (and its occupants) that will need to be considered as a part of the construction management safeguards.

The remaining two structure could not be ascertained. The project team has ascertained that no relocation of these structures will be required and that these structures are low and that the transmission line design and clearance considerations into account.

Recommendations

- Rerouting the alignment around these specific locations/clusters through design alternatives and providing easement compensation for other landowners identified; or
- The structure owners to be provided for resettlement housing and/or assisted self-relocation outside of the Row.

Chances of increased prevalence of Disease

A total of 600 workers will be employed for the construction phase during the peak construction and commissioning. This influx of workers to the community may cause increase in cases of communicable diseases or pandemic which may put pressures on existing health infrastructure. There is also the possibility of increase in sexually transmitted diseases such as HIV/AIDS as a result of the expected influx of workers to the area. In addition, vector-borne diseases will be sensitivity for settlements closer to campsites for the construction phase labour, particularly due to lack of hygienic conditions.

The impact to community health and safety during the construction phase is evaluated to be of minor significance due to the low density of population in the immediate vicinity of the corridor or campsite.

Intensity of Impact	**2**	**Extent of Impact**	**1**	**Duration of Impact**	**1**
Impact Significance = 2 i.e. low					

Mitigation Measures

To reduce Vector- Borne Diseases: The Contractor shall ensure that proper practices are in place to

- Avoid spread of infections and diseases, proliferation of mosquitoes, flies, rodents and other pests:
- No untreated wastewater is discharged from the construction camps.
- Treated discharge from the camp does not accumulates i.e. proper drainage is maintained for the water to flow.
- Solid Waste is not dumped into the adjoining areas but is handed over to the nearest municipal corporation for disposal

Operation Phase

During the operation of the transmission lien and substation Electro Magnetic Field (EMF) created by the transmission line can cause inconvenience on the surrounding community. This has been reported during the consultation that the people feel inconvenienced due to this charge especially when working on paddy fields underneath the conductors or passing under the conductors especially during the monsoon season.

There have been some concerns about the possibility of an increased risk of cancer from exposure to electromagnetic radiation from overhead transmission lines. However, a review by the World Health Organization (WHO) held as part of the International EMF Project (1996), concluded that "From the current scientific literature there is no convincing evidence that exposure to radiation field shortens the life span of humans or induces or promotes cancer".

The proposed transmission line would pass away form settlement except for a few isolated cases. Most of the people in the study area are involved in rain-fed agriculture. The electromagnetic field would cause inconvenience. Since the receptors in the vicinity of the transmission line is low and as this is more of a problem with perception of the community even though the impact would exist over the life of the project the impact is identified as low.

Intensity of Impact	**3**	**Extent of Impact**	**1**	**Duration of Impact**	**1**
Impact Significance = 3 i.e. low					

Mitigation Measures:

The proposed mitigation measures are as follows:

- Education of the community regarding the effects of the electromagnetic field is important

5.4.14Potential Impact on Occupational Health and Safety

The impacts envisaged during construction phase on the occupational health and safety of workers is the following:

Construction Phase

- Working at heights during the erection of transmission tower and stringing of the conductor, erection of gantry etc;
- Electrocution during testing and commissioning

Impact Due to Fall from Height

The occupational risk related to the construction of transmission lines and substation is primarily due to fall from heights which might cause serious injuries. Transmission towers would be of different heights and minimum height of the tower would be 23 m in case of 765 kV transmission line. A review of the incident database (OSHA's Integrated Management Information System (IMIS) database) [21] indicate most of the incidents are due to fall form height while some incidents reported also include being struck by loads or falling objects during the erection of tower. Similarly, there are risks of fall in the excavation created for tower footing.

Impacts of electrocution during the testing and charging

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

The duration and extent of the construction phase will be short but the any possibility of the occurrence of any hazard will lead to adverse impacts that could range from loss of productive time and even fatalities. Hence the impact significance will be moderate.

Intensity of Impact	**3**	**Extent of Impact**	**1**	**Duration of Impact**	**2**
Impact Significance = 6 i.e. Medium					

[21] https://www.osha.gov/laws-regs/federalregister/2015-04-15-0

Mitigation Measures:

The measures would be in place to minimise the health and safety impacts to personnel from general construction activities include:

- Measures would be implemented to reduce the likelihood and consequence of the following hazards:
    - falling from height;
    - tripping over long-term obstacles or short-term obstructions;
    - contact with dangerous substances;
    - electric shock;
    - mistakes in operation;
    - variable weather conditions;
    - lifting excessive weights; and
    - traffic operations.
- Competent and adequately resourced sub-contractors would be used where construction activities are to be sub-contracted;
- All persons working on site will be provided information about risks on Site and arrangements would be made for workers to discuss health and safety with the Contractor;
- All workers would be properly informed, consulted and trained on health and safety issues;
- Before starting work all the appropriate safety equipment and the first-aid kit would be assembled and checked as being in working order.
- All lifting equipment and cranes would be tested and inspected regularly. All hoist ways would be guarded;
- All scaffolds will be erected and inspected, and the appropriate records maintained by the Contractor;
- Safety hoops or cages would be provided for ladders with a height in excess of two metres;
- The Contractor shall provide appropriate safety barriers with hazard warning signs attached around all exposed openings and excavations when the work is in progress.

Residual Impact

With implementation of the precautionary and the mitigation measures mentioned above impacts would be negligible.

Operation Phase

During the operation phase and maintenance of the electrical equipment at the substation the workers would also be exposed to risk of electrocution unless the standard procedures related to electrical maintenance are followed. Since procedures are existing the impacts are low, but the inexperience and lack of knowledge and training can cause severe impacts. Thus, the impact of occupational Health and safety is of medium significance.

Mitigation Measures:

The following precautions would be taken:

- Induction trainings has to be carried out for each of the new employees (temporary/ permanent/ contractual). They have to undergo refresher training once a year on OHS aspects
- All near misses has to be reported to the system. All injuries and fatalities have to be reported as per the Railway's systems and labour laws.

5.4.15Potential Impact on Aesthetics

The study area has unique land features such as the Rann of Kachh which are huge expanses of plain barren land with stretches of water bodies and salt pans. Erection of transmission towers within these areas will lead to

change in the general landscape of the area. This may lead to medium impact on the aesthetics of the Rann of Kachh.

Impact Due to Erection of Transmission tower

Potential impacts to aesthetics and visual quality because of setting up transmission tower, may arise primarily due to disruption and degradation of views in the surrounding landscape. Visual impacts from transmission lines are highly variable and depends on several factors like location of the project, lines of sight, scenic vistas and most importantly the perception of individuals. With the study area, not being recognized as a place of natural scenic beauty or a tourist destination, these factors are unlikely to lead to any significant adverse visual and aesthetic impacts. Thus, visual impacts can be rated as negligible

Impacts from Disposal of Waste

The disposal of construction waste and MSW from labour camp may lead to nuisance and visual impact of the nearby settlements, if disposed in non-designated area.

In both the above cases the intensity of impacts is low due to the absence of any receptor near the transmission line.so the impact is considered as negligible

6. Environmental and Social Management Plan

6.1 Introduction

This section presents the Environmental and Social Management Plan (ESMP) for the proposed Project. The purpose of this ESMP is to specify the standards and controls required to manage and monitor environmental and social impacts during different phase of project life cycle, i.e. construction, operation phases. To achieve this, the ESMP identifies potential adverse impacts from the planned activities and outlines mitigation measures required to reduce the likely negative effects on the physical, natural and social environment. This is in accordance to IFC Performance Standards 1 that emphasizes the importance of managing social and environmental performance through the lifecycle of the Project.

6.2 Environmental Social Management Plan

The environmental mitigation measures and plans are presented in form of a matrix according to sequential flow of activities in the project life cycle. The matrix focuses on strategies to be adopted for safeguard of the environment from possible impacts resulting out of the project activities. The ESMP provided in Table 6.1

Table 6-1 : Environmental Management Plan

Sl. No.	Project phase/Activity	Potential impacts	Proposed mitigation plan	Responsibility
Planning and detailed design stage				
1	Planning/pre construct Transmission line through forest/ protected area / precious ecological area	Loss of precious ecological values/ damage to precious species	Careful selection of route alignment to avoid natural habitats (i. g. National Parks, Wildlife Sanctuary, Biosphere Reserves/ Biodiversity Hotspots)	Design Consultant
		Deforestation and loss of biodiversity edge effect	• Avoid transmission line/ tower in protected and reserve forest, by careful selection of alignment. • If avoidance is not possible, minimise the land to be taken from forest • Obtain Stage I and Stage II Clearance from the forest department.	Design Consultant
		Tree felling permission	Permission for felling of trees to be obtained before tree felling	LBTL
2	Line through identified migratory bird path and bird habitats and near water bodies	Risk to the bird population primarily due to collision	• Careful selection of route to avoid such areas with known avian populations e.g. nesting grounds, foraging grounds, migration corridors etc. • Provide bird guards and markers [as per the specification provided in IS-5613 (Part-II)] in transmission line when passing through/near nesting grounds, foraging grounds, migration corridors etc.	Design Consultant
3	Location of transmission line/tower	Diminution of land value in the width of RoW, restriction on use of land	• Compensation at the rate of 85% of land value, as determined by District Magistrate or any other authority based on Circle rate/ Guideline value/ Stamp Act rates for tower base area (between four legs); • Compensation at the rate of 15% of land value, as determined based on prevailing Circle rate /Stamp Act rate towards diminution of land value in the width of RoW (27m) corridor • Compensation for ROW and Tower footing to be paid before beginning of civil work • Ensure the SEP and GRM cover the landowners and along the transmission line	LBTL
		Exposure to safety related risks	• Transmission line will be designed as per IS 5613 (Par 2) to provide setback from dwelling area.	Design Consultant
		Exposure to electromagnetic interference	• Transmission line would be designed considering international guidelines such as Commission on Non-Ionizing Radiation Protection (ICNIRP), US National Council on Radiation, State Transmission Lines Standards and Guidelines in the USA etc. • Education of the community regarding the effects of the electromagnetic field is important •	Design Consultant

		Damage to private property	• Avoid settlement / hamlets within RoW	Design Consultant
		Impact on Cultural Heritage	• Careful selection of route alignment to avoid socially, culturally and archaeological sensitive areas (i. g. sacred groves, graveyard, religious worship place, monuments etc.); and • Maintain minimum distance of 100 m from archaeological monuments	Design Consultant
Construction				
4.	Site preparation and construction work	Loss of topsoil	• Top soil from the entire tower footing area (approx. 22 sq. m.) will be stripped (10 to 15 cm) before commencement of construction work; • Top soil will be stored in a dedicated top soil storage site, having adequate mitigation measures for preventing erosion due to runoff; • Activities will be scheduled (as far as possible) to avoid extreme weather events, such as heavy rainfall; • After construction work is over, top soil will be reinstated at the construction site.	Contractor*
		Noise and vibrations	• All equipment/machineries to be regularly maintained to ensure efficient operation. • DG sets with acoustic enclosure should be used. • Construction work during night time (10 pm to 6 am) to be prohibited. In case of emergency work at night approval of LBTL Division/ Circle is mandatory.	Contractor*
		Air Pollution	• Water sprinkling to be carried out twice a day during dry season on exposed surface area. • Vehicles transporting loose construction/excavated materials shall be covered with tarpaulin sheets. • Loose construction material/ excavated material shall be stored against any structure or would be kept covered with tarpaulin sheet at the construction site. • All vehicles utilized in transportation of raw materials and personnel, will have valid Pollution under Control Certificate (PUCC). • Regular maintenance of machines, equipment and vehicles that will be used for construction activities of substation/tower construction.	
5.		Water/Soil pollution	Soak pits/modular bio-toilets would be provided at all construction camp, laydown area and labour camp	Contractor*
6.	Occupational Health and safety	Injury and sickness of workers	• Provide safety equipment's (PPEs) for construction workers; • Prevent entry of unauthorised person at construction site; • Provide training on health and safety to all the workers.	Contractor*

7.	Line through areas having vegetation(trimming/cutting of trees/ vegetation clearance)	Loss of Vegetation	• Avoid felling of trees during stringing unless it becomes absolutely necessary. • After completion of stringing, natural regeneration or dwarf tree/medicinal tree plantation would be allowed to heights as per the standards mentioned in IS: 5613 and Government of India Circular 7-25/2012-FC dated 5th May 2014.	Contractor*
8.	Line through farmland	Disturbance to farming activity	• Use existing access roads wherever possible • Repair /reinstate damaged bunds on agricultural field etc after completion of construction work. • Construction activities and stringing of line to be avoided during cropping season. • Compensation for fruit bearing trees at prevalent market rates, to be calculated as annual net product value multiplied by the number of productive years remaining; • Compensation for timber trees to be calculated based on girth and type of trees; • Compensation for one-year net harvest for seasonal crops at prevalent market rates;	Contractor*
9.	Community Health and Safety	Injury and sickness of local people	• Coordination with local communities for construction schedules etc; • Barricading construction area; • Placing reflective tapes on the boundary of construction area; • Undertaking regular health check-ups of the work-force and reporting any major illnesses at the earliest to Block health officer for disease control and surveillance; • Creating mass and labour awareness on HIV and STDs;	Contractor*
		Gender issue of local community	• Labour Camp should be located away from the village and it should be access control for the local people; • Awareness should be created among the migratory labour that they should not be entered in the village without prior information to the villagers; • Local resource like handpump, bathing ghat should not be used by the labours.	Contractors*
10.	Health, Hygiene, Safety and Security of Workers in Labour Camp	Labour camp related EHS and Hygiene Issues	Facilities would be provided at the labour camp as per provisions of IFC Guidance Note on Worker's Accommodation 2009. Some of the relevant provisions to be complied are as follows: • Worker's accommodation; • Provision of safe drinking water; • Appropriate arrangement for cooking; • Management of wastewater and solid waste from the camp site; • Availability of medical facility (first aid); • Security arrangement of the camp site; • Arrangement to register and redress grievance of workers.	Contractor*
		Conflict with local community due to	• Local resource like Handpump, pond, bathing ghat should not be used by the workforce.	Contractor*

		sharing of local resources		
11.	Community health and safety during operation	Injury/ mortality to public	• Barriers to prevent climbing on transmission towers • Warning signs at transmission towers	LBTL
12.			•	
13.			•	
			•	
14.				
Operational Phase				
15.	Operation of transmission line	Collision of avifauna	Use of power line markers, which reduces of bird collision by increasing the visibility of transmission line to birds.	LBTL
16.	Uncontrolled growth of vegetation	Loss of vegetation	Periodic pruning of vegetation to maintain minimum clearance of 4m between conductor and trees would (As per Government of India Circular 7-25/2012-FC dated 5th May 2014).	LBTL
17.	Occupational health and safety of staff	Injury/ mortality to staff during O&M work	During the testing and charging of electrical line, electricity insulating protective equipment like footwear (ISO 20345: 2004 Part-2), rubber gloves (IS 4770: 1991) would be provided to workers. In addition, provisions of the “Central Electricity Authority (Measures Relating to Safety and Electric Supply) Regulations 2010” would be adhered to.	LBTL
			Induction training to the entire new employee and six monthly refresher training for substation O&M staff would be organised.	LBTL
		Injury/ mortality from emergency situation	Preparation of fire emergency action plan and training given to staff on implementing emergency action plan.	LBTL

* ***Contractors are imposed with penalties in case of any default of norms during supply & erection phase. During construction phase these activities are monitored by LBTL project team.***

6.3 Environmental and Social Monitoring Plan

The monitoring indicators, frequency for measurement and responsibility for monitoring for each of the migrations proposed the management plan are described Table 6.2. The monitoring of the EMP provisions would be carried out by the respective agencies at a frequency mentioned in the Environment Management Plan.

Table 6-2 : Environmental Monitoring Plan and Responsibility

Sl No	Project phase/Activity	Potential impacts	Parameter to be monitored/indicator	Monitoring frequency	Responsibility
Pre-construction					
1.1	Location of transmission line/ tower	Diminution of land value in the width of RoW, restriction on use of land	Compensation received by land owner, grievance recorded from land owner	Once before construction work	LBTL
1.2		Exposure to safety related risks	Setback distances to nearest dwelling units	Once during detailed design	LBTL subdivision/Division/Circle
1.3		Exposure to electromagnetic inference	Electromagnetic field strength for proposed line design	Once during detailed design	LBTL subdivision/Division/Circle
1.4		Damage to private property	Distance from nearest dwelling units	Once during detailed design	LBTL subdivision/Division/Circle
1.6	Felling of trees on the land	Permission under the tree felling act	Number of trees felled against the permissible number of trees which can be felled	Once before commencement of construction activity	LBTL subdivision/Division/Circle
1.7	Design of residential quarter and office at substation	Water/ soil pollution	Provision of septic tank with soak pit in substation design	Once during detailed design	LBTL subdivision/Division/Circle
1.8	Securing the land for transmission line/ tower	Loss of forest land	Stage I and Stage II clearance	Once before commencement of construction activity	LBTL subdivision/Division/Circle
Construction					
2.1	Site preparation and construction work for tower foundation and substation construction	Loss of topsoil	Practice adopted to store and reuse topsoil which is removed from the construction site	Every Week	LBTL subdivision/Division/Circle
2.2		Noise and Vibrations	Maintenance log book of vehicle/machinery, Number of equipment/vehicle undergoing regular maintenance	Every Week	LBTL subdivision/Division/Circle

2.3		Air pollution	Water sprinkling dust generating area	Every Week	LBTL subdivision/Division/Circle
			Tarpaulin cover an vehicle carrying loose construction/excavated material	Every Week	LBTL subdivision/Division/Circle
			Tarpaulin cover on loose construction/excavation materials	Every Week	LBTL subdivision/Division/Circle
			Number of vehicle not having valid PUCC certificate	Every Month	LBTL subdivision/Division/Circle
			Maintenance log book of vehicle/machinery, number of equipment/vehicle undergoing regular maintenance.	Every Month	LBTL subdivision/Division/Circle
		Water/soil pollution	Availability septic tanks and soak pits/modular bio-toilets	Every Month	LBTL subdivision/Division/Circle
		Erosion and Sediment	Measures adopted to prevent erosion Availability of peripheral site drainage channel, sedimentation tank	Every Month	LBTL subdivision/Division/Circle
		Depletion of water resource	Water conservation measures adopted at construction and labour camp	Every Month	LBTL subdivision/Division/Circle
2.4	Community Health and Safety	Injury and sickness of local people	• Number of accidents of local people (if any) of construction site, number of grievance recorded • Review of document related to regular health check-up of the work force • Review of document related to awareness camp organised periodically	Every Month	LBTL subdivision/Division/Circle
		Local women community	Physical observation of the labour camp before commencement of	Every Month	LBTL subdivision/Division/Circle

			construction and during construction period		
2.5	Occupational Health and Safety	Injury and Sickness of workers	Awareness of workers, use of PPE by workers	Every 15 days	LBTL subdivision/Division/Circle
		Labour camp related EHS and Hygiene issues	Condition of labour camp, awareness of workers, compliant register	Every 15 days	LBTL subdivision/Division/Circle
		Conflict with local community due to sharing of local recourse	No of registered grievances and redressal status	Every month	LBTL subdivision/Division/Circle
3.Operation and Maintenance					
3.1	Drainage of storm water	Water /soil pollution	Available of internal and peripheral site drainage channel, sedimentation tank and oil water separator of outfall of peripheral site drainage channel	Every month	LBTL subdivision/Division/Circle
3.2	Handling and disposal of waste	Water /soil pollution	Municipal disposal arrangement for GPS, Availability of composting pit Availability of authorization letter	Annually	LBTL subdivision/Division/Circle
3.3	Occupational health and safety of staff	Injury/mortality to staff during operation and maintenance work	Accident incident register	Monthly	LBTL subdivision/Division/Circle
			Document pertaining to training/awareness programs and mock drills/awareness level of staff engaged in O&M work of substation	Monthly	LBTL subdivision/Division/Circle
		Injury/mortality from emergency situation	Accident-incident list	Monthly	LBTL subdivision/Division/Circle
3.5	Community health and safety	Injury /mortality to public	Accident-incident list	Monthly	LBTL subdivision/Division/Circle

6.4 Organizational Structure

6.4.1.1 Corporate Level E &S Management System

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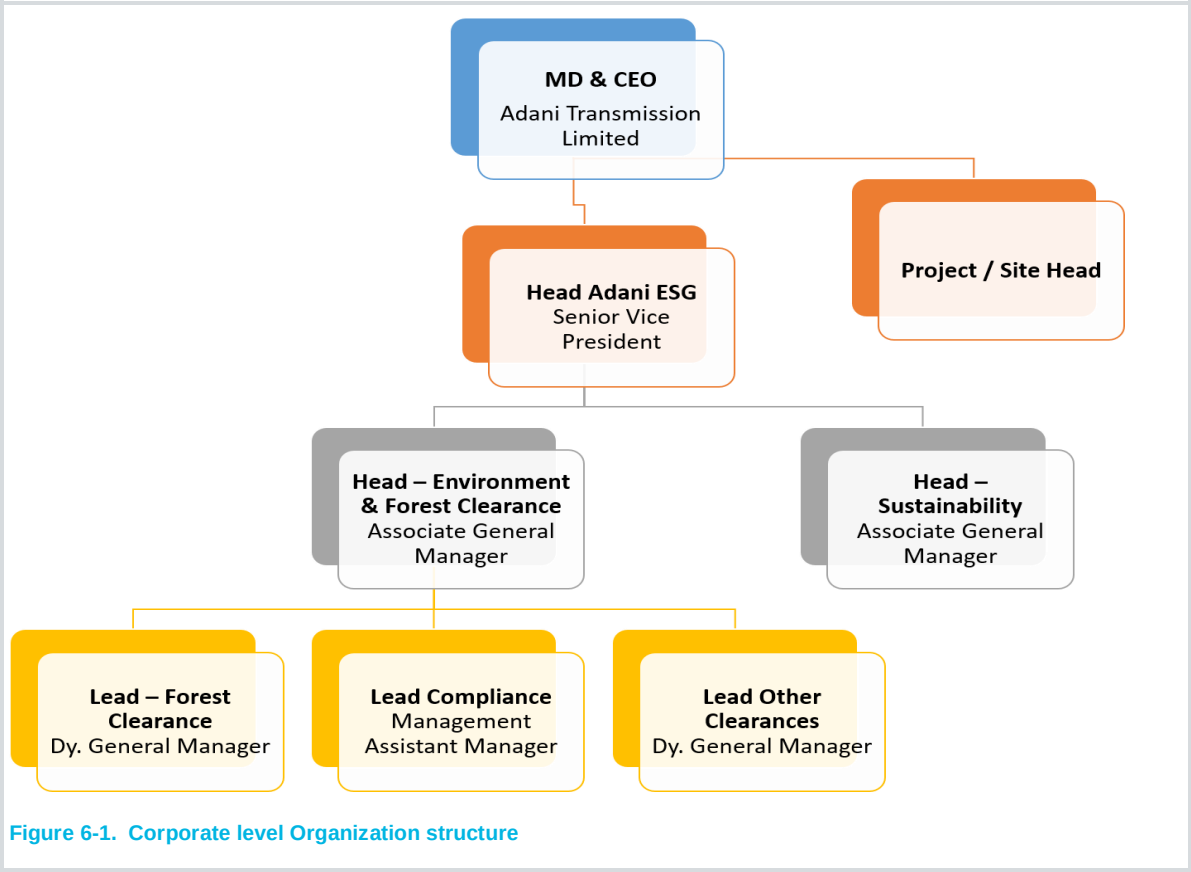

Figure 6-1. Corporate level Organization structure

As per the document ESMS Manual, the ESMS applies to project life cycle and associated activities, which includes three sequential phases:

- Construction and development of renewable energy project and electric power transmission infrastructure;
- Renewable energy project operations; and
- Renewable energy project decommissioning, site restoration and closure.

The ESMS has established E&S requirements concerning a) policy level considerations and commitments, b) management programs/ procedures, c) risk and impact identification, d) organizational competency and capacity, e) emergency preparedness, f) monitoring and supervision of implementation of management measures, and g) stakeholder engagement

6.4.1.2 Project level Organization Structure

Project level organization structure given below.

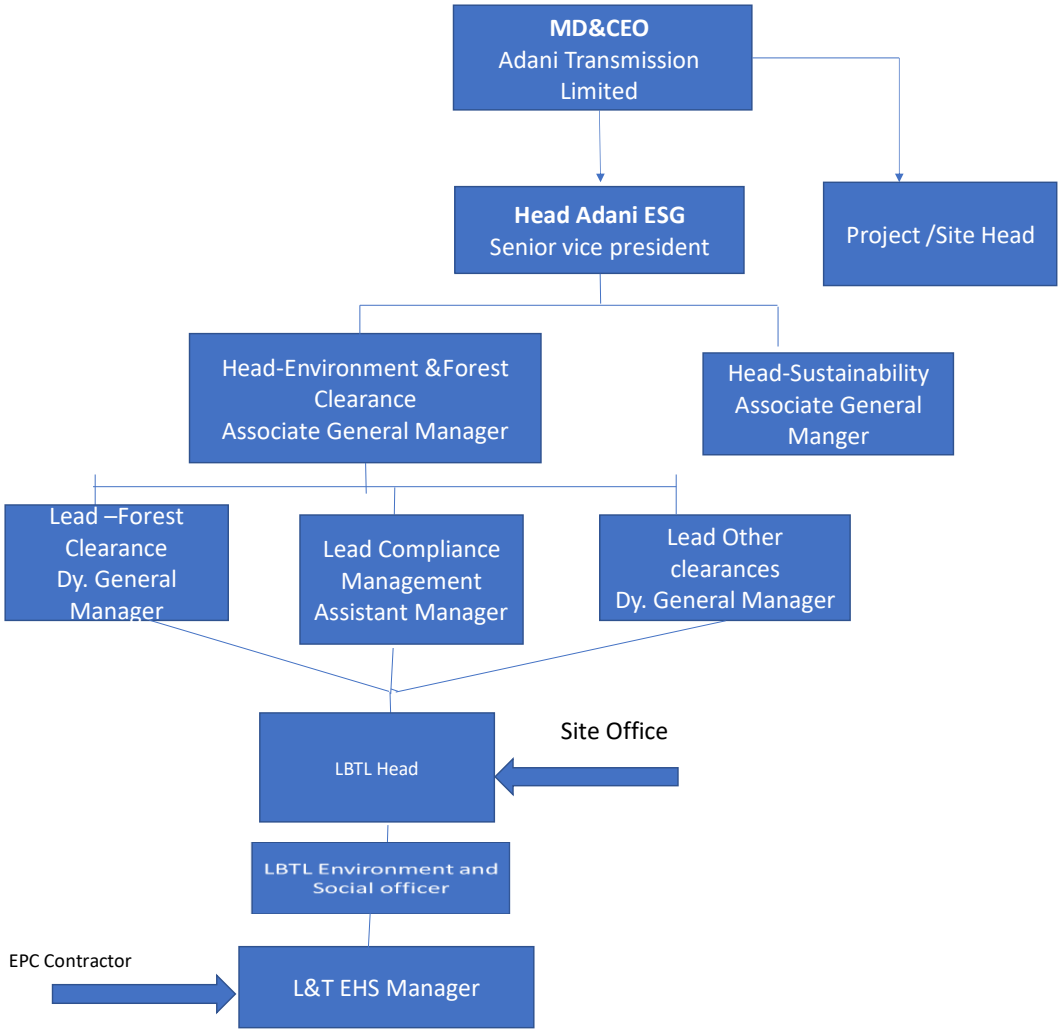

Figure 6-2Project level Organization structure

6.5 Inspectional Monitoring and Reporting

Inspection and monitoring of the environmental impacts of the Project activities will increase the effectiveness of ESMP. Through the process of inspection and auditing, LBTL will ensure that the conditions stipulated under various permits are followed. The inspections and audits will be done by off role safety officers deployed by ATL (during construction phase), ATL's EHS department and by external agencies/experts. The entire process of inspections and audits should be documented. The inspection and audit findings are to be implemented by the site head and safety office at site.

6.5.1 Roles and Responsibility

Environment, Health and Safety department shall be responsible for monitoring the implementation of the various actions which are to be executed by the agencies specified in the ESMS at the corporate level and ESMP.

In general, the EHS department shall perform the following activities:

- Preparation of required documents on environmental and social management;
- Ensuring availability of resources and appropriate institutional arrangements for implementation of ESMP;
- Implementation of the health and safety measures;
- Collection of the statistics of health of workers;

- Providing support during routine medical check-ups of workers;
- Awareness and implementing safety programmes;
- Providing job specific induction training;
- Compliance of regulatory requirements;
- Carrying out environmental audits;
- Identify unsafe acts and conditions and suggest remedies;
- Develop safety culture and comply with company's EHS policy and standard requirements;
- Encourage and enforce the use of PPE's;
- Educate all employees for the use of PPE's and safe practices;
- Direct, coordinate and orient the safety activities;
- Promulgate the spread of policy, objectives, rules and/or regulations;
- Perform a thorough investigation of all accidents and review the recommendations to avoid any repetition;
- Monitoring the progress of implementation of ESMP; and
- Reviewing and updating the ESMP as and when required for its effective implementation

6.5.2 Reporting and Documentation

LBTL will develop and implement a programme of regular reporting through the stages of the project lifecycle. The personnel delegated EHS roles shall be required to fully comply with the monitoring programme in terms of timely submissions of reports as per acceptable level of detail. Reporting will be done in form of environmental check list, incident record register, training records, and environmental and social performance reports (weekly, monthly, quarterly, half yearly, yearly etc.).

6.5.3 External Reporting and Communication

EHS head of LBTL and Cluster Safety officer will be responsible for ensuring that communication with regulatory agencies and stakeholders are maintained as per the requirement. All complaints and enquiries are to be appropriately dealt with and records should be maintained in a Complaint/Enquiry Register by the delegated staff of EHS.

6.5.4 Internal Reporting and Communication

Documentation is an important step in the implementation of the ESMP. LBTL has a formal monitoring and review procedures in place. Key points of the monitoring and review procedure are as below.

The Monitoring and review procedure mandates LBTL SOP No.1 Document and Record Control procedure to be followed at Site.

- The monitoring and review procedure also mandates development of environmental and social monitoring plan to capture all the specific monitoring needs identified in the site specific documents and final project ESIA/DPR.
- Non-conformances noted in monitoring activities will be resolved through the corrective and preventive action process as prescribed in SOP No. 3. Any EHS non-conformance identified at Site should be brought in immediate attention of Site supervisor who will forward such information to the EHS Manager for evaluation.
- An annual regulatory compliance verification audit will also be conducted by EHS manager for detailed verification of project compliance with applicable regulation.
- After initiation of construction phase, project is required to conduct OHS hazards and risks assessment annually and results of the assessment to be shared at Corporate level as part of performance data required by management review process.
- Internal audits are required to be conducted once in six months by the cluster level EHS coordinator.

6.5.5 Documentation

Documentation is an important step in the implementation of the ESMP, LBTL will establish a documentation and record keeping system in keeping with their ESMS, to ensure recording and updating of documents as discussed in the ESMP. Responsibilities have to be assigned to relevant personnel for ensuring that the ESMP documentation system is maintained and that document control is ensured through access by and distribution to, identified personnel in form of the following:

- Master Environment Management System document;
- Legal Register;
- Operation control procedures;
- Work instructions;
- Incident reports;
- Emergency preparedness and response procedures;
- Training records;
- Monitoring reports;
- Auditing reports; and
- Complaints register and issues attended/closed.

6.6 ESMP Review and Amendments

The ESMP acts as an environment and social management tool which needs to be periodically reviewed to address changes in the organization, process or regulatory requirements. Following a review, Site in charge in coordination with personnel delegated EHS will be responsible for making the amendments in the ESMP and seeking approval from the Regional and Corporate heads. The amended ESMP will be communicated to all the staff on the project

6.7 Occupational Health Management

The construction phase includes site preparation, tower erection and sub-station construction, access road to towers, construction area for sub-stations, etc. The health hazards associated with these activities are mainly due to dust and noise pollution. Excessive noise contributes to loss of hearing and triggers physiological and psychological body changes. Dust pollution can cause eye and respiratory irritation and, in some cases, allergic reactions. The inhalation of exhaust gases from vehicles and machinery are also harmful for health. Stress can be caused by working in shifts, high workload, poor living condition of workers etc.

Table 6-3 : General Measures for Workers' Health

• Issues	• Requirements
• Health and Hygiene	• Cleanliness • Ventilation and temperature • Dust and fumes • Disposal of wastes and effluents • Overcrowding • Illumination • Latrines and urinals • Spittoons and dustbins
• Dust and Fumes	• Any dust or fumes or other impurities likely to be injurious to the workers, effective measures shall be taken to prevent its accumulation and its inhalation by workers
• Overcrowding	• No work room in any factory shall be overcrowded • At least five hundred cubic feet of space shall be provided for every worker employed in a work room

• Latrines and urinals	• Sufficient latrines and urinals shall be provided • Shall be maintained in clean and sanitary condition • Shall be adequately lighted and ventilated
• First aid	• Provided and maintained first aid facility • One for every one hundred and fifty workers • Shall be kept with a responsible trained person who shall be available during the working hours • In every facility where five hundred or more workers are employed, a dispensary shall be provided and maintained
• Disposal of wastes and effluents	• Provide with proper disposal system for solid waste and effluents • In case of a factory where no public sewerage system exists, prior approval of the arrangements should be made for the disposal of wastes and effluents

6.8 Disaster Management

The main risks are related to physical injuries due to fall from heights, objects falling on persons, risk of working in confined environment, fire, electrocution and impact of electromagnetic waves. All the above risks can be life threatening and utmost care should be taken to reduce the risks. The section below gives the details of the mitigation measures to reduce the risks.

Table 6-4 : General Measures for Workers' Safety

Risk of working at heights	• Construction workers should wear protective helmets, protective glasses, safety belts and protective shoes. • Installation of fixtures on tower components to facilitate the use of fall protection systems. • A main guardrail at least 1 meter above the edge • 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; • Safety belts and harnesses should be of not less than 16mm two-in-one nylon or material of equivalent strength. • When operating power tools at height, workers should use a second (back-up) safety strap. • Signs and other obstructions should be removed from poles or structures prior to undertaking work.
Risk of falling objects	• Putting nets above the ground level in areas where work is in progress so as to avoid falling objects reaching the ground • No loose material shall be left on the platform. Place the tools in toolbox & other items in basket. • Tethering tools and equipment with connectors, connection points, and anchors • Restriction to climb up on the rails of scaffold to overreach job location. • Proper training to workers who are working heights
PRECAUTIONS IN CASE OF FIRE	• Shall be provided with means of escape in case of fire • Effective measures shall be taken to ensure that all the workers are familiar with the means of escape • Fire-fighting apparatus should be provided and maintained
WORKING IN CONFINED PLACES	• Workers should not be exposed for more than 4 hours • Ear muffs and other PPEs should be provided
ELECTRICAL HAZARDS DURING OPERATION	• Consider installation of hazard warning lights inside electrical equipment enclosures to warn of inadvertent energization; • Use of voltage sensors prior to and during workers' entrance into enclosures containing electrical components; • Deactivation and proper grounding of live power equipment and distribution lines according to applicable legislation and guidelines whenever possible before work is performed on or proximal to them. • Provision of specialized electrical safety training to those workers working with or around exposed components of electric circuits. This training should include, but not be limited to, training in basic electrical theory, proper safe work procedures, hazard awareness and identification, proper use of PPE, proper lockout/tagout procedures, first aid including CPR,

and proper rescue procedures. Provisions should be made for periodic retraining as necessary.

6.8.1 Disaster Management plan for Natural disaster

The study area is prone to natural disasters such as earthquakes and floods. For transmission projects the main risks due to earthquakes and heavy rainfall/flooding are

- Collapse of structures due to earthquake.
- Road blockage on account of conductor snapping or tower collapse near road crossings or road proximity.
- Conductor snapping due to mechanical failure, wind pressure, insulator failure.
- Insulator failure due to a lightning strike, mechanical damage, sabotage, surge voltages.
- Flooding of cable trench due to heavy rainfall

LBTL will develop plans and procedures to identify the potential for and response to natural disaster such as earthquakes and floods. Emergency preparedness and response will be reviewed by EHS officer on at least an annual basis and after the occurrence of any accidents or emergency situations to ensure that lessons learnt inform continuous improvement. Emergency exercises will be undertaken on a regular basis to confirm adequacy of response strategies. Investigations of damage from natural disasters will follow formal documented procedures associated with them.
The steps to be taken to ensure safety and minimum damage in times of natural disaster are provided below.
Earthquakes

- All maintenance staff should stay away from transmission towers and conductors and remain under cover until the movement subsides
- After the shaking stops, survey your immediate area for trapped or injured persons and ruptured utilities (water, gas, etc.), broken conductors, damaged towers, transformers, etc. If damage has occurred in your area, inform Safety and Security immediately
- Do not evacuate until instructed by emergency personnel
- If out in the open, stay in an open area away from buildings, power lines, trees or roadways.

After an earthquake:

- Put on enclosed shoes to protect against broken glass
- If the power is out use a flashlight. Do not light a match or candle
- Be alert for safety hazards such as fire, electrical wires, gas leaks, etc.
- Check on others. If there are injuries or other urgent problems, report them to Safety and Security
- Give or seek first aid. Assist any disabled persons in finding a safe place for them
- Evacuate if the building seems unsafe or if instructed to do so
- Cooperate with emergency personnel, keep informed, and remain calm

Flooding
Minor or area flooding could occur as a result of a major multiple rainstorms. For imminent or actual flooding, and only if you can safely do so:

- Secure vital equipment, records, and other important papers
- If present in your area, report all hazardous materials, chemicals to security officers.
- Shut off all electrical equipment
- If the building of sub-stations or other installations must be evacuated, follow the instructions on Building Evacuation
- Do not return to sub-stations until you have been instructed to do so by security officers

If you are assisting with flood clean-up, report immediately to Environmental Health and Safety any oil, chemical, or hazardous materials suspected of mixing with flood waters

7. Stakeholder Assessment and Discloser

This section provides the stakeholder identification and analysis as well as a brief understanding of the engagement process for the project.

Stakeholder mapping and analysis is the process of identifying individuals or groups having a stake and influence over the entire cycle of project. The identified stakeholder groups are then assessed according to their impacts on the project and the impact the project will have on them. This information is then used to assess the way the interests of the stakeholders or the project's impact on them should be addressed in the project development plan or its operation.

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

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

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

7.1 Stakeholder Assessment

7.1.1 Stakeholder Identification

This section provides an analysis of the stakeholders identified for the project. This stakeholder identification is based on the present understanding of the project context, its footprint, the primary data collected during site visit in November 2020 and the understanding of transmission lines projects in India. This analysis of stakeholders identifies the individuals or groups that are likely to be impacted by the project activities and groups them based on the significance of the impact/influence.

A stakeholder is "a person, group, or organization that has a direct or indirect stake in a project/organization because it can affect or be affected by the Project/organization's actions, objectives, and policies". Stakeholders thus vary in terms of degree of interest, influence and control they have over the project. Stakeholders who have a direct impact on or are directly impacted by the project are known as **Primary Stakeholders**, those who have an indirect impact or are indirectly impacted are known as **Secondary Stakeholders**. Keeping in mind the nature of the project and its setting, the stakeholders have been identified and listed in the table below.

Table 7-1 : Stakeholder Group Categorisation

Stakeholder Groups	Primary Stakeholders	Secondary Stakeholders
Community	• Project Affected Landowners of the Transmission Line (Tower and ROW) • Landowners of the Substation	• Local Community • Vulnerable Community
Institutional	• Project Developers 3 • Gram Panchayats and Local administration	

Stakeholder Groups	Primary Stakeholders	Secondary Stakeholders
Government Bodies	• Regulatory Authorities • District Administration	
Other Groups	• EPC Contractor and Sub Contractors • Contractual Workers • Migrant Labours	• Media • Local NGOs

7.1.2 Stakeholder Analysis

Stakeholder Analysis is understood as the process of examining the relative influence that different individuals and groups have over a project as well as the influence of the project over them.

The significance of a stakeholder group is categorized considering the magnitude of impact (type, extent, duration, scale and frequency) or degree of influence (power and proximity) of a stakeholder group and urgency/likelihood of the impact/influence associated with the stakeholder group in the project context. The magnitude of stakeholder impact/influence is assessed taking the power/responsibility and proximity of the stakeholder group and the group is consequently categorized as negligible, small, medium or large. The urgency or likelihood of the impact on/influence by the stakeholder is assessed in a scale of low, medium and high. The overall significance of the stakeholder group is assessed as per the matrix provided below

Table 7-2 : Stakeholder Impact Matrix

		Likelihood of influence on/by stakeholder		
		Low	**Medium**	**High**
Magnitude of Influence/ Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

Based on such an understanding, the stakeholders are categorized into High Influence/ Priority, Medium Influence/ Priority and Low Influence/ Priority. The stakeholders who are categorized as high influence implies a high degree of influence of the stakeholder/project on the project/stakeholders in terms of participation and decision making or high priority to engage with the stakeholder; Similarly, the stakeholders categorized as medium influence are those who have a moderate influence over the project or even though they are to be impacted by the project, it is unlikely to be substantial and these stakeholders are thus neither high nor low in the project proponent's list for engagement. On the other hand, the stakeholders with low influences are those who have a minimal influence on the decision-making process or are to be minimally impacted by the project and are thus low in the project proponent's engagement list.

The intermediary categorisation of low to medium or medium to high primarily infer that their influence and important could vary in that based on specific conditions and context or also based on the responses of the project towards the community.

The coverage of stakeholders as stated above includes any person, group, institution or organization that is likely to be impacted (directly or indirectly) or may have interest/influence over the project. Keeping this wide scope of inclusion in stakeholder category and the long life of project, it is difficult to identify all potential stakeholders and gauge their level of influence over project at the outset of the project. Therefore, project proponent is advised to consider this stakeholder mapping as a live document which should be revised in a timely manner to make it comprehensive for any given period of time. **Table 7.3** provides details on the stakeholder mapping and analysis.

Table 7-3 : Stakeholder Mapping and Analysis

Stakeholder Groups	Profile	Impact/Influence of the project on this Stakeholder Group	Impact/Influence of the Stakeholder Group on the project	Expectations, Opinions Key Concerns of Stakeholders	Overall Rating of Stakeholder Influence
Primary Stakeholders					
Project Affected Landowners of the transmission Line	This stakeholder group is comprised of approx. 600 private landowners whose land is used for tower footing. The number of projects affected person along the ROW is likely to be finalized as the process of identification of landowners along the TL corridor is still ongoing	The main influence of project on the stakeholder group will be in the form of impact on restriction of land use /depreciation of the land value will be impacted by the project and creation of economic opportunities. The project will also likely to have a minimal reduction in the total land productivity.	The influence of the stakeholder group on the project will pertain to the willingness of the landowners to utilise the land for tower footprint. The stakeholder group may also have a significant role to play in the public opinion formation towards the project, especially since most of these landowners will continue to use their land for agricultural use.	The major concern of the stakeholder is adequate compensation for land under the tower footprint and in the case of crop loss the affected landowners should be provided compensation for damages to crops during laying of tower foundation and stringing. Adequate time to harvest the agriculture produce from the land procured. Timely disclosure of information	Influence/Impact of Stakeholder: Large Influence/Impact of the Project: High
Vulnerable Groups	This stakeholder groups comprises of the ST and SC population, women headed household, elderly, physically handicapped and economically poor households. Along the study area, SC population comprises of 20% and ST 1% of the overall population.	Based on the understanding of the project and its activities, the vulnerable groups are likely to be impacted due to land use. This is critical in the case of economically weaker and marginal category farmer with small landholdings more susceptible to restriction on land use.	This group's influence on the project stems from the group being part of a larger community. However, the level of influence exerted is expected to be lower due to their socio-economic standing in the community	Priority in economic benefits and development opportunities created by the project Access to project CSR activities Minimal disturbance to the community in regard to access issues, pollution and influx of migrant workers	Influence/Impact of Stakeholder: Low Influence/Impact of the Project: High

Gram Panchayat and Local Administration	This stakeholder group comprised of the lowest level of local governance. The gram panchayats consist of one or more revenue villages and are the lowest level of decision-making bodies for development activities in the villages.	The project can play an important role in the development of the villages by undertaking CSR activities in collaboration with the Gram Panchayat.	The influence of the gram panchayat plays a crucial role in the smooth functioning of the projects by giving approval for setting up canvass camp for labour during constructions and for dissemination information to the local community. The panchayat member also pays a critical role since the process if ROW procurement is still underway the way the panchayat plays a critical role in identification of landowners, providing NOC for setting up the projects. They also have a significant role to play in the public opinion formation towards the project, In the case of CSR activities, this stakeholder group plays an important role in planning and execution of CSR activities	Consultation with the headmen/ leaders reveal that the expectations and concerns of this group from the project is limited to adequate compensation for the affected farmers. They are willing to extend their support for the project and have no objection with regards to the projects. They also expressed that the project will bring in positive impact to the overall development in their villages such as employment opportunities for the local people.	Influence/Impact of Stakeholder: HighI Influence/Impact of the Project: Small
Regulatory Authority	This stakeholder group is comprised of the central, state and district level regulatory authorities such as the Ministry of Forest, Pollution control board, Gujarat Electricity Authority etc These authorities influence the project in terms of establishing policy, granting permits and approvals for the project, monitoring and enforcing compliance with the applicable rules and regulations	The influence of the project on the stakeholders pertains to the role the project will play in the development of power evacuation networks in the area. The project should comply with applicable regulatory framework comprising of the guidelines and policies of the state and central bodies	The failure of the project to comply with the various rules and regulations applicable may play a role in the timely implementation of the project. This stakeholder group is also critical for various permits/clearances required for the commissioning of the project	The key expectations and concerns of the regulatory authorities from the project is ensuring the project compliance to all regulatory requirements, timely disclosure of information and provisioning of updates throughout the project life cycle	Influence/Impact of Stakeholder: High Influence/Impact of the Project: Small

District Administration	This stakeholder groups comprised of government bodies at the district level which influences the decision-making authority throughout the decentralisation process. These includes the District Collector, forest Department, Block Development Officer, Tehsildars, Revenue Officer. These government bodies are responsible for providing approvals (section 164 of the electricity Act) for the project, deciding the compensation rate for the affected landowners, Similarly the revenue and land registry would be responsible for documentation/ registration of land lease, mutation, updating and records	The project is expected to have a positive influence over the local administration by extending support through these authorities or by collaborating to undertake any community development activities. The influence of the project on the stakeholders pertains to the role the project will play in the development of power evacuation networks in the area	This stakeholder group is critical for the obtaining of the various permits/clearances required for the commissioning of the project and its smooth functioning thereafter. Delay in issuance of the relevant permits can adversely impact the timely execution of the project. Similarly, unresolved matters relating to land such as litigation, non-payment of compensation and encroachment might create complications, drag the firm into legal disputes thereby This group serves as important points of contact between the state level authorities and the local community	The overall opinion of the local authorities is positive towards the project and secondly, that the project may bring development and create some local employment and other opportunities in the form of local contractors the local community	Influence/Impact of Stakeholder: High Influence/Impact of the Project: Small
EPC Contractors and Sub-Contractors	LBTL is the project developers and has appointed the L&T as the EPC contractor for project construction. LBTL role is to provide the contractor the land for laying of tower foundation and tower erection.	The influence of the project on the group pertains to the role of the project in business opportunities and the process of contract closure Employment opportunities for local unskilled and skilled labour. As informed during consultation, the EPC contractor has employed local labour for foundation works and security guards.	This stakeholder group is critical for the smooth functioning and timely implementation of the project	The major concern of these stakeholders is, smooth functioning of the project without any litigation or community conflict; Timely payment of their agreed contract amount from developers;	Influence/Impact of Stakeholder: High Influence/Impact of the Project: High

Workforce-Migrant Labour/Contractual workers	This stakeholder group comprises of those workers who are to be engaged in the project on a contractual basis through the different phases of project life. These labourers will be primarily semiskilled and unskilled workers. As reported by LBTL team has employed migrant labour from neighbouring states such as Jharkhand and Bihar for the ongoing construction work (tower foundation and erection)	The primary concern of the stakeholder group pertaining to the project will be as following: - the role of the project in continued economic opportunity, work generation and a source of income	These stakeholder group's influence on the project pertains to their role in the smooth functioning of the project and the opinion formation towards the project	The main expectations from the project will be: - timely settlement of dues and payments in keeping with the legal requirements - continued work opportunities - safety at work	Influence/Impact of Stakeholder: High Influence/Impact of the Project: Medium
Workforce: Employees	This stakeholder group comprises of the regular employees of LBTL Team who are to be involved in the various stages of the project	The project is expected to ensure continued economic opportunities and work generation	The influence of these stakeholders pertains to the roles played by them in the overall smooth functioning of the project operations as well as the brand value. They will also serve an extremely important role in the maintenance and improvement of services and facilities	The expectations of this stakeholder group in regards to the project pertain to the following: - Job security, Safe working conditions, Provision of rewards and recognitions for good performances and safe behaviour - Proper work-life balance - Ethical and professional conduct - Employee engagement within & after working hours - Regular updating of rules and regulations Facilitation and maintenance of everyday convenience in regard to facilities such as transport, seating, food, accommodation etc	Influence/Impact of Stakeholder: High Influence/Impact of the Project: Medium
Secondary Stakeholders					
Local Community along the AOI	The local community is an important stakeholder as the transmission line is being erected on private land. The local community in the study area is	As informed during consultation, the project has involved local unskilled labour for tower foundation work.	The stakeholder group may have a significant role to play in the public opinion formation towards the project		Influence/Impact of Stakeholder: Medium

	comprised of 15 villages along the 500-metre buffer along the TL corridor. The community has an agrarian economy where cultivators and agricultural labours form a major proportion of the economically active population				Influence/Impact of the Project: Small
NGos/Local Media	Local NGOS based out in Gujarat acts as a social watchdog in matters relating to securing the livelihoods of the rural communities along with their socio-cultural facets Though the number of such NGOs active in the study could be ascertain. Media comprising of print and visual media	Engagement of local NGOs for any ongoing/upcoming CSR though partnership for local development.	The stakeholder group may have a significant role to play in the public opinion formation towards the project largely by whether the impacts of setting up of the development venture is being viewed/ perceived in positive light by the local population with special reference to the vulnerable communities or not.	NGO They can also play a major role in community mobilization, building trust and even participate in implementing CSR initiatives.	Influence of Stakeholder: Medium Influence of the Project: Small

Summary of the overall stakeholder influence is presented in the ***Table 7.4***

Table 7-4 : Summary of Stakeholder Analysis

Stakeholder Group	Relevant Stakeholders	Magnitude of Influence/Impact	Likelihood of Influence on/by Stakeholder	Overall Rating of stakeholder influence
Primary Stakeholder	Project Affected Person along the ROW and Tower Footing	High	High	Major
	Regulatory Authorities	Small	High	Moderate
	District Administration	Small	Medium	Minor
	EPC Contractor	High	High	Major
	Contractual Labour/Migrant workers	High	High	Major
	Local Gram Panchayat	Small	High	Moderate
	Vulnerable Community	Small	Medium	Minor
Secondary Stakeholder	Local Community	Small	Medium	Minor
	NGO/Media	Small	Medium	Minor

7.1.3 Stakeholder Consultation

As part of the ESIA process, the project team has undertaken consultation with the stakeholder of the project to understand the concern expectation for the projects. The main objective of the consultations was made to develop an understanding of the stakeholder group's key concerns and expectations from the project, the stakeholder group's perception of the project and to triangulate the secondary information available on the area. Table 7-5 provides a summary of the consultations undertaken with different stakeholder. Details regarding the consultation undertaken have been provided as **Appendix F.**

Table 7-5 : Consultations undertaken for the Project

Date	Stakeholders Details	Brief Outcome of the consultation
27.11.2020	Consultation with Project Team	• The route for the transmission alignment was finalised considering the minimum environmental impacts, avoiding human settlements, large forest covers etc. Out of the three-route alignment surveyed, route 1 was considered as the most feasible for the project and approval for the same has been obtained. • Land procurement was undertaken as per section 164 of the Electricity Act 2003. A notification was issued to the affected landowner impacted due to the ROW. The project proponent reported that a committee was formed by the District Collector for determining the land and crop compensation. Under section 164 of Electricity Act,2003, authorized the project company under section 10 of the Indian telegraph act,1885 to place & maintain transmission line upon any immovable property. In case dispute arising in compensation, the District Magistrate will facilitate to determine the compensation amount. • Total 58 villages will be impacted due to the project of which Land compensation has been fixed for 34 villages, 14 villages of Kutch is under process. The land value was fixed INR 970 for irrigated land and

		1772/sqm and unirrigated land 881/sqm. against circle INR 100 sqm. Land compensation for the remaining 14 villages is expected to be 900 sq.mt • About 600 landowners will be impacted due to tower footing, Details of affected landowner along the ROW is yet to be finalised. Compensation for land is paid as per the MoP guideline i.e 85% of the land value for Tower and 25% for RoW corridor. Compensation for the affected landowners is paid in three phases 3 phase. As of 11.02.2021 about 197 towers has been completed and payment has been completed for 150 landowners. • Total Land compensation is Rs 104 crores and total compensation for crops is Rs 28 crores. • Prior to carry out project activities-construction work, paper Notification was given for any issues. All the stakeholders record is documented for the payment made towards compensation. Public hearing with affected villagers carried out in the office of DC/SDM. In case of dispute, payment towards compensation is being paid as per orders received from the administration. • The concern from individual farmers whose land has been used for transmission line ROW is always taken & properly documented. None of the affected landowners reported any complaints and concerns for the projects.
26.11.2020	Consultation with Farmers	• In Sanwas village, agriculture is the main occupation whereby triple cropped is carried out in the area. The major crop grown are Cumins, Castor, Bajra, Cotton. • The main irrigation facility in the area is through canal. Not all farmers are not capable of accessing canal water for irrigation. As a result, the farmers enter into a verbal agreement with third party to provide irrigation water. In return, farmers share 1/3 of their produce. The average landholding size of the farmers 15-20 acreas. • Market Land value in Sanwa for 1 bigha -INR 3-4 lakhs. • The farmers knew about the project and he reported that farmers undertake cultivation underneath the tower.

26.11.2020	Consultation with Headman and Community	• The main livelihood activities of the people is agriculture. The main crops grown are Cumins, Cotton, Wheat, Sesame seed, Castor, Mustard. • For irrigation facility, canal (Narmada) and tubewell/Boring are the main sources. For tube well, the water table is found at a depth of 700-800mt. The water quality from tubewell is reported to be of high soil salinity. • The average landholding size of the villagers is 10 bigha. However, there are 20-25 households who are landless. • Besides Agriculture, daily labour (farm and non-farm) is another main occupation of the villagers. • The current market value of land varies is Daisar varies from INR 2-3 lakhs per bigha for land inside the village and INR 506 lakhs per bigha for land near to highway. The Government circle rate in the area is INR 40-50 sqm • Total 8 towers will pass through the village thus affecting 8 landowners. The impacted land is double cropped agriculture land. The landholding size of impacted farmers is medium farmers. All the 8 landowners do not belong to any indigenous community.
27.11.2020	Consultation with Headwomen and local community	• 90% are into agriculture and the remaining are into services and daily labour. Double cropped is practice and the major crop grown are Cumin, castor, Jowar and Vegetables, Wheat. During June/July -Wheat, Jowar, Bajra Cummins and Oct/Nov- Wheat, cumin and Castor. Other vegetables grown are tomato, cauliflower etc. Crop Productivity for Jeera 15 – 20 mon in 1 bigha and Jowar 50-80 mon for 1 bigha • The market value of land price varies from INR 3 lakh to 3.5 lakhs. • About 6 landowners are affected due to tower footing and the land value compensation is fixed at INR 881 per sq. m. Crop compensation for tower has already been paid to the affected landowner. Currently due to better irrigation supply, the affected farmers undertake triple cropped on the affected land parcel. • For development project, while constructing the dam, 100 of trees were cut down, however the dam water has provided irrigation water to the villagers. So, both positive and negative aspects are there in any development project. With the construction of dam water, agriculture in the area has flourished and people ae able to carry out agriculture twice in a year as a result the level of poverty has declined.
26.11.2020	Consultation with Contractor	The stockyard and labour camp are in Rathnapura village in a total area of 12 acres. The land for stockyard was lease from 4 landowner. The contractor reported that the land was not under cultivation when the land was lease out to the EPC contractor. The contractor has a total workforce of 150 which includes migrant workers. The project has engaged 30-40 migrant labour from Jharkhand mainly for tower erection activities.

During peak season the project will require 600 manpower for construction.

7.2 Present Status of Stakeholder Engagement by Project

As per consultation with the project Team, stakeholder engagement is limited to consultation with the project affected landowners and the local community/gram panchayat for obtaining consent and mutual agreements. Consent from the respective landowners have been obtained during engagement process.A Stakeholder Engagement Plan for the project has been prepared for implementation at the site level.

8. Grievance Redressal Mechanism

8.1 Grievance Mechanism Principal

The Grievance redressal process of the LBTL project has been developed based on the ADANI Groups Grievance structure and has been customised to the requirement of the project. Some additional features have been added keeping in requirement the IFC Performance standards. This system has been purely designed for external stakeholders (e.g. Aggrieved parties, project affected people etc). Internal stakeholders e.g. employees, labour, contractor would use the internal Grievance redressal mechanism of LBTL. The GRM is anchored on the five principles to guide in facilitating and resolving concerns and grievances:

- **Transparency.** The GRM encourages comments and feedback (negative and positive) to improve the project. The community must be aware of all complaints, grievances and problems reported; must be involved in their redress; and must be kept informed on progress made in resolving grievances. Public would be made aware of the grievance redress procedures. The campaign will ensure that the poor, women, indigenous peoples, the vulnerable and the disadvantaged groups are made aware of grievance redress procedures A Project Information Kit containing GRM overview and contact details in the form of brochures/leaflets and written in local dialects. A GRM hotline will be posted in subproject site.
- Socially Inclusive. The whole community (and even those outside) is given the opportunity to raise concerns and the right to be accorded a response. The GRM provides an accessible, inclusive, gender-sensitive and culturally appropriate platform for receiving and facilitating resolution of affected persons' grievances related to the project.
- Simple and Accessible. Procedures to file complaints and seek redress are kept simple and easy to understand by the affected people, most specially the nonliterate, and their communities. Affected persons will have the flexibility of conveying grievances/suggestions through verbal narration from walk-in affected person, by dropping grievance redress/suggestion forms in complaints/suggestion boxes in accessible locations, through telephone hotlines, through WhatsApp, by e-mail, by post, or by writing in a complaint register in ULB office or PMU or PIU office.
- Anonymity and Security. To remain accessible, open and trusted, the GRM ensures that the identities of those complaining are kept confidential. This encourages people to openly participate and file grievance. Careful documentation of the name of the complainant, date of receipt of the complaint, address/contact details of the person, location of the problem area and the grievance detail will be maintained by the project. Project will ensure a system for grievance tracking and monitoring of grievances lodged, response accorded, its resolution status and closure. The Project Manager along with the Environmental and or Social Management Officer will have the joint responsibility for timely grievance redressal on safeguards and gender issues and for registration of grievances, related disclosure, and communication with the aggrieved party. The affected persons will also be encouraged to seek a complaint registration number through the PIU.
- Institutional Outreach. Through the GRM, the project can strengthen channels of communication and mechanisms for grievance redress at the community/project area level.

8.2 Approach to Grievance Redressal

The Grievance redressal mechanism developed for Adani Transmission Limited (the parent organisation) would be extended to the project. A common GRM will be in place to redress the environmental and social safeguards concerns in the project and/or subproject related grievances[22] especially during the construction. However, some modification has been planned to consider the project location, socio-economic conditions.

The Grievance Process would include the surrounding community of the project is considered as important stakeholder by the Project. The possible grievances of the community envisaged, and which could be entertained/addressed through this project include:

- Community development, employment and other issues

[22] Grievance is defined as any comments/ suggestions, non-contentious questions/ clarifications regarding the project, issues/concerns that resulted to non-performance of obligations of any of the parties involved in project processes particularly safeguards implementation.

- Risks to community, health & safety (e.g. traffic, risk during construction of tower or stringing of conductor);
- Accidents (e.g. involving livestock, or other property including community property);
- Unethical Behaviour by ADANI personnel or its sub-contractors;
- Noise/dust/air emissions or any other impact on environment caused by project or sub-contractors;
- Demand for development interventions in the community;
- Issues owing to behaviour of the security personnel and general attitude of the local community;
- Issues related to cultural conflicts or opportunity conflict owing to presence of migrant workers in the community or in the nearby areas;
- Any attempts to conceal the above

8.3 Project Level Grievance Mechanism

A three-tier grievance mechanism is proposed for the project arrangement i.e. at Field level, Project level and Corporate level.

8.3.1 Field Level GRM

Field level arrangements will comprise of contractor and their project implementation staff on ground, and field level staff from LBTL. All minor issues and those that are immediate and urgent in the perception of the complainant will be resolved at the field level itself. The contractor, and supervision personnel from LBTL will try to successfully resolve them in consultation with the aggrieved person. In case of larger issues, they will seek the advice and assistance of the Project Management. The Contractor will be responsible for documentation and record keeping. A summary of grievance record will be submitted to the Project Management on monthly basis. The EHS Manager / E&S Officer at both the LBTL and will both monitor and provide input support to the contractors in field level grievance redress and its record keeping.

8.3.2 Project Level GRM.

A Grievance Redress Cell will be established at Project Manager's Office constituting of the EHS Manager / E&S Officer of the respective project, Site in-charge, supported by the project manager /Project In charge of the Contractor. All such grievances that cannot be resolved at the field level and those that are directly registered with the GR cell will be addressed by this body. A proper documentation of grievances (including records of grievances redressed at field level) will be maintained. The Grievance Redressal Cell will also be responsible for conducting periodic community meetings with affected communities to understand their concerns and help them through the process of grievance redressal, recording and registering grievances of nonliterate affected persons and explaining the process of GRM. In cases, where Site Level Management is unable to resolve grievance within the stipulated time period, it shall consult Project Management for advice and implement suggested actions within specified time. Grievance Redressal Cell will also be responsible for follow up for each grievance, periodic information dissemination to complainants on the status of their grievance and recording their feedback (satisfaction/dissatisfaction and suggestions).

8.3.3 Corporate Level GRM.

This Corporate Level arrangement will be led by the Corporate Head with support from the Corporate EHS Manager and other departmental representatives (on invitation). All such grievances that cannot be resolved at the Project level Grievance Redress Cell, will be brought to the notice of this body, seeking its advice or referred for resolution at this level. This Corporate body will specifically, will provide regular monitoring and advisory support to Project in grievance redress functioning and its record keeping. Project Level compilation of grievance redress records and documentation will be done by EHS Manager / E&S Officer.

8.4 Beyond Project Grievance Mechanism

Grievances that cannot be redressed through within/at the project level within stipulated time period will be referred to the District Level Committee. The following will be the people would be part fo the District Level Grievance Committee:

- District Collector

- Additional District Collector
- Corporate Head
- Project Manager
- EHS Manager / E&S Officer.
- Tehsildar/ Local Land Revenue Official
- Representatives of local NGOs (Special Invitees)

8.4.1 Country/State Legal System:

An aggrieved person shall have access to the country's legal system at any stage and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

Steps for Developing Grievance Redressal Mechanism

The following process would be adopted for the setting up of the Grievance Redressal Mechanism:

8.4.2 Publicizing Grievance Management Procedures

For LBTL Project would ensure suitable public disclosure of its grievance handling and redressal process to its external stakeholders such as the community or the local administration. As discussed earlier a Project Information Kit containing GRM overview and contact details in the form of brochures/leaflets and written in Gujrati and Hindi will be prepared. Awareness campaign publicizing the GRM process and GRM Hotline would be carried out. Person from the company's grievance cell such as onsite personal for handling and managing grievances, CSR officers, or individuals working in analogous positions, shall be responsible for publicizing the procedure through appropriate methods

8.4.3 Receiving and Keeping Track of Grievances

This receipt and tracking of grievances primarily involves the following stages:

- Collecting and recording grievances as they come in and recording the following details (including contact details of complainant, date the complaint was received, nature of grievance;
- Registering them in a central place; and
- Tracking them throughout the processing cycle to reflect their status and important details e.g. agreed corrective actions and the date these were taken and final outcome

8.4.4 Maintaining Record of Grievance

Tracking of grievances can be undertaken through a Grievance log maintained both aat the Proejct and Corporate levels. This record maintenance would help track cases, respond to grievances in a timely manner, check the status of complaints and track progress, measure effectiveness, and report on results. A sample tracking format at minimum should contain and maintain the following grievance is presented in

No.	Grievance Date	Village / work Site	Areas	Name and gender of Complainant	Details of the issue(Categorization can be done)	Hearing officer	Issue Related to concerned Dept	Present Status	Remarks (Open, Closed, and Pending Status)	Total time taken to close the grievance

Relevant personnel from respective departments/sections of the project will track the resolution status, coordinate it with the division(s) responsible for corrective actions, and maintain a record of progress (for example- open, pending or closed).

EHS Manager / E&S Officer. of the sites will present to the Management both at the Project and Corporate Level an aggregated monthly report on the status of complaints; the frequency may vary once the construction stage is

over. The EHS Manager / E&S Officer may also do a case to case grievance status reporting in case of critical grievances or grievances that may require immediate attention of the management.

8.4.5 Reviewing and Investigating Grievances

The EHS Manager / E&S Officer responsible for grievance handling will organize the process to validate the complaint's legitimacy and arrange for investigation of details. To begin this process, the nature of the grievance shall be established to determine the measures needed for review and investigation. All grievances shall undergo some degree of review and investigation, depending on the type of grievance and clarity of circumstances:

8.4.6 Resolution of Grievance and Preparing a Response

The Rationale for Grievance resolution and closure is as follows:

- The requirements/need specified in the form of grievance by the aggrieved have been effectively addressed to the satisfaction of the complainant
- Grievance to be duly addressed and closed by LBTL.

8.4.7 Monitoring of Grievances

Grievance records will provide the background information for regular monitoring. Some of the monitoring indicators identified that can be a part of the monitoring mechanism may include:

- Tracking the number of grievances received and resolved (by gender, male/female, vulnerable categories);
- Analysing effectiveness and efficiency, using complaints to analyse systemic deficiencies.
- Patterns in the grievances the company receives, and their resolution.
- Communities preference of different channels to submit grievances;
- Any particular sub group in the community who are aggrieved and raising complaints (for example, women, elderly, a particular locality);
- Trends observed in grievances e.g. particular groups/ particular kind of complaints relating to operations or accessibility or any specific issues;
- Average time taken for resolution of grievances falling under particular category;
- Matters significantly affecting company policy or requiring legal review;
- Issues of cultural appropriateness and transparency;
- Efficacy of the system to meet the company requirement s and expectation of stakeholders

8.4.8 Reporting of Grievance

The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the Project and Site offices, Panchayat of the concerned notice boards and on the website of the company, as well as reported in the semi-annual environmental and social monitoring reports to be submitted to IFC

8.5 Resource required for Grievance Redressal Mechanism Implementation

Manpower and Budget would be required for the successful implementation of the Grievance redressal ant both the project and Corporate Level

8.5.1 Manpower

8.5.1.1 Corporate Level

The Corporate EHS Manager would be responsible for day-to-day management of the Grievances. He would be responsible for coordinating with the Project level EHS Manager / E&S Officer at the Project to ensure that all the grievance is redressed in a timely manner. He would also be responsible for analysis of the trends in the grievances received and advising the both the Corporate and Project level management of possible remedial measures.

8.5.1.2 Project Level

A grievance cell headed by the EHS Manager / E&S Officer is to be formed during the initial inception phase of the project. The grievance coordinator will be responsible for effective implementation of GRM and coordinating day to day functions. Periodic meetings and reviews of the Grievance cell are carried out by them. The grievance cell at project level would keep a grievance log and be reporting back to the Project Head. He would also be responsible for supporting the Corporate EHS Manager in reporting to the Corporate Management and the Funding agency.

8.6 Discloser of The Grievance Redressal Mechanism

The disclosure for GRM will be done with the community, and other relevant stakeholders. The steps will be disclosed in the Project Information Kit. In addition, leaflets or posters will be made available to villagers at the village/panchayat office, or other public notification boards. The disclosure will be done through website, Project Site Office and other relevant places.

8.7 Present Status of Grievance Redressal Process

As part of the grievance redressal, the project prior to project commencement, had issued notice for the proposed transmission line passing through the villages published in local & national newspaper and Gazette of India. This was carried out before authorization given for section 164 of the Electricity Act 2003, a window period of not less than 60 days from the date of such publication for public/community to raise any objection/clarification on the proposed route. As reported, no objection received for the proposed route alignment of LBTL project.

Presently, LBTL has a well-developed Grievance redressal mechanism as a part of its ESMS system which has been implemented and applicable to all its subsidiaries and SPVs including project site. The project LBTL has a Grievance redressal mechanism overlook by the Project Head on site. The grievance mechanism has been shared with the local communities during obtaining consent stage. A grievance register as per format are available at site office for recording the grievances of local communities. Reportedly, since the project commencement no grievance was formally submitted or recorded on Standard grievance register.

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9. Conclusion and Recommendation

The ESIA has assessed overall acceptability of environmental and social impacts likely to arise as a result of construction and operation of transmission line for LBTL project. The proposed project is categorised as category B as the social or environmental impacts are assessed as limited, few in number, site specific, largely reversible, and readily addressed through mitigation measures. Though some portion of the project Area will be fall under Protected Area (Wild Ass Sanctuary), however, during the field visit no Wild Ass has been observed. It was reported that in rare cases the wild ass stray to the fringe areas of the sanctuaries where the transmission line is located. Moreover, the transmission line is not considered as high-risk project because of the inherent low risks that they carry. Also, with these embedded mitigation measures the risk to the wild ass from the project is reduced. Also, note that the actual habitat of the wild ass is in the Little Rann of Kutch which is approximately 24 km south from the transmission line.

The project is assessed to generate some environmental and social issue owing to land access and the spread of transmission corridor. The community had raised concern on issues with regards to health and safety and potential exposure to electromagnetic fields during operation especially during rainy season. Besides, the community also had raised concern for adequate compensation for land use along the tower footprint as.
Mitigation measures for insignificant impacts on Air, Water, land, soil, noise ecology and socio-economics have been specified through proper

- Follow up of best practice of compensation, public disclosure, grievance management and compensation.
- Planning and designing of tower structure, site preparation and access route, compensation etc.
- Application of standards for Health and safety for construction tower erection and stringing activities
- Clearances and permits (including forest clearance) required for each sub activity

The ESMP provides a delivery mechanism to address potential adverse impacts, to instruct contractors and to introduce standards of good practice to be adopts for project activities taken up during construction and operation phases of the project. Inspection and monitoring of the environmental and social components phase activities will increase the effectiveness of suggested mitigations.

Appendix A Mammals of the Study Area

SN	Scientific Name	Common Name	IUCN Status *	WPA Schedule**
1	***Equus hemionus khur****	**Asiatic Wild Ass**	NT	I
2	***Boselaphus tragocamelus****	**Blue Bull**	LC	III
3	*Gazella bennettii*	Indian Gazelle	LC	I
4	*Antilope cervicapra*	Blackbuck	LC	I
5	*Felis caracal*	Caracal	LC	I
6	*Felis silvestris*	Asiatic Wild Cat	LC	I
7	***Felis chaus prateri****	**Jungle Cat**	LC	II
8	*Viverricula indica*	Small Indian Civet	LC	II
9	***Herpestes edwardsii***	**Grey Mongoose**	LC	II
10	*Herpestes auropunctatus*	Small Indian Mongoose	LC	IV
11	*Hyaena hyaena*	Striped Hyaena	NT	III
12	*Canis lupus pallipes*	Indian Wolf	LC	I
13	***Pteropus giganteus****	**Indian Flying Fox**	LC	IV
14	***Vulpes bengalensis****	**Indian Fox**	LC	II
15	*Vulpus vulpus pusilla*	Desert Fox	LC	-
16	***Sus scrofa****	**Wild pig**	LC	III
17	*Mellivora capensis*	Honey Badger	LC	I
18	*Canis aureus*	Jackal	LC	II
19	***Lepus nigricollis dayanus****	**Indian Hare**	LC	IV
20	*Manis crassicaudata*	Indian Pangolin	EN	I
21	*Suncus murinus*	House Shrew	LC	-
22	*Scotophilus heathii*	Greater Asiatic Yellow House Bat	LC	-
23	*Scotophilus kuhli*	Lesser Asiatic Yellow bat	LC	-
24	*Paraechinus micropus*	Indian Hedgehog	LC	IV
25	*Hystrix indica*	Indian Crested Porcupine	LC	IV
26	***Funambulus pennantii***	**Palm Squirrel**	LC	IV
27	***Tatera indica***	**Indian Gerbil**	LC	-
28	*Meriones hurrianae*	Indian Desert Jird	LC	-
29	***Mus musculus***	**House Mouse**	LC	V
30	***Mus booduga***	**Little Indian Field Mouse**	LC	V
31	*Millardia meltada*	Soft-furred Field Rat	LC	V
32	*Golunda ellioti*	Indian Bush Rat	LC	V
33	***Bandicota indica***	**Large Bandicoot Rat**	LC	V
34	*Rattus rattus*	House Rat	LC	V

**Status assigned by the International Union for Conservation of Nature and Natural Resources, where –CR – Critically Endangered; EN – Endangered; LC – Least Concern, NA – Not Assessed; NT – Near Threatened; and VU - Vulnerable.*

***Schedules I to VI: Indian Wildlife (Protection) Act, 1972.*

Sources: Vivek Menon (2014), Indian Mammals: A Field Guide. Hachette Book Publishing India Pvt. Ltd., Gurgaon, India, pp 1-522; The IUCN Red List of Threatened Species. Version 2019-3; Schedules I to VI: Indian Wildlife (Protection) Act, 1972.

Appendix B Resident Birds of the Study Area

SN	Scientific Name	Common Name	IUCN Status*	WPA Schedule**
1	*Ephippiorhynchus asiaticus*	Black-necked Stork	NT	IV
2	*Sarkidiornis melanotos*	Knob-billed Duck	LC	IV
3	*Nettapus coromandelianus*	Cotton Pygmy Goose	LC	IV
4	*Anas poecilorhyncha*	Indian Spot-billed Duck	LC	IV
5	*Tachybaptus ruficollis*	Little Grebe	LC	IV
6	*Podiceps cristatus*	Great Crested Grebe	LC	IV
7	*Mycteria leucocephala*	Painted Stork	LC	IV
8	***Anastomus oscitans***	**Asian Openbill**	LC	IV
9	***Threskiornis melanocephala***	**Black-headed Ibis**	LC	IV
10	*Pseudibis papillosa*	Black Ibis	LC	IV
11	*Platalea leucorodia*	Eurasian Spoonbill	LC	I
12	*Ardea purpurea*	Purple Heron	LC	IV
13	***Ardeola grayii***	**Indian Pond Heron**	LC	IV
14	***Bubulcus ibis***	**Cattle Egret**	LC	IV
15	***Egretta garzetta***	**Little Egret**	LC	IV
16	***Casmerodicus albus***	**Great Egret**	LC	IV
17	*Mesophoyx intermedia*	Intermediate Egret	LC	IV
18	*Microcarbo niger*	Little Cormorant	LC	IV
19	*Elanus caeruleus*	Black-winged Kite	LC	IV
20	***Milvus migrans***	**Black Kite**	LC	IV
21	*Haliastur indus*	Brahminy Kite	LC	IV
22	*Pernis ptilorhynchus*	Oriental Honey Buzzard	LC	IV
23	*Butastur teesa*	White-eyed Buzzard	LC	IV
24	***Amaurornis phoenicurus***	**White-breasted Waterhen**	LC	IV
25	***Porphyrio porphyrio***	**Purple Swamphen**	LC	IV
26	***Gallinula chloropus***	**Common Moorhen**	LC	IV
27	*Grus antigone*	Sarus Crane	VU	I
28	***Vanellus indicus***	**Red-wattled Lapwing**	LC	IV
29	*Charadris dubius*	Little Ringed Plover	LC	IV
30	*Charadrius alexandrinus*	Kentish Plover	LC	IV
31	*Fulica atra*	Common Coot	LC	IV
32	***Columba livia***	**Common Pigeon**	LC	IV
33	***Streptopelia decaocto***	**Eurasian Collared Dove**	LC	IV
34	***Stigmatopelia senegalensis***	**Laughing Dove**	LC	IV
35	***Psittacula krameri***	**Rose-ringed Parakeet**	LC	IV
36	***Eudynamis scolopaceus***	**Asian Koel**	LC	IV
37	*Caprimulgus asiaticus*	Indian Nightjar	LC	IV
38	***Apus affinis***	**Little Swift**	LC	IV

SN	Scientific Name	Common Name	IUCN Status*	WPA Schedule**
39	***Coracias benghalensis***	**Indian Roller**	LC	IV
40	***Halcyon smyrnensis***	**White-throated Kingfisher**	LC	IV
41	***Alcedo atthis***	**Common Kingfisher**	LC	IV
42	*Ceryle rudis*	Pied Kingfisher	LC	IV
43	***Merops leschenaulti***	**Chestnut Headed Bee-eater**	LC	IV
44	***Megalaima haemocephala***	**Coppersmith Barbet**	LC	IV
45	*Aegithinia nigrolutea*	Marshall's Iora	LC	IV
46	*Pericrocotus erythropygius*	White-bellied Minivet	LC	IV
47	*Pericrocotus cinnamomeus*	Small Minivet	LC	IV
48	*Lanius vittatus*	Bay-backed Shrike	LC	IV
49	***Lanius schach***	**Long-tailed Shrike**	LC	IV
50	***Dicrurus macrocercus***	**Black Drongo**	LC	IV
51	***Dendrocitta vagabunda***	**Rufous Treepie**	LC	IV
52	*Corvus (corax) subcorax*	Punjab Raven	LC	IV
53	***Corvus splendens***	**House Crow**	LC	V
54	*Ammomanes phoenicurus*	Rufous-tailed Lark	LC	IV
55	*Ammomanes deserti*	Desert Lark	LC	IV
56	*Calandrella raytal*	Sand Lark	LC	IV
57	*Eremopterix nigriceps*	Black-crowned Sparrow Lark	LC	IV
58	*Galerida cristata*	Crested Lark	LC	IV
59	*Alauda gulgula*	Oriental Skylark	LC	IV
60	***Pycnonotus leucotis***	**White-eared Bulbul**	LC	IV
61	***Pycnonotus cafer***	**Red-vented Bulbul**	LC	IV
62	*Orthotomus sutorius*	Common Tailorbird	LC	IV
63	***Turdoides caudata***	**Common Babbler**	LC	IV
64	*Turdoides malcolmi*	Large Grey Babbler	LC	IV
65	***Acridotheres tristis***	**Common Myna**	LC	IV
66	***Sturnia pagodarum***	**Brahminy Starling**	LC	IV
67	***Saxicoloides fulicatus***	**Indian Robin**	LC	IV
68	***Cinnyris asiaticus***	**Purple Sunbird**	LC	IV
69	***Passer domesticus***	**House Sparrow**	LC	IV
70	***Ploceus philippinus****	**Baya Weaver**	LC	IV
71	***Anthus rufulus***	**Paddyfield Pipit**	LC	IV
72	*Rostratula bengalensis*	Greater Painted-snipe	LC	IV
73	*Pterocles exustus*	Chestnut-bellied sandgrouse	LC	IV
74	*Centropus parroti*	Southern Coucal	LC	IV
75	*Athene brama*	Spotted Owlet	LC	IV
76	*Francolinus francolinus*	Black Francolin	LC	IV
77	*Francolinus pondicerianus*	Grey Francolin	LC	IV
78	*Hirundo smithii*	Wire-tailed Swallow	LC	IV

SN	Scientific Name	Common Name	IUCN Status*	WPA Schedule**
79	*Emberiza striolate*	Striolated Bunting	LC	IV
80	*Cursorius coromandelicus*	Indian Courser	LC	IV

**Status assigned by the International Union for Conservation of Nature and Natural Resources, where –CR – Critically Endangered; EN – Endangered; LC – Least Concern, NA – Not Assessed; NT – Near Threatened; and VU - Vulnerable.*

***Schedules I to VI: Indian Wildlife (Protection) Act, 1972.*

Sources: R. Grimmett, C. Inskipp & T. Inskipp (2011). Birds of the Indian Subcontinent. Oxford University Press, pp 1-528; IUCN (2019). The IUCN Red List of Threatened Species. Version 2019-3.; Schedules I to VI: Indian Wildlife (Protection) Act, 1972.

Appendix C Migratory Birds of the Study Area

SN	Scientific Name	Common Name	IUCN Status*	WPA Schedule**	Type of Migrant
1	*Coturnix coturnix*	Common Quail	LC	IV	Winter
2	*Coturnix coromandelica*	Rain Quail	LC	IV	Summer
3	*Phoenicopterus roseus*	Greater Flamingo	LC	IV	Winter
4	*Phoeniconaias minor*	Lesser Flamingo	NT	IV	Winter
5	*Plegadis falcinellus*	Glossy Ibis	LC	IV	Winter
6	***Ardea cinerea***	**Grey Heron**	LC	IV	Winter
7	*Tadorna ferruginea*	Ruddy Shelduck	LC	IV	Winter
8	*Marmaronetta angustirostris*	Marbled Duck	LC	IV	Winter
9	*Anas strepera*	Gadwall	LC	IV	Winter
10	*Anas penelope*	Eurasian Wigeon	LC	IV	Winter
11	*Anas platyrhynchos*	Mallard	LC	IV	Winter
12	*Anas clypeata*	Northern Shoveler	LC	IV	Winter
13	*Anas acuta*	Northern Pintail	LC	IV	Winter
14	*Anas querquedula*	Garganey	LC	IV	Winter
15	*Anas crecca*	Common Teal	LC	IV	Winter
16	*Netta rufina*	Red-crested Pochard	LC	IV	Winter
17	*Ciconia nigra*	Black Stork	LC	IV	Winter
18	*Ciconia ciconia*	White Stork	LC	IV	Winter
19	*Pelecanus onocrotalus*	Great White Pelican	LC	IV	Winter
20	*Pelecanus crispus*	Dalmatian Pelican	NT	IV	Winter
21	***Phalacrocorax fuscicollis***	**Indian Cormorant**	LC	IV	Winter
22	*Phalacrocorax carbo*	Great Cormorant	LC	IV	Winter
23	*Falco tinnunculus*	Common Kestrel	LC	IV	Winter
24	*Falco cherrug*	Saker Falcon	EN	IV	Winter
25	*Falco peregrinus*	Peregrine Falcon	LC	IV	Winter
26	*Falco (peregrinus) pelegrinoides*	Barbary Falcon	NA	IV	Winter
27	*Milvus (migrans) lineatus*	Black-eared Kite	NA	IV	Winter
28	*Pandion haliaetus*	Osprey	LC	I	Winter
29	*Circus aeruginosus*	Eurasian Marsh Harrier	LC	IV	Winter
30	*Aquila clanga*	Greater Spotted Eagle	VU	IV	Winter
31	*Aquila heliaca*	Eastern Imperial Eagle	VU	IV	Winter
32	*Gyps fulvus*	Griffon Vulture	LC	IV	Winter
33	*Aegypius monachus*	Cinereous Vulture	NT	IV	Winter
34	***Hieraaetus pennatus***	**Booted Eagle**	LC	IV	Winter
35	*Chlamydotis macqueenii*	Macqueen's Bustard	VU	I	Winter
36	*Turnix sylvaticus*	Small Buttonquail	LC	IV	Summer
37	*Turnix tanki*	Yellow-legged Buttonquail	LC	IV	Summer
38	***Grus virgo***	**Demoiselle Crane**	LC	IV	Winter

SN	Scientific Name	Common Name	IUCN Status*	WPA Schedule**	Type of Migrant
39	*Grus grus*	Common Crane	LC	IV	Winter
40	*Recurvirostra avosetta*	Pied Avocet	LC	IV	Winter
41	*Gallinago gallinago*	Common Snipe	LC	IV	Winter
42	*Lymnocryptes minimus*	Jack Snipe	LC	IV	Winter
43	*Limosa limosa*	Black-tailed Godwit	NT	IV	Winter
44	*Numenius arquata*	Eurasian Curlew	NT	IV	Winter
45	*Tringa erythropus*	Spotted Redshank	LC	IV	Winter
46	*Tringa totanus*	Common Redshank	LC	IV	Winter
47	*Tringa nebularia*	Common Greenshank	LC	IV	Winter
48	*Tringa ochropus*	Green Sandpiper	LC	IV	Winter
49	*Tringa glareola*	Wood Sandpiper	LC	IV	Winter
50	***Actitis hypoleucos***	**Common Sandpiper**	LC	IV	Winter
51	*Calidris minuta*	Little Stint	LC	IV	Winter
52	*Cursorius cursor*	Cream-coloured Courser	LC	IV	Winter
53	*Pterocles alchata*	Pin-tailed Sandgrouse	LC	IV	Winter
54	*Pterocles senegallus*	Spotted Sandgrouse	LC	IV	Winter
55	*Pterocles orientalis*	Black-bellied Sandgrouse	LC	IV	Winter
56	*Streptopelia orientalis*	Oriental Turtle Dove	LC	IV	Winter
57	*Clamator jacobinus*	Jacobin Cuckoo	LC	IV	Winter
58	***Upupa epops***	**Common Hoopoe**	LC	IV	Winter
59	*Coracias garrulus*	Eurasian Roller	LC	IV	Passage
60	*Lanius phoenicuroides*	Red-tailed Shrike	LC	IV	Passage
61	*Hirundo rustica*	Barn Swallow	LC	IV	Winter
62	*Calandrella brachydactyla*	Greater Short-toed Lark	LC	IV	Winter
63	*Acrocephalus stentoreus*	Clamorous Reed Warbler	LC	IV	Winter
64	*Phylloscopus collybita*	Common Chiffchaff	LC	IV	Winter
65	*Phylloscopus neglectus*	Plain Leaf Warbler	LC	IV	Winter
66	*Sylvia curruca*	Lesser Whitethroat	LC	IV	Winter
67	*Sylvia (curruca) minula*	Desert Whitethroat	LC	IV	Winter
68	*Sylvia althaea*	Hume's Whitethroat	LC	IV	Passage
69	*Sylvia hortensis*	Orphean Warbler	LC	-	Winter
70	*Sylvia nana*	Asian Desert Warbler	LC	IV	Winter
71	*Cercotrichas galactotes*	Rufous-tailed Scrub Robin	LC	IV	Winter
72	*Phoenicurus ochruros*	Black Redstart	LC	IV	Winter
73	***Oenanthe isabellina***	**Isabelline Wheatear**	LC	IV	Winter
74	*Oenanthe chrysopygia*	Red-tailed Wheatear	LC	IV	Winter
75	***Oenanthe deserti***	**Desert Wheatear**	LC	IV	Winter
76	***Oenanthe picta***	**Variable Wheatear**	LC	IV	Winter
77	*Monticola solitarius*	Blue Rock Thrush	LC	IV	Winter
78	***Passer hispaniolensis***	**Spanish Sparrow**	LC	IV	Winter

SN	Scientific Name	Common Name	IUCN Status*	WPA Schedule**	Type of Migrant
79	*Motacilla flava*	Yellow Wagtail	LC	IV	Winter
80	***Motacilla citreola***	**Citrine Wagtail**	LC	IV	Winter
81	*Motacilla cinerea*	Grey Wagtail	LC	IV	Winter
82	***Motacilla alba***	**White Wagtail**	LC	IV	Winter
83	*Emberiza buchanani*	Grey-necked Bunting	LC	IV	Winter
84	*Hydroprogne caspia*	Caspian tern	LC	IV	Winter
85	*Chlamydotis macqueenii*	Macqueen's bustard	VU	I	Winter
86	*Glareola lactea*	Small pratincole	LC	IV	Winter
87	*Pandion haliaetus*	Osprey	LC	I	Winter

**Status assigned by the International Union for Conservation of Nature and Natural Resources, where –CR – Critically Endangered, EN – Endangered, LC – Least Concern, NA – Not Assessed; NT – Near Threatened; and VU - Vulnerable.*

***Schedules I to VI: Indian Wildlife (Protection) Act, 1972.*

Sources: R. Grimmett, C. Inskipp & T. Inskipp (2011). Birds of the Indian Subcontinent. Oxford University Press, pp 1-528; IUCN (2019). The IUCN Red List of Threatened Species. Version 2019-3.; Schedules I to VI: Indian Wildlife (Protection) Act, 1972.

Appendix D Reptiles of the Study Area

SN	Scientific Name	Common Name	IUCN Status*	WPA Schedule**
1	*Eryx johnii*	Indian Sand Boa	LC	-
2	***Boiga trigonata****	**Common Cat Snake**	LC	-
3	*Lycodon aulicus*	Indian Wolf Snake	LC	-
4	*Oligodon arnensis*	Banded Kukri Snake	LC	-
5	***Ptyas mucosa****	**Indian Rat Snake**	LC	II
6	***Bungarus caeruleus****	**Common Krait**	LC	-
7	***Bungarus sindanus****	**Sind Krait**	NE	-
8	***Naja naja****	**Indian Cobra**	LC	II
9	*Echis carinatus*	Saw-scaled Viper	LC	-
10	*Cyrtopodion kachhense*	Kutch Bent-toed Gecko	NE	-
11	*Calotes minor*	Dwarf Ground Lizard	DD	-
12	***Calotes versicolor***	**Indian Garden Lizard**	LC	-
13	***Hemidactylus frenatus***	**Asian House Gecko**	LC	-
14	*Saara hardwickii*	Indian Spiny-tailed Lizard	NE	II
15	*Cyrtopodion scabrum*	Rough Bent-toed Gecko	LC	-
16	*Hemidactylus flaviviridis*	Northern House Gecko	LC	-
17	*Cyrtodactylus kacchensis*	Banded Rock Gecko	LC	-
18	*Ophisops kutchensis*	Kutch Small-scaled Snake-eye	NE	-
19	*Eutropis macularia*	Bronze Grass Skink	LC	-
20	*Varanus bengalensis*	Bengal Monitor	LC	I
21	*Varanus griseus*	Desert Monitor	NE	-
22	*Geochelone elegans*	Indian Star Tortoise	VU	IV
23	*Agama* spp.	Rock agama	LC	-
24	*Sitana ponticeriana*	Fan-throated lizard	LC	-
25	*Echis carinatus*	Saw scaled viper	NE	II

**Status assigned by the International Union for Conservation of Nature and Natural Resources, where – DD – Data Deficient; LC – Least Concern; NE – Not Evaluated and VU - Vulnerable.*

***Schedules I to VI: Indian Wildlife (Protection) Act, 1972.*

Sources: Patel, H., Vyas, R. (2019) Reptiles of Gujarat, India: Updated Checklist, Distribution, and Conservation Status. Herpetology Notes, Vol. 12 pp. 765-777.; The IUCN Red List of Threatened Species. Version 2019-3.; Schedules I to VI: Indian Wildlife (Protection) Act, 1972.

Appendix E Amphibians of the Study Area

SN	Scientific Name	Common Name	IUCN Status*	WPA Schedule**
1	***Duttaphrynus melanostictus****	**Asian Common Toad**	LC	IV
2	*Duttaphrynus stomaticus*	Indian Marbled Toad	LC	IV
3	*Euphlyctis hexadactylus*	Indian Green Frog	LC	IV
4	***Hoplobatrachus tigerinus****	**Indian Bullfrog**	LC	IV
5	*Microhyla ornata*	Ant Frog	LC	IV
6	*Sphaerotheca breviceps*	Indian Burrowing Frog	LC	IV

**Status assigned by the International Union for Conservation of Nature and Natural Resources, where –CR – Critically Endangered and EN - Endangered.*

***Schedules I to VI: Indian Wildlife (Protection) Act, 1972.*

Sources: Vyas, R. (2008) Review of the current diversity and richness of amphibians of Gujarat, India. Indian Forester Vol 134 (10) pp 1381-1392.; The IUCN Red List of Threatened Species. Version 2019-3.; Schedules I to VI: Indian Wildlife (Protection) Act, 1972.

Appendix F Stakeholder Consultation

A	***Project Title:***	ESIA for Adani Transmission Line	
B	***Stakeholder Title:***	Consultation with Project Team	
C	***Basic details**:*		
	Location:	Shivlakha, Kachchh, Gujarat	
	Date:	13th December 2020	
D	***Attended By:***		
	Sr.	**Name**	**Designation**
	1.	Mr Sukram	Project Head
E	*Purpose of Consultation*		
	• The purpose of the consultation was to have an overall understanding of the project elements, the status of the ongoing project on site.		
F	***Key Points Inferred:***		
	• The route for the transmission alignment was finalised considering the minimum environmental impacts, avoiding human settlements, large forest covers etc. Out of the three-route alignment surveyed, route 1 was considered as the most feasible for the project and approval for the same has been obtained. • Land procurement was undertaken as per section 164 of the Electricity Act 2003. A notification was issued to the affected landowner impacted due to the ROW. The project proponent reported that a committee was formed by the District Collector for determining the land and crop compensation. • Total 58 villages will be impacted due to the project of which Land compensation has been fixed for 20 villages, 19 villages under process 19 completed. The land value was fixed INR 970 for irrigated land and 1772/sqm and unirrigated land 881/sqm. against circle INR 100 sqm • About 600 landowners will be impacted due to tower footing, Details of affected landowner along the ROW is yet to be finalised. Compensation for land is paid as per the MoP guideline ie 85% of the land value for Tower and 25% for RoW corridor. Compensation for the affected landowners is paid in three phases 3 phase. So far 197 tower has been completed and payment has been completed for 150 landowners. • NOC for railway under process.		
	Photos		

A	***Project Title:***	ESIA for Adani Transmission Line
B	***Stakeholder Title:***	Consultation with Headman
C	***Basic details****:*	
	Location:	Dasar
	Date:	26th November 2020

D ***Attended By:***

Sr.	Name	Designation
1.	Narendra Singh	Head Man

E *Purpose of Consultation*

- The purpose of the consultation was to understand the village profile
- To ascertain the impacts caused by the project

F ***Key Points Inferred:***

- Dasar has a total household of 300 and total population of 2000. The major community are Choudri, Thakur, Rabari, Darbar and Koli. The village has a total 50 BPL families. Of the total 300 households 20-25 households belongs to Bhil and Harijan. They are the vulnerable households and landless category. They are dependent on agriculture labour and daily wages for their income.
- The village has a government school till Class X post which they travel to Radhanpur for college Women and girls completed their schooling till class X while some have completed graduate, but the number is very less.
- The main livelihood activities of the people is agriculture. Double cropping is practice in the area and the main crops grown are Cumins, Cotton, Wheat, Sesame seed, Castor, Mustard. For irrigation facility, canal (Narmada) and tubewell/Boring are the main sources. For tube well, the water table is found at a depth of 700-800mt. The water quality from tubewell is reported to be of high soil salinity.
- The average landholding size of the villagers is 10 bigha. However, there are 20-25 households who are landless.
- Besides Agriculture, daily labour (farm and non-farm) is another main occupation of the villagers. Daily wages for agri-labour is INR 200 per. Villagers are also working in nearby solar Plant, Sindicatum Solar energy Private Limited as security guard and grass cutter.
- The current market value of land varies is Daisar varies from INR 2-3 lakhs per bigha for land inside the village and INR 5- 6 lakhs per bigha for land near to highway. The Government circle rate in the area is INR 40-50 sqm i.e
- The sarpanch is very much aware of the project. Total 8 towers will pass through the village thus affecting 8 landowners. The impacted land is double cropped agriculture land. The landholding size of impacted farmers is medium farmers. All the 8 landowners do not belong to any indigenous community.
- Land price for Daisar village is not yet fixed, hence, none of the affected landowners have received compensation

Photos: No Photograph

A	***Project Title:***	ESIA for Adani Transmission Line
B	***Stakeholder Title:***	Consultation with Local Community and Landowner
C	***Basic details****:*	
	Location:	Chachasma, Bhabar Taluka
	Date:	26th November 2020
D	***Attended By:***	

<table>
<tr><td></td><td>Sr.</td><td>Name</td><td>Designation</td></tr>
<tr><td></td><td>1.</td><td>Krishna Ben</td><td>Headwomen</td></tr>
<tr><td></td><td>2</td><td>Ramachandra Thakur</td><td>Retired Government Officer</td></tr>
<tr><td>E</td><td colspan="3">Purpose of Consultation
• The purpose of the consultation was to understand the village profile
• To ascertain the impacts caused by the project</td></tr>
<tr><td>F</td><td colspan="3">Key Points Inferred:
• Chachasna has a total household of 100 and total population of 2000-2500. Major community found in the area are Anusulya, Suta, Desai, Bar, Thakur, Prajapati, Naik, Sadhus. No ST community is reported in the village. Total 10 houses are BPL category.
• Education completed till Class 10 post which they undertake cultivation. Women partially assist their husband in agriculture while for livestock rearing, women play a crucial role. This is a booming activity and they have a dairy cooperative society. It’s the main contributor to a family income. Monthly income from livestock 4-5 lakh and in a year 1.5 crore income from livestock.
• 90% are into agriculture and the remaining are into services and daily labour. Double cropped is practice and the major crop grown are Cumin, castor, Jowar and Vegetables, Wheat. During June/July -Wheat, Jowar, Bajra Cummins and Oct/Nov- Wheat, cumin and Castor. Other vegetables grown are tomato, cauliflower etc. Crop Productivity for Jeera 15 – 20 mon in 1 bigha and Jowar 50-80 mon for 1 bigha
• For irrigation facility, Branch canal (3km) is the main sources of irrigation. However, during scanty rainfall, canal water supply is also irregular. This current year (2020) due to abundant rainfall, almost every they received good supply of irrigation water from canal. Apart from canal, 10 bore well are available in the village, however due to high iron and salinity content, farmers avoid using borewell water.
• For drinking water every household are connected through government piped water. Other sources is tube well at a depth of 870-1000ft.
• The market value of land price varies from INR 3 lakh to 3.5 lakhs.
• About 6 landowners are affected due to tower footing and the land value compensation is fixed at INR 881 per sq. m. Crop compensation for tower has already been paid to the affected landowner. The affected farmers undertake double/ triple cropped on a in the affected land parcel.
• For development project, while constructing the dam, 100 of trees were cut down, however the dam water has provided irrigation water to the villagers. So, both positive and negative aspects are there in any development project. With the construction of dam water, agriculture in the area has flourished and people ae able to carry out agriculture twice in a year as a result the level of poverty has declined. Earlier 70 to 80% mud houses were there but nowadays only 15% mud houses while 85% are RCC houses.
• The local community reported that the project benefit only for those whose land use has been obtained, and they are wondering how the villages can get benefits. The project proponent explain the benefits of the project whereby the government is exploring and tapping renewable sources of energy for providing affordable electricity since renewable energy has low input cost hence generating and tapping solar energy is more cost effective.</td></tr>
<tr><td></td><td colspan="3">Photos</td></tr>
</table>

A	***Project Title:***	ESIA for Adani Transmission Line	
B	***Stakeholder Title:***	Consultation with Local Community and Landowner	
C	***Basic details**:*		
	Location:	Sanwa	
	Date:	26th November 2020	
D	***Attended By:***		
	Sr.	**Name**	**Designation**
	1.	Mohan Bacher Bhai	Farmer
	2	Manga Kamraj	
E	*Purpose of Consultation*		
	• The purpose of the consultation was to understand the village profile • To ascertain the impacts caused by the project		
F	• Mohan is an agricultural labour from Phulparas and he has been carrying out agriculture in Sanvas. His land is located near to the proposed Adani power line and exiting PowerGrid. • In Sanwas village, agriculture is the main occupation whereby triple cropped is carried out in the area. The major crop grown are Cumins, Castor, Bajra, Cotton. • The main irrigation facility in the area is through canal. Not all farmers are not capable of accessing canal water for irrigation. As a result, the farmers enter into a verbal agreement with third party to provide irrigation water. In return, farmers share 1/3 of their produce. The average landholding size of the farmers 15-20 acreas. • Market Land value in Sanwa for 1 bigha -INR 3-4 lakhs. • The farmers knew about the project and he reported that farmers undertake cultivation underneath the tower.		

	Photos 

A	***Project Title:***	ESIA for Adani Transmission Line	
B	***Stakeholder Title:***	Consultation with EPC Contractor	
C	***Basic details****:*		
	Location:	Radhanpur, Patan	
	Date:	26th November 2020	
D	***Attended By:***		
	Sr.	**Name**	**Designation**
	1.	Sampath Kumar	Assistant Manager
	2	Anil Kumar	Store Manager
	3	Brajesh Jha	Admin in charge
	4	B.K Rahul	Account Manager
E	*Purpose of Consultation*		
	• To Understand the Manpower requirement • Health and Safety • Labour and working condition		
F	***Key Points Inferred:***		

The stockyard and labour camp are in Radhanpur village in a total area of 12 acres. The land for stockyard was lease from 4 landowner. The contractor reported that the land was not under cultivation when the land was lease out to the EPC contractor.

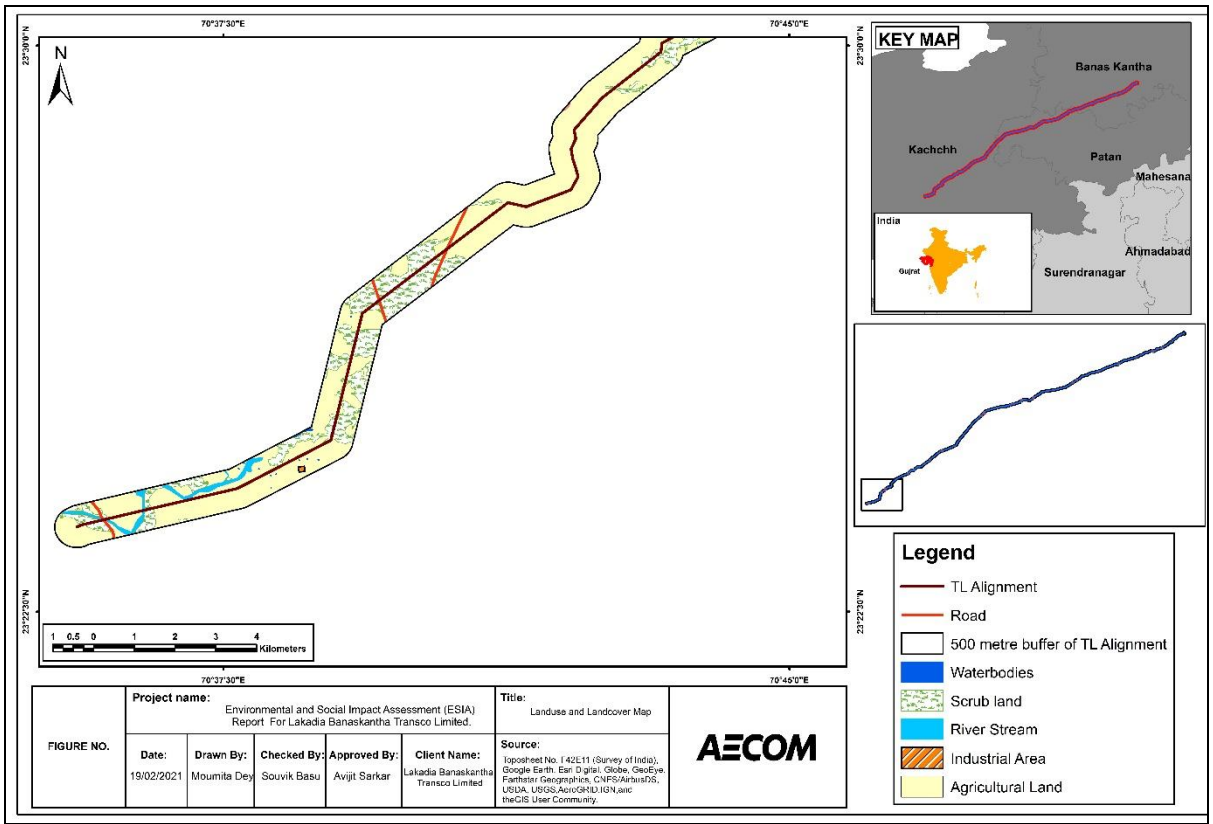
The contractor has a total workforce of 150 which includes migrant workers. The project has engaged 30-40 migrant labour from Jharkhand mainly for tower erection activities. During peak season the project will require 600 manpower for construction.

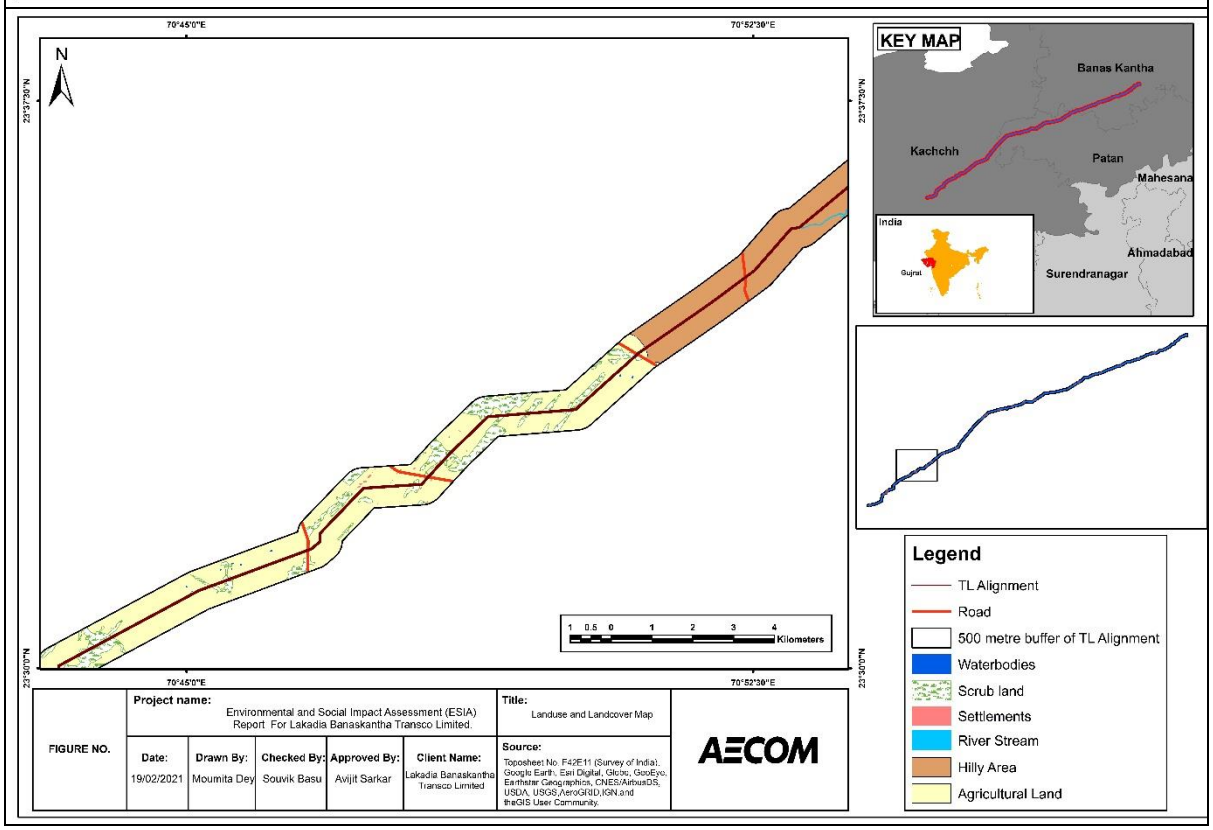
Canvass camp are reported to be set up in construction site and prior permission from panchayat has been obtained for setting up the camp. In case of any damage to crops during setting up canvass camp, Compensation for the same is being provided.

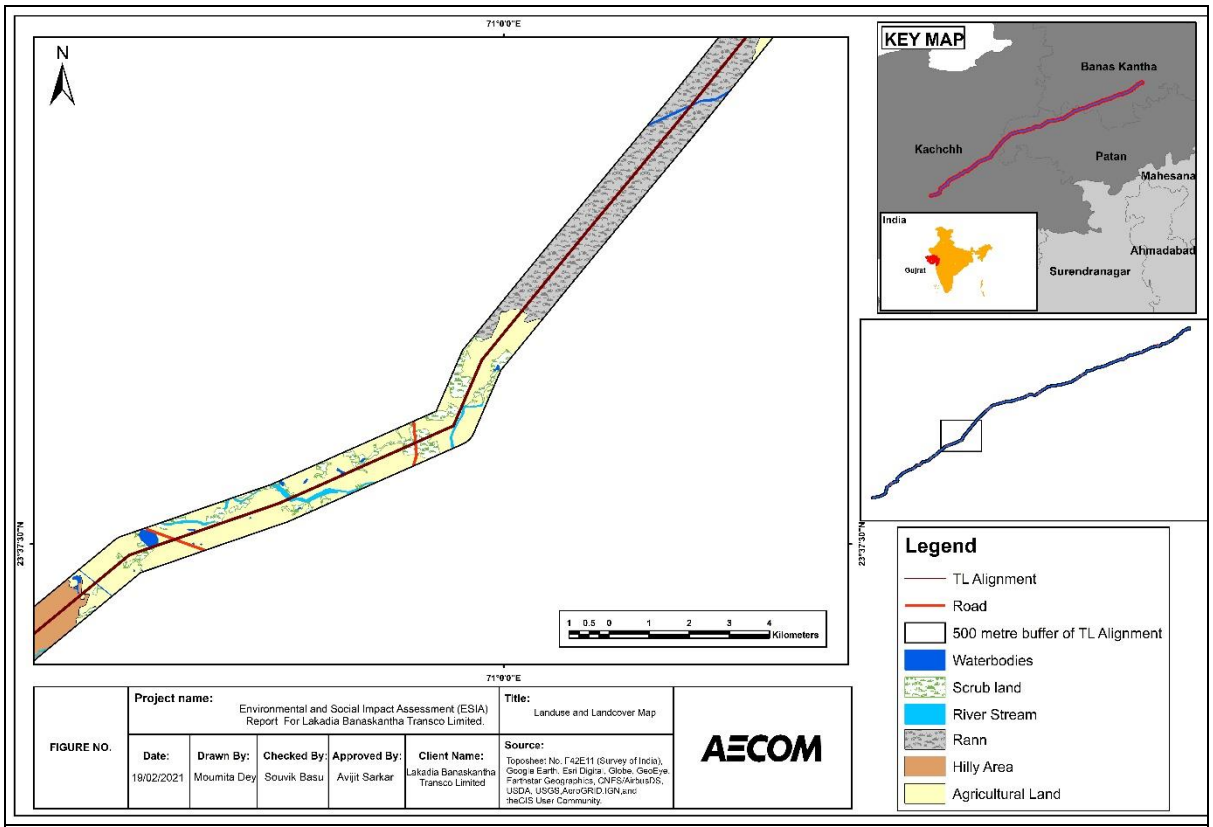
With regards to health and safety, safe drinking water supply through tanker is provided, thermal scanning is done prior entering the work premises. Safety training and induction was provided to all workers during recruitment.

	Photos  

Appendix G Land Use map



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N
23°37'30"N
KEY MAP
Banas Kantha
Kachchh
Patan
Mahesana
India
Gujrat
Ahmadabad
Surendranagar
Legend
TL Alignment
Road
500 metre buffer of TL Alignment
Waterbodies
Scrub land
River Stream
Rann
Hilly Area
Agricultural Land
1 0.5 0 1 2 3 4
Kilometers
FIGURE NO.
Project name:
Environmental and Social Impact Assessment (ESIA) Report For Lakadia Banaskantha Transco Limited.
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Landuse and Landcover Map
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19/02/2021
Drawn By:
Moumita Dey
Checked By:
Souvik Basu
Approved By:
Avijit Sarkar
Client Name:
Lakadia Banaskantha Transco Limited
Source:
Toposheet No. F42E11 (Survey of India), Google Earth, Esri Digital, Globe, GeoEye, Earthstar Geographics, CNES/AirbusDS, USDA, USGS,AeroGRID,IGN,and theGIS User Community.
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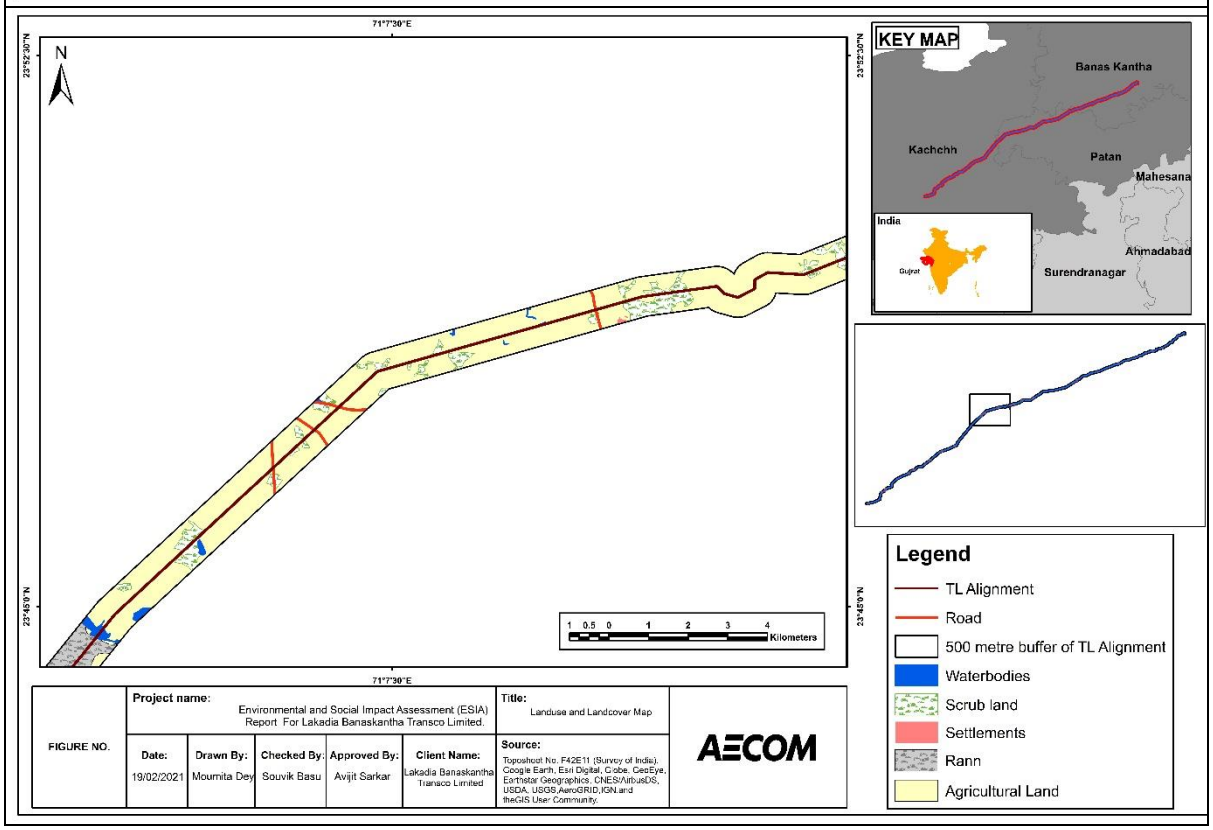
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23°45'0"N
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Banas Kantha
Kachchh
Patan
Mahesana
India
Gujrat
Ahmadabad
Surendranagar
Legend
TL Alignment
Road
500 metre buffer of TL Alignment
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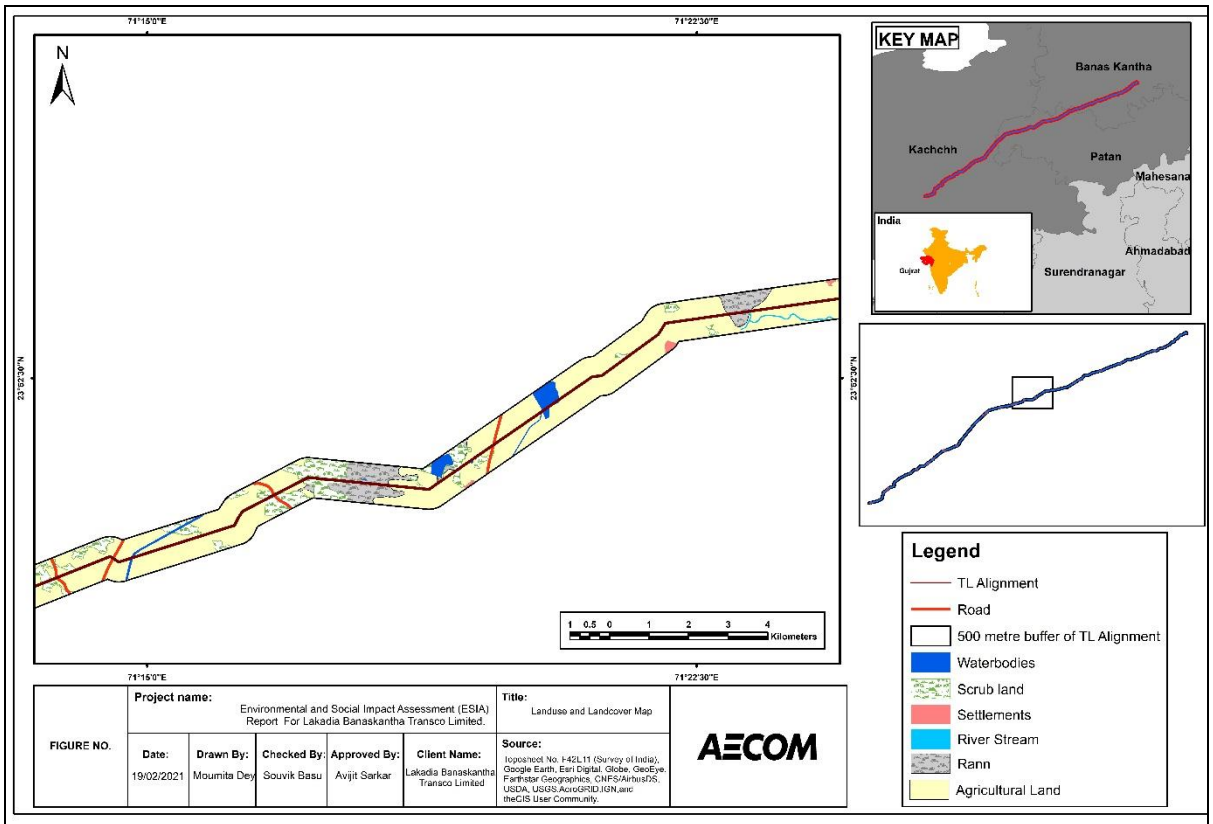
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71°22'30"E
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23°32'30"N
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Kachchh
Patan
Mahesana
India
Gujrat
Ahmadabad
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1 0.5 0 1 2 3 4
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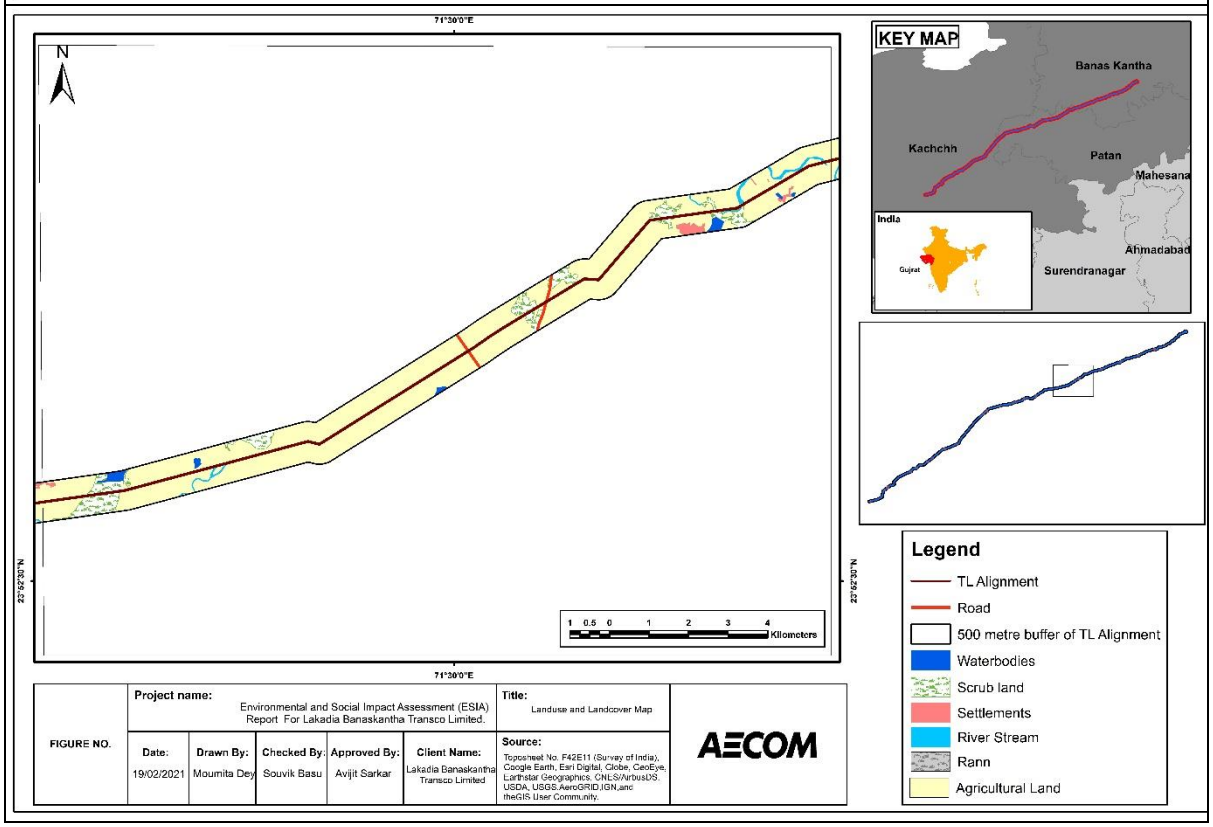
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1 0.5 0 1 2 3 4
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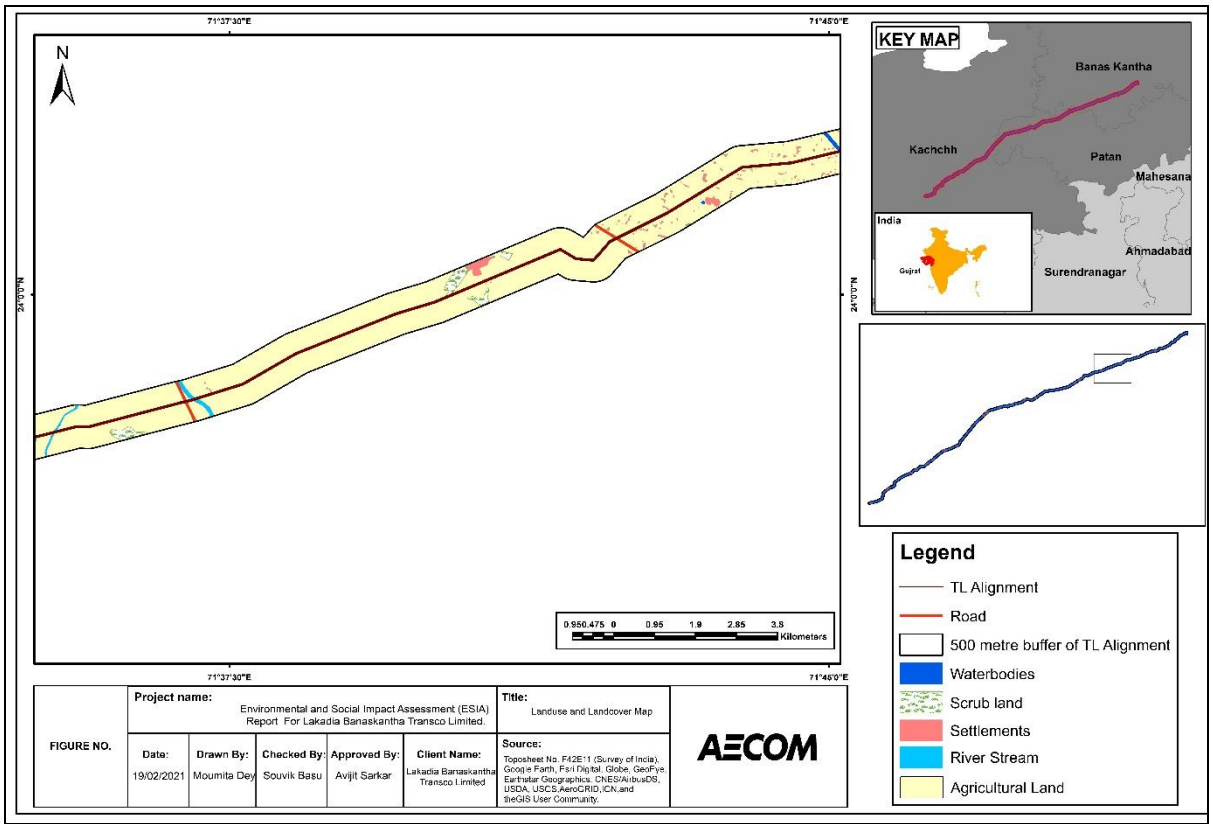
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Banas Kantha
Kachchh
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India
Gujrat
Ahmadabad
Surendranagar
0.950.475 0 0.95 1.9 2.85 3.8
Kilometers
71°37'30"E
71°46'0"E
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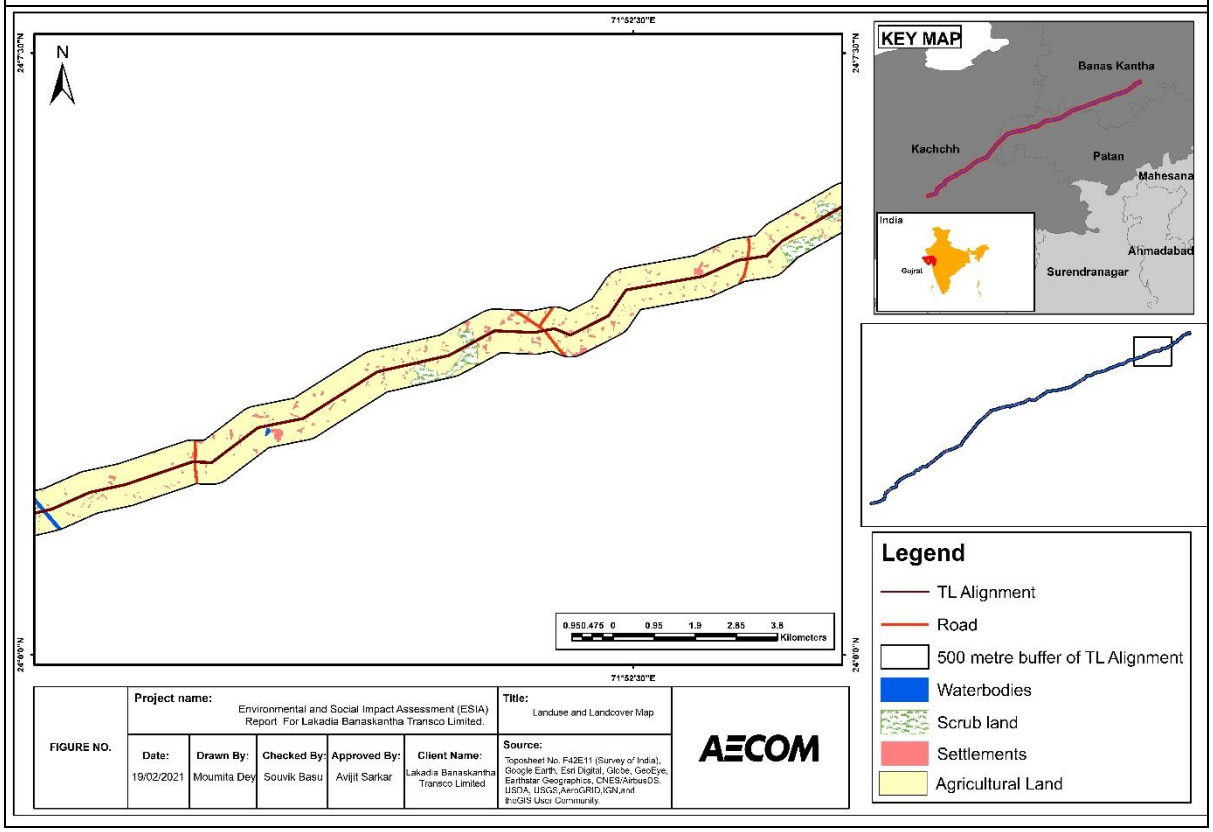
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24°3'0"N
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Kachchh
Patan
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India
Gujrat
Ahmadabad
Surendranagar
0.950.475 0 0.95 1.9 2.85 3.8
Kilometers
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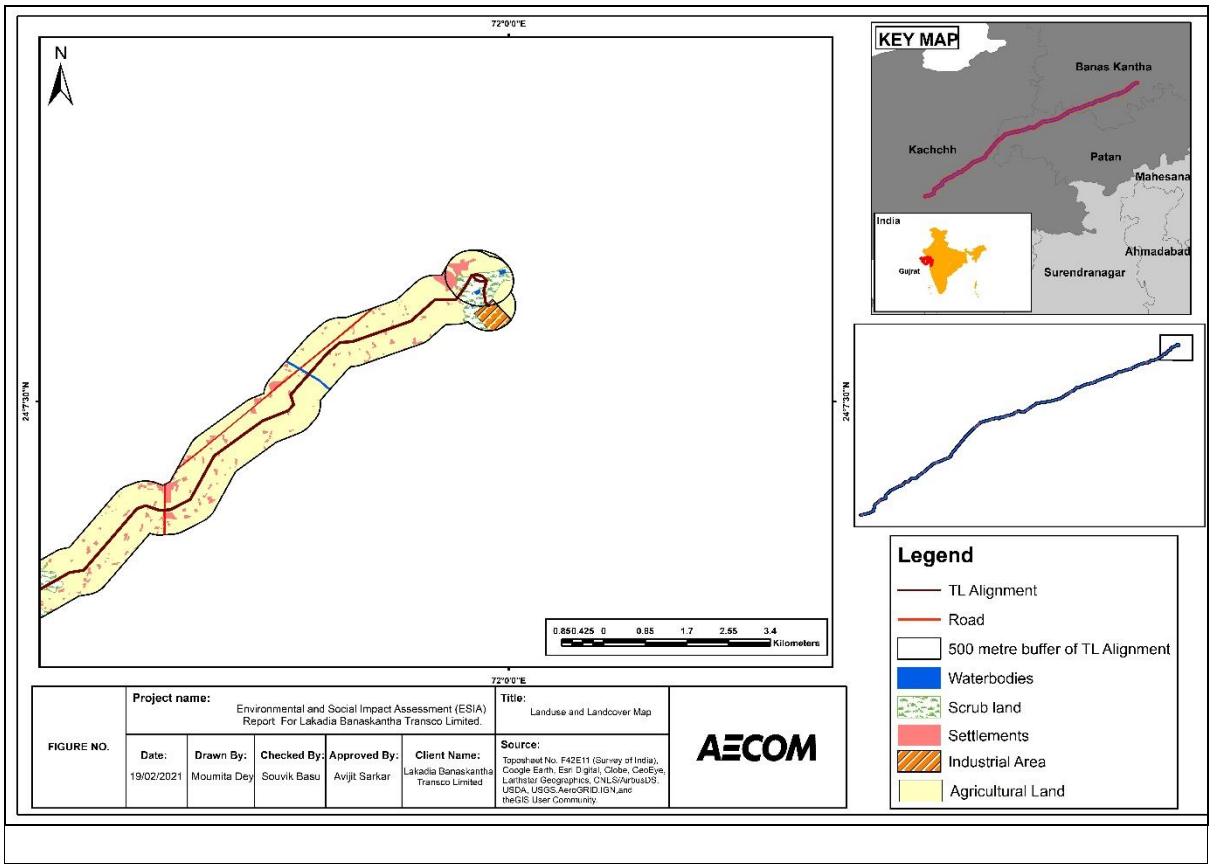
72°0'0"E
N
24°7'30"N
KEY MAP
Banas Kantha
Kachchh
Patan
Mahesana
India
Gujrat
Ahmadabad
Surendranagar
0.850.425 0 0.85 1.7 2.55 3.4
Kilometers
Legend
TL Alignment
Road
500 metre buffer of TL Alignment
Waterbodies
Scrub land
Settlements
Industrial Area
Agricultural Land
FIGURE NO.
Project name:
Environmental and Social Impact Assessment (ESIA) Report For Lakadia Banaskantha Transco Limited.
Title:
Landuse and Landcover Map
Date:
19/02/2021
Drawn By:
Moumita Dey
Checked By:
Souvik Basu
Approved By:
Avijit Sarkar
Client Name:
Lakadia Banaskantha Transco Limited
Source:
Toposheet No. F42E11 (Survey of India), Google Earth, Esri, Digital, Globe, CeoEye, Earthstar Geographics, CNES/AirbusDS, USDA, USGS,AeroGRID,IGN,and theGIS User Community
AECOM