

Initial Environmental Examination

Project Number: 51308-009

June 2022

India: Tripura Power Distribution Strengthening and Generation Efficiency Improvement Project

Tripura State Electricity Corporation Limited Distribution Component

Volume 2: Appendices

CURRENCY EQUIVALENTS

(as of 30 March 2022)

Currency unit	-	Indian rupee (Rs)
Rs1.00	=	\$ 0.0132
\$1.00	=	INR 75.86

ABBREVIATIONS

AAAC	All Aluminum Alloy Conductor
ABC	aerial bundled conductor
ACSR	Aluminum Conductor Steel Reinforced
ADB	Asian Development Bank
ASI	Archaeological Survey of India
AT&C	aggregate technical and commercial losses
BIS	Bureau of Indian Standards
CAP	corrective action plan
CEA	Central Electricity Authority
CGWA	Central Ground Water Authority
CPCB	Central Pollution Control Board
CTE	Consent to Establish
CTO	Consent to Operate
CWLW	Chief Wildlife Warden
DPR	detailed project report
EHS	environmental, health and safety
EHSG	environmental, health safety guidelines
EIA	Environmental Impact Assessment
EMF	electromagnetic field
EMoP	environmental monitoring plan
EMP	environmental management plan
EPC	engineering, procurement and construction
ESD	electrical subdivision
ESMP	environmental and social management system
ESZ	ecologically sensitive zone
GHG	greenhouse gas
GIIP	good international industry practice
GRC	grievance redressal committee
GRM	grievance redress mechanism
HDD	horizontal directional drilling
HoFF	Head of the Forest Force
HVDS	high voltage distribution system
IBA	important bird area
IBAT	Integrated Biodiversity Assessment Tool
ICNIRP	International Commission for Non-Ionizing Radiation Protection
IEE	initial environmental examination
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
KBA	key biodiversity area
LBS	load break switches
MOEF&CC	Ministry of Environment, Forest, and Climate Change
MRSS	Main Receiving Substation
NAAQS	National Ambient Air Quality Standards

NABL	National Accreditation Board of Testing and Calibration Laboratories
NBWL	National Board of Wildlife
NGT	National Green Tribunal
NSRCC	Netaji Subhas Regional Coaching Centre
OHL	overhead line
O&M	operation and maintenance
PAI	project area of influence
PCB	polychlorinated biphenyl
PCC	Plain Cement Concrete
PCC	power control center
PCCF	Principal Chief Conservator of Forests
PCR	physical cultural resources
PIA	project area of influence
PIU	project implementation unit
PMU	project management unit
POP	persistent organic pollutant
PPE	personal protective equipment
RMU	ring main unit
ROW	right of way
SEAA	State Level Environmental Impact Assessment Authority
SPCB	state level pollution control board
TDS	Total Dissolved Solids
TERC	Tripura Electricity Regulatory Commission
TPCB	Tripura Pollution Control Board
TSECL	Tripura State Electricity Corporation Limited
TTAADC	Tripura Tribal Areas Autonomous District Council
TVM	Tri-vector Meter
WHO	World Health Organization
WLS	wildlife sanctuary

WEIGHTS AND MEASURES

dB(A)	-	A-weighted decibel
amp	-	ampere
ckm	-	circuit km
km	-	kilometer (1000 meters)
kV	-	kilovolt (1000 volts)
kWh	-	kilowatt-hour (1000 watts)
kWp	-	kilowatt peak
LV	-	low voltage
m	-	meter
sqm	-	square meter
MVA	-	mega volt ampere (1000 kVA)

NOTES

In this report, "\$" refers to US dollars unless otherwise stated.

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APPENDIX 1: DETAILS OF DISTRIBUTION LINES SCOPE

Scope: Package 2

Lines visited are highlighted (see Appendix 4)

Lot Number	Name of Line	TSECL Electric Circle	Length (ckm)
New 33kV Line on UG cable			
Lot-1	132 KV SM Nagar SS to 33 KV Charipara SS via Badharghat SS	EC-I & II West	14
Lot-1	Bodgangnagar SS to 33 KV Adharsha Colony SS	EC-I & II West	15
Lot-1	33KV Adharsha Colony SS to 33 KV College tilla SS	EC-I & II West	3.5
Lot-1	79 tilla Grid 132 KV SS to 33 KV Rampur SS	EC-I & II West	6
Lot-1	33KV stadium SS to 33KV NSRCC SS	EC-I & II West	4
Lot-1	33 KV Tilla Bazar SS (under construction) to 33 KV Kailsahar SS	EC-I & II West	7
Lot-1	132 KV Mission Tilla SS to 33 KV Dhigalbag SS	EC-I & II West	0.5
Total length of New 33kV Line on UG cable (cKm)			50
New 33 kV Line / Augmentation			
Lot-1	132 KV Ambassa SS to 33KV Salema SS	EC-I & II West	15
Lot-1	33KV Salema SS to 132KV Garodtilla	EC-I & II West	17
Lot-2	132 KV Gamaitilla SS to 33KV Kalyanpur SS	EC-Khowai	15
Lot-3	132 KV Mission Tilla SS to 33 KV Dhigalbag SS	EC-Dharmanagar & Unakoti & Dhalai	5
Lot-3	132 KV Mission Tilla SS to 33 KV Dhamchara via Panisagar SS	EC-Dharmanagar & Unakoti & Dhalai	12
Lot-3	Kumarghat SS to Pecharthal SS	EC-Dharmanagar & Unakoti & Dhalai	11
Lot-3	33 KV Pechartal SS to 33 KV Panisagar SS	EC-Dharmanagar & Unakoti & Dhalai	16
Lot-3	33 KV Mission Tilla SS to 33 KV Panisagar SS	EC-Dharmanagar & Unakoti & Dhalai	4
Lot-3	33 KV Mission Tilla - Panisagar- Dhamchara Line	EC-Dharmanagar & Unakoti & Dhalai	12
Total length of New 33 kV line / Augmentation (cKm)			107
New 11 kV Line on UG cable			
Lot-3	Proposed name of new feeder – B.Ed College feeder	EC-Dharmanagar & Unakoti & Dhalai	0.1
Lot-3	Proposed name of new feeder - Kachaicharra feeder	EC-Dharmanagar & Unakoti & Dhalai	0.1
Lot-3	Proposed name of new feeder - Kurti feeder	EC-Dharmanagar & Unakoti & Dhalai	2
Lot-3	Proposed name of new feeder - Kadamtala Hospital feeder	EC-Dharmanagar & Unakoti & Dhalai	2
Total length of New 11 kV Line on UG cable (cKm)			4.2
New 11 kV Line on Covered Conductor			
Lot-1	Proposed name of new feeder Manikbhandar 1	EC-I & II West	14
Lot-1	Proposed name of new feeder - Industry feeder	EC-I & II West	6
Lot-1	Proposed name of new feeder - Kambuck charra feeder	EC-I & II West	9
Lot-1	Proposed name of new feeder -Campaknagar-2 Feeder	EC-I & II West	3
Lot-1	Proposed name of new feeder -Meglipara Feeder	EC-I & II West	8
Lot-1	Proposed name of new feeder -East Noabadi	EC-I & II West	8

Lot Number	Name of Line	TSECL Electric Circle	Length (ckm)
Lot-1	Proposed name of new feeder -Khumpui	EC-I & II West	6
Lot-1	Proposed name of new feeder -Jiban Sardar	EC-I & II West	8
Lot-1	Proposed name of new feeder -Ajendra Bazar	EC-I & II West	5
Lot-2	Proposed name of new feeder-Dibaday Feeder	EC-Khowai	18
Lot-2	Proposed name of new feeder-Jambura Feeder	EC-Khowai	8
Lot-2	Proposed name of new feeder- Gopalnagar 1	EC-Khowai	15
Lot-2	Proposed name of new feeder-Cherma Feeder	EC-Khowai	8
Lot-2	Proposed name of new feeder-Pex Bazar Feeder	EC-Khowai	6
Lot-2	Proposed name of new feeder-Gournagar Feeder	EC-Khowai	12
Lot-2	Proposed name of new feeder- Ujan Maidan Feeder	EC-Khowai	13
Lot-2	Proposed name of new feeder - Tuichakma Feeder	EC-Khowai	14
Lot-2	Proposed name of new feeder - RS Para Feeder	EC-Khowai	8
Lot-2	Proposed name of new feeder - Sarbong Feeder	EC-Khowai	10
Lot-2	Proposed name of new feeder - Tuichindrai ITI Feeder	EC-Khowai	10
Lot-2	Proposed name of new feeder - Hrangkhawl Bazar Feeder	EC-Khowai	15
Lot-2	Proposed name of new feeder - Duski Feeder	EC-Khowai	8
Lot-2	Proposed name of new feeder - Krishnapur Feeder	EC-Khowai	7
Lot-2	Proposed name of new feeder -SDM Feeder	EC-Khowai	5
Lot-2	Proposed name of new feeder -Twikarma Feeder	EC-Khowai	12
Lot-2	Proposed name of new feeder -Kerepara Feeder	EC-Khowai	19
Lot-2	Proposed name of new feeder-Ratanpur Feeder	EC-Khowai	12
Lot-2	Proposed name of new feeder-Gournagar Feeder	EC-Khowai	12
Lot-2	Proposed name of new feeder-Gopalnagar Feeder	EC-Khowai	15
Lot-2	Proposed name of new feeder-Maharanipur Feeder	EC-Khowai	8
Lot-2	Proposed name of new feeder-47 Mile Feeder	EC-Khowai	12
Lot-2	Proposed name of new feeder-Mungakami Feeder	EC-Khowai	5
Lot-2	Proposed name of new feeder-Kakracharra Feeder	EC-Khowai	21
Lot-3	Proposed name of new feeder - Gakulnagar feeder (1)	EC-Dharmanagar & Unakoti & Dhalai	14
Lot-3	Proposed name of new feeder - Kuleshnagar feeder	EC-Dharmanagar & Unakoti & Dhalai	18
Lot-3	Proposed name of new feeder - Juri Charra feeder	EC-Dharmanagar & Unakoti & Dhalai	5
Lot-3	Proposed name of new feeder - Gakulnagar feeder (2) feeder	EC-Dharmanagar & Unakoti & Dhalai	12
Lot-3	Proposed name of new feeder - Radhanagar feeder	EC-Dharmanagar & Unakoti & Dhalai	14
Lot-3	Proposed name of new feeder - Fatikroy College feeder	EC-Dharmanagar & Unakoti & Dhalai	13
Lot-3	Proposed name of new feeder - Nidevi feeder	EC-Dharmanagar & Unakoti & Dhalai	9
Lot-3	Proposed name of new feeder -B. Ed College feeder	EC-Dharmanagar & Unakoti & Dhalai	5
Lot-3	Proposed name of new feeder -Kumarghat Industry feeder	EC-Dharmanagar & Unakoti & Dhalai	5
Lot-3	Proposed name of new feeder - Sonamuri feeder	EC-Dharmanagar & Unakoti & Dhalai	9
Lot-3	Proposed name of new feeder - Kachaicharra feeder	EC-Dharmanagar & Unakoti & Dhalai	12
Lot-3	Proposed name of new feeder -Padabill Feeder	EC-Dharmanagar &	7

Lot Number	Name of Line	TSECL Electric Circle	Length (ckm)
		Unakoti & Dhalai	
Lot-3	Proposed name of new feeder -Noagaon Feeder	EC-Dharmanagar & Unakoti & Dhalai	9
Lot-3	Proposed name of new feeder -Chandrapur 2nd Feeder	EC-Dharmanagar & Unakoti & Dhalai	10
Lot-3	Proposed name of new feeder - Digalbagh feeder	EC-Dharmanagar & Unakoti & Dhalai	8
Lot-3	Proposed name of new feeder - Mahespur Tea Estate feeder	EC-Dharmanagar & Unakoti & Dhalai	10
Lot-3	Proposed name of new feeder - Bajendra feeder	EC-Dharmanagar & Unakoti & Dhalai	13
Total length of New 11 kV Line on Covered Conductor (cKm)			513
Conversion of 11 kV Line to Covered Conductor			
Lot-1	Renturs 11KV Feeder	EC-I & II West	3.5
Lot-1	Aralia 11KV Feeder	EC-I & II West	6.5
Lot-1	Ashram 11KV Feeder	EC-I & II West	3
Lot-1	Champamura 11KV Feeder	EC-I & II West	4
Lot-1	Ananda Nagar 11KV Feeder	EC-I & II West	18
Lot-1	TFDC 11KV Feeder	EC-I & II West	4.5
Lot-1	Pratapgarh 11KV Feeder	EC-I & II West	4.5
Lot-1	Mahesh Khola 11KV Feeder	EC-I & II West	4.5
Lot-1	Battala 11KV Feeder	EC-I & II West	1.5
Lot-1	AD Nagar 11KV Feeder	EC-I & II West	2
Lot-1	Sree-Pally. 11KV Feeder	EC-I & II West	2
Lot-1	Bhutharia 11KV Feeder	EC-I & II West	5
Lot-1	Nischintapur BOP 11KV Feeder	EC-I & II West	1
Lot-1	Amtali 11KV Feeder	EC-I & II West	7
Lot-1	SM Nagar 11KV Feeder	EC-I & II West	9
Lot-1	Aswani Market 11KV Feeder	EC-I & II West	9
Lot-1	Kathaltali 11KV Feeder	EC-I & II West	9
Lot-1	Ranir Khama 11KV Feeder	EC-I & II West	3
Lot-1	Bikram Nagar 11KV Feeder	EC-I & II West	16
Lot-1	Fultali 11KV Feeder	EC-I & II West	21
Total length of Conversion of 11 kV Line to Covered Conductor (cKm)			134
Conversion of 11 kV Line to UG cable			
Lot-1	Ashram chowmuni to Roybari (2 nos DT)	EC-I & II West	1.5
Lot-1	ISBT to jamtala (3 nos DT)	EC-I & II West	1.2
Lot-1	ISBT to Tata Kalibari (1 nos DT)	EC-I & II West	1.5
Lot-1	ISBT to balda khal (2 nos DT)	EC-I & II West	0.8
Lot-1	MBB gate to TVS Showroom TVS & showroom to Chittaranhan Gedu Mia Masjid (7 Nos DT)	EC-I & II West	1.5
Lot-1	TVS showroom to Pagla Devta (2 nos DT)	EC-I & II West	1
Lot-1	Math Chowmuni to Ganarah Chow via Malipara (8 nos DT)	EC-I & II West	1.1
Lot-1	Netaji Chowmuni to Jhulanta Bridge (3 Nos DT)	EC-I & II West	2.6
Lot-1	Forest Office to Steel Bridge (5 nos DT)	EC-I & II West	1.8
Lot-1	Rampur SS to Tampur Ramnagar Road end (8 Nos Dt)	EC-I & II West	1.7
Lot-1	Biswar Para to Shilparar via kalikapur (for Minabari and Barjala feeder) (25 Nos DTS)	EC-I & II West	1.8
Lot-1	Gochakar to Dashamighat via joypur (20 nod DTS)	EC-I & II West	3.6

Lot Number	Name of Line	TSECL Electric Circle	Length (ckm)
Lot-1	Forest Office to Steel Bridge (4 nos DT)	EC-I & II West	1.2
Lot-1	Gochakar to Fire Service Chowk (12 nos DTS)	EC-I & II West	1.4
Lot-1	IGM Chowmuni to Apurupa Bakery Shop (4 Nos DT)	EC-I & II West	0.6
Lot-1	Bidurkarta to Bijoykumar Chowmuni (15 Nos DT)	EC-I & II West	2
Lot-1	Natunnagar TGB to Dighalia (4 Dts)	EC-I & II West	2.8
Lot-1	Bharat Ratna Club to Achara jee para (6 nos DTs)	EC-I & II West	2.3
Lot-1	Acharjee para to Sunmura (5 nos of DTS)	EC-I & II West	2
Lot-1	Blood Sun Club to Blood Sub East DT (1 Nos DTS)	EC-I & II West	0.2
Lot-1	Rabidas para DT to Mian Road (1 Nos DTS)	EC-I & II West	0.16
Lot-1	Inranagar South Chandrapur to JB School (4 nod DTS)	EC-I & II West	1
Lot-1	Barnali Sangha DT to Henry Derigio School (1 no Dts)	EC-I & II West	0.25
Lot-1	LIG / MIG Station to pump (1 no. Dt)	EC-I & II West	0.15
Lot-1	Kunjaban township to PG Hostel (1 Nos Dt)	EC-I & II West	0.2
Lot-1	8 Pole Structure to NTH2 Kiosk (4 nos Dts)	EC-I & II West	0.4
Lot-1	SDO Chowmuni to Chandannagar High School (14 nos of DTS)	EC-I & II West	2.5
Lot-1	ED -II (Various Locations to be decided during implementation)	EC-I & II West	52
Total length of Conversion of 11 kV Line to UG cable (cKm)			89.26
Conversion of LT (0.4 KV) Line to Aerial Bunched Cable			
Lot-1	ESD-GB	EC-I & II West	5
Lot-1	ESD, Durjoynagar	EC-I & II West	10
Lot-1	ESD, Sekherkote	EC-I & II West	15
Lot-1	ESD, Ranirbazar	EC-I & II West	5
Lot-1	ESD, Jirania	EC-I & II West	5
Lot-1	ESD, Mandwi	EC-I & II West	20
Lot-1	ESD, Bodhjungnagar	EC-I & II West	10
Lot-1	ESD, Khumlwng	EC-I & II West	20
Lot-1	ESD, Champaknagar	EC-I & II West	15
Lot-1	ESD, Mohanpur	EC-I & II West	5
Lot-1	ESD, Hezamara	EC-I & II West	20
Lot-1	ESD, Bamutia	EC-I & II West	5
Lot-1	ESD, Lefunga	EC-I & II West	15
Lot-2	ESD, Padmabill	EC-Khowai	20
Lot-2	ESD, Tulashikhar	EC-Khowai	25
Lot-2	ESD, Chebri	EC-Khowai	15
Lot-2	ESD-II, Teliamura	EC-Khowai	15
Lot-2	ESD, Kalyanpur	EC-Khowai	15
Lot-2	ESD, Mungiakami	EC-Khowai	25
Lot-3	ESD, Panisagar	EC-Dharmanagar & Unakoti & Dhalai	10
Lot-3	ESD, Damcherra	EC-Dharmanagar & Unakoti & Dhalai	15
Lot-3	ESD, Jubrajnagar	EC-Dharmanagar & Unakoti & Dhalai	15
Lot-3	ESD-I, Dharmanagar	EC-Dharmanagar & Unakoti & Dhalai	5
Lot-3	ESD-II, Dharmanagar	EC-Dharmanagar & Unakoti & Dhalai	10
Lot-3	ESD, Kadamtala	EC-Dharmanagar & Unakoti & Dhalai	10

Lot Number	Name of Line	TSECL Electric Circle	Length (ckm)
Lot-3	ESD, Kumargat	EC-Dharmanagar & Unakoti & Dhalai	10
Lot-3	ESD, Kanchanbari	EC-Dharmanagar & Unakoti & Dhalai	20
Lot-3	ESD, Pecharthal	EC-Dharmanagar & Unakoti & Dhalai	20
Lot-3	ESD-I, Kailasahar	EC-Dharmanagar & Unakoti & Dhalai	10
Lot-3	ESD-II, Kailasahar	EC-Dharmanagar & Unakoti & Dhalai	20
Lot-3	ESD, Ambassa	EC-Dharmanagar & Unakoti & Dhalai	5
Lot-3	ESD, Gandacherra	EC-Dharmanagar & Unakoti & Dhalai	25
Lot-3	ESD, Durgachaumuhani	EC-Dharmanagar & Unakoti & Dhalai	15
Lot-3	ESD, Salema	EC-Dharmanagar & Unakoti & Dhalai	15
Lot-3	ESD, Kamalpur	EC-Dharmanagar & Unakoti & Dhalai	5
Lot-3	ESD, Manu	EC-Dharmanagar & Unakoti & Dhalai	20
Lot-3	ESD, Chamanu	EC-Dharmanagar & Unakoti & Dhalai	20
Total length of Conversion of LT (0.4 KV) Line to Aerial Bunched Cable (cKm)			515
Total length of DL under Package II (cKm)			1412.46

Source: TSECL

Overall Scope: Package 3

Lines visited are highlighted (see Appendix 4)

Lot Number	Name of Line	TSECL Electric Circle	Length (cKm)
New 33kV Line on Covered Conductor			
Lot-1	33kv Amtali to Jangali 33kv SS via Gokulnagar 66KV	EC – Sepahijala	10
Lot-1	66KVGokulnagar SS to 33KV Madhupur SS	EC – Sepahijala	14
Lot-1	132 KV SM Nagar SS to 33KV Takarjala SS	EC – Sepahijala	12
Lot-2	33 KV Bagma SS to 33 KV Udaipur Power House SS	EC - Gomati	10
Lot-2	33 KV Bisramgang SS to 33 KV Bagma SS	EC - Gomati	15
Lot-2	132KV Bandwar SS to 33KV Killa SS	EC - Gomati	16
Lot-2	132KV Bandwar SS to 33KV Rani SS	EC - Gomati	18
Lot-3	66KV Bagafa SS to 33KV Jolaibari SS	EC - Belonia	18
Total length of New 33kV Line on Covered Conductor			113
New 11 kV Line on Covered Conductor			
Lot-2	Proposed name of new feeder- Salghara	EC - Gomati	21
Lot-2	Proposed name of new feeder -Khilpara	EC - Gomati	8
Lot-2	Proposed name of new feeder- Gukulpur	EC - Gomati	18
Lot-2	Proposed name of new feeder- Nityabazar	EC - Gomati	19
Lot-2	Proposed name of new feeder- Palatanabazar	EC - Gomati	12
Lot-2	Proposed name of new feeder- Tulamurabazar	EC - Gomati	23

Lot Number	Name of Line	TSECL Electric Circle	Length (cKm)
Lot-2	Proposed name of new feeder-Garjee	EC - Gomati	16
Lot-2	Proposed name of new feeder-BSF Camp	EC - Gomati	14
Lot-2	Proposed name of new feeder-Laxmipati	EC - Gomati	10
Lot-2	Proposed name of new feeder-Khataliabari	EC - Gomati	11
Lot-2	Proposed name of new feeder-Arjunpara	EC - Gomati	15
Lot-2	Proposed name of new feeder-Dalak Bazar feeder	EC - Gomati	8.3
Lot-2	Proposed name of new feeder-TSR feeder	EC - Gomati	6.5
Lot-2	Proposed name of new feeder-Malbassa feeder	EC - Gomati	14
Lot-2	Proposed name of new feeder-Burburia Feeder	EC - Gomati	16
Lot-2	Proposed name of new feeder-Babusai Feeder	EC - Gomati	23
Lot-2	Proposed name of new feeder-Hapaiya Feeder	EC - Gomati	24
Lot-2	Proposed name of new feeder-Rabi Roy Feeder	EC - Gomati	24
Lot-2	Proposed name of new feeder-Tuidu Local Feeder	EC - Gomati	2
Lot-2	Proposed name of new feeder- Uttar Tuidu Local Feeder	EC - Gomati	4
Lot-2	Proposed name of new feeder- Sonacharra Feeder	EC - Gomati	5
Lot-2	Proposed name of new feeder- Chesua Feeder	EC - Gomati	3
Lot-2	Proposed name of new feeder- Natun Bazar-2	EC - Gomati	4
Lot-2	Proposed name of new feeder- Budha Mandir Feeder	EC - Gomati	5
Lot-2	Proposed name of new feeder- Border Feeder	EC - Gomati	4
Lot-2	Proposed name of new feeder- Purba Karbook-2 Feeder	EC - Gomati	2
Lot-3	Proposed name of new feeder - Chittamura Feeder	EC - Belonia	12
Lot-3	Proposed name of new feeder - Uttar Bharat Chaumuhani Feeder	EC - Belonia	10
Lot-3	Proposed name of new feeder - South Sonaichari Feeder	EC - Belonia	20
Lot-3	Proposed name of new feeder -Josh Mura Feeder	EC - Belonia	12
Lot-3	Proposed name of new feeder -Gab Tali Feeder	EC - Belonia	15
Lot-3	Proposed name of new feeder -Krishnagar Feeder	EC - Belonia	12
Lot-3	Proposed name of new feeder -Powangbari Feeder	EC - Belonia	17.5
Lot-3	Proposed name of new feeder -Rajapur Feeder	EC - Belonia	18
Lot-3	Proposed name of new feeder -Lakshmicherar Feeder	EC - Belonia	25
Lot-3	Proposed name of new feeder -Bagafa Feeder	EC - Belonia	15
Lot-3	Proposed name of new feeder -Debdaru Feeder	EC - Belonia	18
Lot-3	Proposed name of new feeder -Sachiram Bari Feeder	EC - Belonia	15
Lot-3	Proposed name of new feeder -Muharipur Feeder	EC - Belonia	12
Lot-1	Proposed name of new feeder-Routhkhala	EC – Sepahijala	2.2
Lot-1	Proposed name of new feeder-Bazar Rural feeder	EC – Sepahijala	2.5
Lot-1	Proposed name of new feeder-Purathal feeder	EC – Sepahijala	8.5
Lot-1	Proposed name of new feeder - Kamthana feeder	EC – Sepahijala	8.5
Lot-1	Proposed name of new feeder - Ramchera feeder	EC – Sepahijala	7.5
Lot-1	Proposed name of new feeder - Durganagar Bazar feeder	EC – Sepahijala	7.5
Lot-1	Proposed name of new feeder - Laxmibill feeder	EC – Sepahijala	32
Lot-1	Proposed name of new feeder - Dayarampara feeder	EC – Sepahijala	46
Lot-1	Proposed name of new feeder - Dayarampara feeder	EC – Sepahijala	14
Lot-1	Proposed name of new feeder - Charilam Bazar feeder	EC – Sepahijala	8
Lot-1	Proposed name of new feeder - South Charilam feeder	EC – Sepahijala	16
Lot-1	Proposed name of new feeder - Rangmala feeder	EC – Sepahijala	19
Lot-1	Proposed name of new feeder - Telkajla feeder	EC – Sepahijala	15
Lot-1	Proposed name of new feeder - Begunbari feeder	EC – Sepahijala	5
Lot-1	Proposed name of new feeder - Gangarai Molsom feeder	EC – Sepahijala	11
Lot-1	Proposed name of new feeder - Arjun Thakur feeder	EC – Sepahijala	17

Lot Number	Name of Line	TSECL Electric Circle	Length (cKm)
Lot-1	Proposed name of new feeder - Hirapur feeder	EC – Sepahijala	17
Lot-1	Proposed name of new feeder - Mohanbhog feeder	EC – Sepahijala	7
Total length of New 11 kV Line on Covered Conductor (cKm)			757
Conversion of LT (0.4 KV) Line to Aerial Bunched Cable			
Lot-1	ESD, Boxanagar	EC – Sepahijala	25
Lot-1	ESD, Sonamura	EC – Sepahijala	20
Lot-1	ESD, Melagarh	EC – Sepahijala	20
Lot-1	ESD, Kathalia	EC – Sepahijala	15
Lot-1	ESD, Nalchar	EC – Sepahijala	15
Lot-1	ESD, Jampuijala	EC – Sepahijala	25
Lot-1	ESD, Gabordi	EC – Sepahijala	25
Lot-1	ESD-I, Bishalgarh	EC – Sepahijala	5
Lot-1	ESD-II, Bishalgarh	EC – Sepahijala	10
Lot-1	ESD, Bisharmajang	EC – Sepahijala	10
Lot-1	ESD, Madhupur	EC – Sepahijala	15
Lot-2	ESD, Killa	EC - Gomati	10
Lot-2	ESD, Maharani	EC - Gomati	10
Lot-2	ESD, Kakraban	EC - Gomati	10
Lot-2	ESD, Dhajanagar	EC - Gomati	10
Lot-2	ESD, Matabari	EC - Gomati	10
Lot-2	ESD, Amarpur	EC - Gomati	10
Lot-2	ESD, Karbook	EC - Gomati	15
Lot-2	ESD, Jatanbarai	EC - Gomati	10
Lot-2	ESD, Ompi	EC - Gomati	15
Lot-3	ESD, Belonia	EC - Belonia	5
Lot-3	ESD Hrishyamukh	EC - Belonia	15
Lot-3	ESD Rajnagar	EC - Belonia	15
Lot-3	ESD Satchand	EC - Belonia	15
Lot-3	ESD Sabroom	EC - Belonia	10
Lot-3	ESD Poangbari	EC - Belonia	20
Lot-3	ESD Bagafa	EC - Belonia	10
Lot-3	ESD Jolaibari	EC - Belonia	10
Total length of Conversion of LT (0.4 KV) Line to Aerial Bunched Cable (cKm)			385
Total length of DL in Package III (cKm)			1255

Source: TSECL

Package 2 Lot 1

Subproject Ref.	Line / Sub-Division	Length (Klm)
New 33kV Line on UG cable		
PII-DL-L1-001	132 KV SM Nagar SS to 33 KV Charpara SS via Badharghat SS	14
PII-DL-L1-002	Bodganaganar SS to 33 KV Adharsha Colony SS	15
PII-DL-L1-003	33KV Adharsha Colony SS to 33 KV College tilla SS	3.5
PII-DL-L1-004	79 tilla Grid 132 KV SS to 33 KV Rampur SS	6
PII-DL-L1-005	33KV stadium SS to 33KV NSRCC SS	4
PII-DL-L1-006	33 KV Tilla Bazar SS (under construction) to 33 KV Kailshar SS	7
PII-DL-L1-007	132 KV Mission Tilla SS to 33 KV Dhigalbag SS	0.5
Conversion of 11 kV Line to UG cable:		
PII-DL-L1-008	Ashram chowmuni to Roybari (2 nos DT)	1.5
PII-DL-L1-009	ISBT to jamtala (3 nos DT)	1.2
PII-DL-L1-010	ISBT to Tata Kalbari (1 nos DT)	1.5
PII-DL-L1-011	ISBT to balda khal (2 nos DT)	0.8
PII-DL-L1-012	MBB gate to TV5 Showroom TV5 & showroom to Chittaranjan Gedu Mia Masjid (07 Nos DT)	1.5
PII-DL-L1-013	TV5 showroom to Pagla Devta (2 nos DT)	1
PII-DL-L1-014	Math Chowmuni to Ganarash Chow via Malipara (8 nos DT)	1.1
PII-DL-L1-015	Netaji Chowmuni to Jhulanta Bridge (3 Nos DT)	2.6
PII-DL-L1-016	Forest Office to Steel Bridge (5 nos DT)	1.8
PII-DL-L1-017	Rampur SS to Tampur Ramnagar Road end (8 Nos DT)	1.7
PII-DL-L1-018	Biswar Para to Shilparar via kalkapur (for Minabari and Barjala feeder) (25 Nos DTs)	1.8
PII-DL-L1-019	Gochakar to Dashamighat via jospur (20 nos DTs)	3.6
PII-DL-L1-020	Forest Office to Steel Bridge (4 nos DT)	1.2
PII-DL-L1-021	Gochakar to Fire Service Chowk (12 nos DTs)	1.4
PII-DL-L1-022	IGM Chowmuni to Apurupa Bakery Shop (4 Nos DT)	0.6
PII-DL-L1-023	Bidurkarta to Bijoykumar Chowmuni (15 Nos DT)	2
PII-DL-L1-024	Narurnagar TGB to Dighalia (4 Dts)	2.8
PII-DL-L1-025	Bharat Ratna Club to Achara jee para (6 nos DTs)	2.3
PII-DL-L1-026	Acharjee para to Sunmura (5 nos of DTs)	2
PII-DL-L1-027	Blood Sun Club to Blood Sub East DT (1 Nos DTs)	0.2
PII-DL-L1-028	Rabidas para Dt to Mian Road (1 Nos DTs)	0.16
PII-DL-L1-029	Inranagar South Chandrapur to JB School (4 nos DTs)	1
PII-DL-L1-030	Barnali Sangha DT to Henry Derigo School (1 nos Dts)	0.25
PII-DL-L1-031	UG/MIG Statio to pump (1 no. Dt)	0.15
PII-DL-L1-032	Kunjaban township to PG Hostel (1 Nos Dt)	0.2
PII-DL-L1-033	8 Pole Structure to NTH2 Kiosk (4 nos Dts)	0.4
PII-DL-L1-034	SDO Chowmuni to Chandannagar High School (54 nos of DTs)	2.5
PII-DL-L1-035	ED-II (Various Locations To be decided during implementataion)	52
New 33kV Line on Covered Conductor		

Subproject Ref.	Line / Sub-Division	Length (Ckm)
PII-DL-L1-036	132 KV Ambassa SS to 33KV Salema SS	15
PII-DL-L1-037	33KV Salema SS to 132KV Garodtilla	17
New 11 kV Line on Covered Conductor		
PII-DL-L1-038	Proposed name of new feeder Manikkhanjar 1	14
PII-DL-L1-039	Proposed name of new feeder - Industry feeder	6
PII-DL-L1-040	Proposed name of new feeder - Kambuck charra feeder	9
PII-DL-L1-041	Proposed name of new feeder -Campalnagar-2 Feeder	3
PII-DL-L1-042	Proposed name of new feeder -Meglpara Feeder	8
PII-DL-L1-043	Proposed name of new feeder -East Noabad	8
PII-DL-L1-044	Proposed name of new feeder -Khumpul	6
PII-DL-L1-045	Proposed name of new feeder -Jiban Sardar	8
PII-DL-L1-046	Proposed name of new feeder -Ajendra Batar	5
Conversion of 11 kV Line to Covered Conductor		
PII-DL-L1-047	Benturs 11KV Feeder	1.5
PII-DL-L1-048	Araka 11KV Feeder	6.5
PII-DL-L1-049	Ashram 11KV Feeder	3
PII-DL-L1-050	Changamura 11KV Feeder	4
PII-DL-L1-051	Ananda Nagar 11KV Feeder	18
PII-DL-L1-052	TFDC 11KV Feeder	4.5
PII-DL-L1-053	Pratappah 11KV Feeder	4.5
PII-DL-L1-054	Mahesh Khola 11KV Feeder	4.5
PII-DL-L1-055	Battala 11KV Feeder	1.5
PII-DL-L1-056	AD Nagar 11KV Feeder	2
PII-DL-L1-057	Sree-Pally, 11KV Feeder	2
PII-DL-L1-058	Bhutharia 11KV Feeder	5
PII-DL-L1-059	Nischintapur BOF 11KV Feeder	1
PII-DL-L1-060	Amtal 11KV Feeder	7
PII-DL-L1-061	SM Nagar 11KV Feeder	9
PII-DL-L1-062	Awani Market 11KV Feeder	9
PII-DL-L1-063	Kathaltal 11KV Feeder	9
PII-DL-L1-064	Ranir Khama 11KV Feeder	3
PII-DL-L1-065	Bikram Nagar 11KV Feeder	16
PII-DL-L1-066	Fultali 11KV Feeder	21
Conversion of LT (0.4 KV) Line to Aerial bunched cable		
PII-DL-L1-067	ESD-GB	5
PII-DL-L1-068	ESD, Ourjoynagar	10
PII-DL-L1-069	ESD, Sekherkute	15
PII-DL-L1-070	ESD, Ranirbazar	5

Subproject Ref.	Line / Sub-Division	Length (Ckm)
PII-DL-L1-071	ESD, Irania	5
PII-DL-L1-072	ESD, Mandwi	20
PII-DL-L1-073	ESD, Bodhjungnagar	10
PII-DL-L1-074	ESD, Khurhwang	20
PII-DL-L1-075	ESD, Champaknagar	15
PII-DL-L1-076	ESD, Mohanpur	5
PII-DL-L1-077	ESD, Hezamara	20
PII-DL-L1-078	ESD, Bamutia	5
PII-DL-L1-079	ESD, Lefunga	15

Package 2 Lot 2

Subproject Ref.	Line / Sub-Division	Length (Ckm)
New 33kV Line on Covered Conductor		
PII-DL-L2-001	132 KV Gomaitilla 55 to 132KV Kalyanpur 55	15
New 11 kV Line on Covered Conductor		
PII-DL-L2-002	Proposed name of new feeder-Dibady Feeder	18
PII-DL-L2-003	Proposed name of new feeder-Iambura Feeder	8
PII-DL-L2-004	Proposed name of new feeder- Gopalnagar 1	15
PII-DL-L2-005	Proposed name of new feeder-Charma Feeder	8
PII-DL-L2-006	Proposed name of new feeder-Pex Bazar Feeder	6
PII-DL-L2-007	Proposed name of new feeder-Gournagar Feeder	12
PII-DL-L2-008	Proposed name of new feeder- Ujan Maidan Feeder	13
PII-DL-L2-009	Proposed name of new feeder - Tuichalma Feeder	14
PII-DL-L2-010	Proposed name of new feeder - RS Para Feeder	8
PII-DL-L2-011	Proposed name of new feeder - Sarbong Feeder	10
PII-DL-L2-012	Proposed name of new feeder - Tuichindral ITI Feeder	10
PII-DL-L2-013	Proposed name of new feeder - Hrangkhal Bazar Feeder	15
PII-DL-L2-014	Proposed name of new feeder - Duski Feeder	8
PII-DL-L2-015	Proposed name of new feeder - Krishnapur Feeder	7
PII-DL-L2-016	Proposed name of new feeder -SDM Feeder	5
PII-DL-L2-017	Proposed name of new feeder -Twikama Feeder	12
PII-DL-L2-018	Proposed name of new feeder -Kerepara Feeder	19
PII-DL-L2-019	Proposed name of new feeder-Ratanpur Feeder	12
PII-DL-L2-020	Proposed name of new feeder-Gournagar Feeder	12
PII-DL-L2-021	Proposed name of new feeder-Gopainagar Feeder	15
PII-DL-L2-022	Proposed name of new feeder-Maharanipur Feeder	8
PII-DL-L2-023	Proposed name of new feeder-47 Mile Feeder	12
PII-DL-L2-024	Proposed name of new feeder-Mungakami Feeder	5
PII-DL-L2-025	Proposed name of new feeder-Kakrachama Feeder	21
Conversion of LT (0.4 KV) Line to Aerial bushed cable		
PII-DL-L2-026	ESD, Padmabil	20
PII-DL-L2-027	ESD, Tulashishar	25
PII-DL-L2-028	ESD, Chebri	15
PII-DL-L2-029	ESD-II, Tallamura	15
PII-DL-L2-030	ESD, Kalyanpur	15
PII-DL-L2-031	ESD, Mungakami	25

Package 2 Lot 3

Subproject Ref.	Line / Sub-Division	Length (Kms)
New 33kV Line on Covered Conductor		
PII-DL-13-001	132 KV Mission Tilla SS to 33 KV Dhigalbag SS	5
PII-DL-13-002	132 KV Mission Tilla SS to 33 KV Dhamchhara via Parisagar SS	12
PII-DL-13-003	Kumarghat SS to Pecharthai SS	11
PII-DL-13-004	33 KV Pecharthai SS to 33 KV Parisagar SS	16
PII-DL-13-005	33 KV Mission Tilla SS to 33 KV Parisagar SS	4
PII-DL-13-006	33 KV Mission Tilla - Parisagar - Dhamchhara Line	12
New 11kV Line on UD cable		
PII-DL-13-007	Proposed name of new feeder -B.Ed College feeder	0.1
PII-DL-13-008	Proposed name of new feeder - Kachaicharra feeder	0.1
PII-DL-13-009	Proposed name of new feeder - Kurti feeder	2
PII-DL-13-010	Proposed name of new feeder - Kadamtala Hospital feeder	2
New 11 kV Line on Covered Conductor		
PII-DL-13-011	Proposed name of new feeder - Gakulnagar feeder(1)	14
PII-DL-13-012	Proposed name of new feeder - Kuleshnagar feeder	18
PII-DL-13-013	Proposed name of new feeder - Jui Charra feeder	5
PII-DL-13-014	Proposed name of new feeder - Gakulnagar feeder(2)feeder	12
PII-DL-13-015	Proposed name of new feeder - Radhanagar feeder	14
PII-DL-13-016	Proposed name of new feeder - Fatikroy College feeder	13
PII-DL-13-017	Proposed name of new feeder - Nidevi feeder	9
PII-DL-13-018	Proposed name of new feeder -B. Ed College feeder	5
PII-DL-13-019	Proposed name of new feeder -Kumarghat Industry feeder	5
PII-DL-13-020	Proposed name of new feeder - Sonamuri feeder	9
PII-DL-13-021	Proposed name of new feeder - Kachaicharra feeder	12
PII-DL-13-022	Proposed name of new feeder -Padabili Feeder	7
PII-DL-13-024	Proposed name of new feeder -Noagaon Feeder	9
PII-DL-13-025	Proposed name of new feeder -Chandrapur 2nd Feeder	10
PII-DL-13-026	Proposed name of new feeder - Digalbagh feeder	8
PII-DL-13-027	Proposed name of new feeder - Mshesipur Tea Estate feeder	10
PII-DL-13-028	Proposed name of new feeder - Bajendra feeder	13
Conversion of LT (0.4 KV) Line to Aerial buched cable		
PII-DL-13-029	ESD, Parisagar	10
PII-DL-13-030	ESD, Damcherra	15
PII-DL-13-031	ESD, Idrajnagar	15
PII-DL-13-032	ESD-I, Dhamanagar	5
PII-DL-13-033	ESD-II, Dhamanagar	10

Subproject Ref.	Line / Sub-Division	Length (Ckm)
PII-DL-L3-034	ESD, Kadamtala	10
PII-DL-L3-035	ESD, Kumargat	10
PII-DL-L3-036	ESD, Kanchanbari	20
PII-DL-L3-037	ESD, Pecharthal	20
PII-DL-L3-038	ESD-I, Kailasahar	10
PII-DL-L3-039	ESD-II, Kailasahar	20
PII-DL-L3-040	ESD, Ambassa	5
PII-DL-L3-041	ESD, Gandacherra	25
PII-DL-L3-042	ESD, Durgachamuhani	15
PII-DL-L3-043	ESD, Salema	15
PII-DL-L3-044	ESD, Kamalpur	5
PII-DL-L3-045	ESD, Manu	20
PII-DL-L3-046	ESD, Chamanu	20

Note: one line has been dropped from the scope of Package 2 Lot 3 included in the bidding documents due to Rowa Wildlife Sanctuary (WLS)/Ecologically Sensitive Zone (ESZ) with a corrigendum issued:

Distribution System Improvement: Turnkey contract for Supply & Construction of New / Augmentation of 33KV / 11KV / LT lines in Tripura - Package II Lot 3 (EC-DHARMANAGAR & UNAKOTI & DHALAI)

Corrigendum 1

Bidders are informed that the following subproject indicated in Vol III of the Bid Document is hereby removed from the scope of Works;

Subproject Ref.	Line / Sub-Division	Length (Ckm)
New 11 kV Line on Covered Conductor:		
PII-DL-L3-017	Rowa Feeder	4

The BOQ quantities indicated in the price schedules shall however remain unchanged in order to accommodate possible variations for other lines during implementation.

Package 3 Lot 1

Subproject Ref.	Line / Sub-Division	Length (Ckm)
New 33kV Line on Covered Conductor		
PHI-DI-L1-001	33kV Aintah to Jangali 33kV SS via Gokulnagar 66kV	10
PHI-DI-L1-002	66kV Gokulnagar SS to 33kV Madhupur SS	14
PHI-DI-L1-003	132 kV SM Nagar SS to 33kV Takarjala SS	17
New 11 kV Line on Covered Conductor		
PHI-DI-L1-004	Proposed name of new feeder - Routhihala	2.2
PHI-DI-L1-005	Proposed name of new feeder - Bazar Buzal feeder	2.5
PHI-DI-L1-006	Proposed name of new feeder - Purathal feeder	8.5
PHI-DI-L1-007	Proposed name of new feeder - Kamthana feeder	8.3
PHI-DI-L1-008	Proposed name of new feeder - Ramchera feeder	7.5
PHI-DI-L1-009	Proposed name of new feeder - Durganagar Bazar feeder	7.5
PHI-DI-L1-010	Proposed name of new feeder - Laxmibill feeder	32
PHI-DI-L1-011	Proposed name of new feeder - Dayarampara feeder	46
PHI-DI-L1-012	Proposed name of new feeder - Lataichatra feeder	14
PHI-DI-L1-013	Proposed name of new feeder - Charlam Bazar feeder	8
PHI-DI-L1-014	Proposed name of new feeder - South Charlam feeder	18
PHI-DI-L1-015	Proposed name of new feeder - Rangnala feeder	19
PHI-DI-L1-016	Proposed name of new feeder - Telkajla feeder	15
PHI-DI-L1-017	Proposed name of new feeder - Begunbari feeder	5
PHI-DI-L1-018	Proposed name of new feeder - Gangrai Mulom feeder	11
PHI-DI-L1-019	Proposed name of new feeder - Atjun Thakur feeder	17
PHI-DI-L1-020	Proposed name of new feeder - Hirapur feeder	17
PHI-DI-L1-021	Proposed name of new feeder - Mohanbhog feeder	7
Conversion of LT (0.4 KV) Line to Aerial bunched cable		
PHI-DI-L1-022	ESD, Boxanagar	25
PHI-DI-L1-023	ESD, Sonamura	20
PHI-DI-L1-024	ESD, Mlugarh	20
PHI-DI-L1-025	ESD, Kathaha	15
PHI-DI-L1-026	ESD, Nalchar	15
PHI-DI-L1-027	ESD, Jampujala	25
PHI-DI-L1-028	ESD, Gabrofi	25
PHI-DI-L1-029	ESD-I, Bishalgah	5
PHI-DI-L1-030	ESD-II, Bishalgah	10
PHI-DI-L1-031	ESD, Biharmajang	10
PHI-DI-L1-032	ESD, Madhupur	15

Package 3 Lot 2

Subproject Ref.	Line / Sub-Division	Length (Ckm)
New 33kV Line on Covered Conductor		
MVL-III-004	33 KV Bagma SS to 33 KV Udaipur Power House SS	10
MVL-III-005	33 KV Bisingang SS to 33 KV Bagma SS	15
MVL-III-006	33KV Bandwar SS to 33KV Killa SS	16
MVL-III-007	33KV Bandwar SS to 33KV Rani SS	18
New 11 kV Line on Covered Conductor		
MVL-III-010	Proposed name of new feeder- Salghara	21
MVL-III-011	Proposed name of new feeder -Khilpara	8
MVL-III-012	Proposed name of new feeder- Gulupur	18
MVL-III-013	Proposed name of new feeder- Nityabazar	19
MVL-III-014	Proposed name of new feeder- Palatanabazar	12
MVL-III-015	Proposed name of new feeder- Tulamrabazar	23
MVL-III-016	Proposed name of new feeder- Garjee	16
MVL-III-017	Proposed name of new feeder- BSF Camp	14
MVL-III-018	Proposed name of new feeder- Laxmpati	10
MVL-III-019	Proposed name of new feeder- Khatalabari	11
MVL-III-020	Proposed name of new feeder- Arjunpara	15
MVL-III-021	Proposed name of new feeder- Dalak Bazar feeder	8.3
MVL-III-022	Proposed name of new feeder- TSB feeder	6.5
MVL-III-023	Proposed name of new feeder- Malbassa feeder	14
MVL-III-024	Proposed name of new feeder- Bursuria Feeder	16
MVL-III-025	Proposed name of new feeder- Baburai Feeder	23
MVL-III-026	Proposed name of new feeder- Hapaiya Feeder	24
MVL-III-027	Proposed name of new feeder- Rabi Roy Feeder	24
MVL-III-028	Proposed name of new feeder- Taidu Local Feeder	2
MVL-III-029	Proposed name of new feeder- Uttar Tothi Local Feeder	4
MVL-III-030	Proposed name of new feeder- Sonacharra Feeder	5
MVL-III-031	Proposed name of new feeder- Chesua Feeder	3
MVL-III-032	Proposed name of new feeder- Natun Bazar 2	4
MVL-III-033	Proposed name of new feeder- Budha Mandi Feeder	5
MVL-III-034	Proposed name of new feeder- Bender Feeder	4
MVL-III-035	Proposed name of new feeder- Parba Karbook-2 Feeder	2
Conversion of LT (0.4 KV) Line to Aerial bushed cable		
MVL-III-078	ESD, Killa	10
MVL-III-079	ESD, Maharani	10
MVL-III-080	ESD, Kakraban	10
MVL-III-081	ESD, Dhajanagar	10

Subproject Ref.	Line / Sub-Division	Length (Ckm)
MVL-III-082	ESD, Matahari	10
MVL-III-083	ESD, Amarpur	10
MVL-III-084	ESD, Karbook	15
MVL-III-085	ESD, Jatanharai	10
MVL-III-086	ESD, Ompi	15

Package 3 Lot 3

Subproject Ref.	Line / Sub-Division	Length (Ckm)
New 33kV Line on Covered Conductor		
MVL-III-009	66KV Bagafa SS to 33KV Jolaibari SS	18
New 11 kV Line on Covered Conductor		
MVL-III-036	Proposed name of new feeder - Chittamana Feeder	12
MVL-III-037	Proposed name of new feeder - Uttar Bharat Chaumuhani Feeder	10
MVL-III-038	Proposed name of new feeder - South Soriaichari Feeder	20
MVL-III-039	Proposed name of new feeder feeder - Jish Mura Feeder	12
MVL-III-040	Proposed name of new feeder - Gab Tali Feeder	15
MVL-III-041	Proposed name of new feeder - Krishnagar Feeder	12
MVL-III-042	Proposed name of new feeder - Phrangbari Feeder	17.5
MVL-III-043	Proposed name of new feeder feeder - Rajapur Feeder	18
MVL-III-044	Proposed name of new feeder - Lakshmincher Feeder	25
MVL-III-045	Proposed name of new feeder - Bagafa Feeder	15
MVL-III-046	Proposed name of new feeder - Debbaru Feeder	18
MVL-III-047	Proposed name of new feeder - Sachiram Bari Feeder	15
MVL-III-048	Proposed name of new feeder - Muharpur Feeder	12
Conversion of LT (0.4 KV) Line to Aerial bunched cable		
MVL-III-087	ESD, Belonia	5
MVL-III-088	ESD Hrishyamukh	15
MVL-III-089	ESD Rajnagar	15
MVL-III-090	ESD Satchand	15
MVL-III-091	ESD Sabroom	10
MVL-III-092	ESD Phrangbari	20
MVL-III-093	ESD Bagafa	10
MVL-III-094	ESD Jolaibari	10

Note: one line has been dropped from the scope of Package 3 Lot 3 included in the bidding documents due to inductive routing through Trishna WLS / ESZ with a corrigendum issued:

Turnkey contract for Supply & Construction of New / Augmentation of 33KV / 11KV / LT lines in Tripura - Package III- Lot 3 (EC-BELONIA)

Corrigendum 1

Bidders are informed that the following subproject indicated in Vol III of the Bid Document is hereby removed from the scope of Works;

Subproject Ref.	Line / Sub-Division	Length (Ckm)
New 33 kV Line on Covered Conductor:		
MVL-III-008	66 KV Belonia SS to 33 KV Rajnagar SS	22

The BOQ quantities indicated in the price schedules shall however remain unchanged in order to accommodate possible variations for other lines during implementation.

APPENDIX 2: SUBSTATION EHS AUDIT REPORT

A. Introduction

1. Under ADB's Safeguard Policy Statement (2009) for projects involving facilities that already exist or are under construction before ADB's involvement, ADB requires relevant external experts to conduct an environment audit, including on site assessment. For a project involving an upgrade or expansion of existing facilities, as is the case for 27 existing substations (SS) under the distribution component of Tripura Power Distribution Strengthening and Generation Efficiency Improvement Project (the Project) the requirements for environmental assessment and EMP apply in addition to the environmental audit.

2. The environmental audit will determine the existence of any areas where the existing substations may cause or are causing environmental impacts and risks. The existing facilities must comply with ADB's Safeguard Policy Statement (2009) and applicable national laws and regulations on environment, health, and safety. Where existing facilities are found not to be in accordance with the environment safeguard principles and requirements applicable to the distribution component, as detailed in Chapter II of the IEE, a Corrective Action Plan (CAP) is to be prepared, including implementation schedule and sufficient budget, to bring the existing facilities into compliance. The environmental audit has been conducted with the aim of assessing compliance of the 27 existing substations with:

- Government of India and Government of Tripura laws and regulations on environment, these include but are not limited to:
 - The Air (Prevention & Control of Pollution) Act, 1981 (amended 1987),
 - The Water (Preventions Control of Pollution) Act, 1974 (amended 1988),
 - Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules 2008 (amended 2009, 2016); and
 - The Regulation of Polychlorinated Biphenyls Order, 2016 (S.O. 1327(E).
- Government of India and Government of Tripura laws and regulations on health and safety measures at workplaces and in the community including the Factories Act, 1948 and the Electricity Act, 2003 (amended 2007);
- Environmental safeguards requirements according to ADB's Safeguard Policy Statement (2009); and
- International Finance Corporation (IFC), Environmental, Health, and Safety (EHS) Guidelines.

3. The environment audit also seeks to identify present inadequacies in environmental, health and safety management at TSECL corporate level with respect to existing facilities; and to recommend actions to be taken to improve and strengthen TSECL's environmental, health, and safety management.

B. Method

4. The TSECL Detailed Project Report (December 2019) was reviewed to evaluate scope of work under the distribution component. Desktop review of the substations to identify the environmental setting before undertaking site visits. The environmental audit took place in the months of December 2020, March 2021, and October 2021. It was undertaken by two independent environmental experts, Dibyendu Banerjee and Arijit Choudhury, engaged by ADB under TA budget on behalf of TSECL. Twenty-seven existing substations, across Tripura, were visited by the environmental experts together with TSECL officials. During the site visits to these substations, a visual inspection of the surroundings, compound including switch yard and control rooms/buildings, road access condition was conducted. Photo and videography, measuring of coordinates, air temperature, noise and EMF using smartphone-based applications were taken and the critical environment, health and safety issues cross checked using an ADB approved audit checklist to identify areas of strength in each substation, and areas that need corrective actions to meet the required standard. Interviews were also held with TSECL substation

engineers and staff and at some locations with local communities in the vicinity of the substations. Locals were invited to the substation by TSECL for consultation. Details of consultations are provided in the Chapter VI of the main IEE report. The general conditions along with key observations from these substations are discussed in this report. The Audit Checklist identifies critical issues as per the following criteria deduced from the standards and guidelines mentioned above:

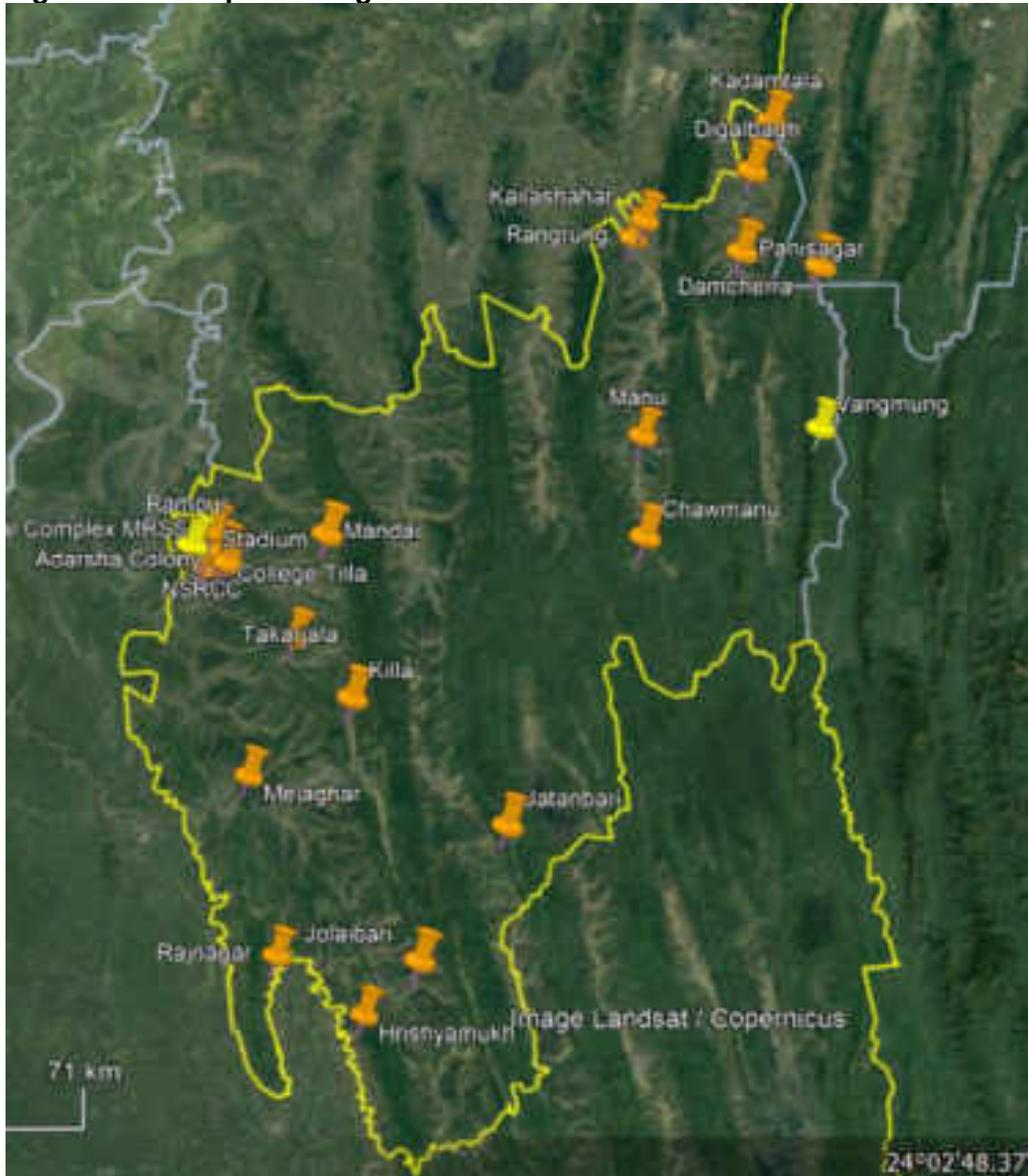
- General environmental management,
- Waste management practices,
- Hazardous material management,
- Occupational health and safety management, and
- Community health and safety management.

5. Following completion of the environmental audit the gaps that were observed were discussed with TSECL officers.

C. Scope of Substations Works

6. The substations are located mostly in rural areas of eight administrative districts of Tripura namely West Tripura, South Tripura, Khowai, North Tripura, Sepahijila, Gomati, Unakoti and Dhalai. The TSECL Electrical Circles (EC) covering these districts (entire state) are five – EC 1: Udaipur, EC II: Agartala, EC III: Kumarghat, EC IV: Agartala and EC V: Ambassa. EC are further divided into electrical divisions and sub-divisions. The augmentation work involves renovation and modernization of 21 existing 33/11 kV substations including replacement of 33 kV and 11 kV breakers, isolators, battery banks and battery chargers, including the provision of safety and welfare equipment (portable Class C CO₂ fire extinguisher, wall mounted general purpose first aid box (at all SS) and reverse osmosis technology water purifier at all substations, and civil works to replace existing foundations and lay cable trenches in the switch yards and control rooms where needed as described in Chapter III of the IEE. The replaced equipment will be dismantled and handed over to TSECL on site or at the TSECL store/repair workshop. There will also be bay extensions at 7 substations (one substation has both augmentation and a bay extension). The details of the twenty-seven existing substations audited, including one being constructed (Charipara) and another (Tillabazar) where construction was just starting at the time of environmental audit, are presented in Table A2-1. The location map of the audited substations is provided as Figure A2-1.

Figure A2-1: Map Showing Locations of TSECL Substations Audited



Source: ADB TA Consultant

Table A2-1: Details of TSECL Substations Audited

Sl. No.	Name	Year Est.	Operational Status	Type	Transformer Make	Year	Included in UNIDO List as Including PCBs	No. Transformers	Location (Division/District)	Grid Coordinates	Date of Audit	Name of Auditor
1	Jatanbari SS	2013	Yes	66/33/11 kV AIS	Schneider Electric India (both)	2012 (both)	-	2	Amarpur EC, Ghumti ED	23°25'7.04"N, 91°45'39.29"E	17.12.2020	Dibyendu Banerjee
2	Killa SS	2012	Yes	33/11 kV AIS	Crompton Greaves (CG India)	2017	-	1	Killa, Gumti ED	23°36'41.58"N, 91°30'44.12"E	17.12.2020	Dibyendu Banerjee
3	Madhupur SS	2007	Yes	33/11 kV AIS	GEC Alstom	1996	-	1	Bisalgarh ED, Sipahijla EC	23°41'29.55" N, 91°16'19.92" E	18.12.2020	Dibyendu Banerjee
4	Stadium SS	2007	Yes	33/11 kV AIS	Kirloskar (both)	1.2002 2.2006	-	2	ED-Agartala, West Tripura	23°48'31.27"N, 91°16'32.09"E	18.12.2020	Dibyendu Banerjee
5	Damchara SS	2012	Yes	33/11 kV AIS	1.Eastern Transformer Exporter Pvt Ltd (ETE) 2.Areva	1.1981 2.2010	ETE, 1981 contains PCB per UNIDO	2	North Tripura ED	24°14'35.16"N, 92°16'58.69"E	12.03.2021	Dibyendu Banerjee
6	Rangrung SS	2012	Yes	33/11 kV AIS	GEC Alstom	1996	-	1	North Tripura ED	24°17'35.47"N, 91°58'48.12"E	13.03.2021	Arijit Choudhury
7	Kailashahar SS	2017	Yes	33/11 kV AIS	1.Crompton 2.Greeves	2017 (both)	-	2	Kailashahar ED, Unakoti EC	24°19'6.61"N, 91°59'59.04"E	13.03.2021	Arijit Choudhury
8	Kadamtalla SS	2004	Yes	33/11 kV GIS and AIS	1.NGEF 2.GEC Alstom	1.1993 2.2001	- -	2	ED-Dharmanagar, North Tripura	24°27'28.78"N, 92°12'25.43"E	13.03.2021	Dibyendu Banerjee
9	Panisagar SS	1997	Yes	33/11 kV AIS	1.CG India (Defunct) 2.CG India 3.CG India	1.1987 2.1991 3.2018	- - -	3	North Tripura, Dharmanagar EC		13.03.2021	Dibyendu Banerjee

Sl. No.	Name	Year Est.	Operational Status	Type	Transformer Make	Year	Included in UNIDO List as Including PCBs	No. Transformers	Location (Division/District)	Grid Coordinates	Date of Audit	Name of Auditor
10	Digalbagh SS	2010	Yes	33/11 kV AIS	Kirloskar	2008 (both)	-	2	North Tripura EC, Dharmanagr ED	24°23'11.27"N, 92°10'28.61"E	13.03.2021	Dibyendu Banerjee
11	Manu SS	1984	Yes	33/11 kV AIS	1.Kirloskar 2.Unknown make	1.Year not legible 2.1987	-	2	Dhalai District, Ambassa EC	23°59'53.74"N, 91°59'25.99"E	14.03.2021	Arijit Choudhury
12	Chawmanu SS	2011	Yes	33/11 kV AIS	Areva (both) (One Defunct)	2010 (both)	-	2	Dhalai District, Ambassa EC	23°50'43.95"N, 91°59'26.39"E	14.03.2021	Dibyendu Banerjee
13	Adharsha Colony SS	2006	Yes	33/11 kV AIS	1.Areva 2.Power Lite	1.2007 2.2013	- -	2	West Tripura ED 2 Agartala	23°48'52.16"N, 91°18'47.21"E	16.03.2021	Dibyendu Banerjee
14	Melagarh SS	2003	Yes	33/11 kV AIS	1.Bharat Bijlee 2.Kirloskar	1.2002 2.1998	- -	2	ED-II, Agartala, West Tripura	23°30'3.18"N, 91°20'37.21"E	16.03.2021	Arijit Choudhury
15	Capital Complex MR SS	2009	Yes	33/11 kV AIS	Marson's Electrical Industries (both)	Not present	Marson's Electrical may contain PCB per UNIDO	2	Capital Complex ED, Agartala 1EC	23°51'51.74"N, 91°17'24.08"E	16.03.2021	Arijit Choudhury
16	College Tilla SS	1991	Yes	33/11 kV AIS	Kirloskar	1996 (both)	-	2	ED-I, Agartala, West Tripura	23°49'46.05"N, 91°18'5.26"E	16.03.2021	Dibyendu Banerjee
17	NSRCC SS	2019	Yes	33/11 kV AIS	GE	2017	-	1	ED 1 Agaratala, EC1	23°49'38.27"N, 91°16'44.05"E	16.03.2021	Dibyendu Banerjee
18	Rampur SS	2002	Yes	33/11 kV AIS	1.Bharat Bijlee 2.Areva	1.2001 2.2004	- -	2	ED 2, EC 1 Agartala	23°50'27.85"N, 91°15'16.79"E	16.03.2021	Dibyendu Banerjee

Sl. No.	Name	Year Est.	Operational Status	Type	Transformer Make	Year	Included in UNIDO List as Including PCBs	No. Transformers	Location (Division/District)	Grid Coordinates	Date of Audit	Name of Auditor
19	Rajnagar SS	2001	Yes	33/11 kV AIS	1.Vijay Electricals Ltd 2.Vidyut Transformers Pvt. Ltd.	1.2009 2.Not legible	- -	2	ED-Belonia, South Tripura	23°13'57.62"N, 91°23'5.92"E	17.03.2021	Arijit Choudhury
20	Hrishamukh SS	2002	Yes	33/11 kV AIS	1.Bharat Bijlee 2.Apex Electrical	1.2001 2.1981	- -	3	South Tripura, Belonia EC	23° 8'32.90"N, 91°31'31.26"E	17.03.2021	Arijit Choudhury
21	Jolaibari SS	2000	Yes	33/11 kV AIS	1.Bharat Bijlee 2.Eastern Transformer & Exporter Pvt Ltd (ETE)	1.2001 2.1991	- -	2	ED-Santirbazar, South Tripura	23°13'8.56"N, 91°36'57.49"E	17.03.2021	Dibyendu Banerjee
22	Mandai SS	2011	Yes	33/11 kV AIS and GIS	Areva	1.2007	-	1	ED Jirania, EC2	23°51'18.49"N, 91°28'29.38"E	18.03.2021	Dibyendu Banerjee
23	Takarjala SS	2004	Yes	33/11 kV AIS	1.Vijay Electricals Ltd 2.NGEF	1.2009 2.1986	- -	2	ED Jampuijala, Ec Sipahijala	23°42'20.85"N, 91°25'17.10"E	18.03.2021	Arijit Choudhury
24	Charipara SS	-	Under Construction (95 %)	33/11 kV AIS	NUCON	2020 (both)	-	2	Agartala 2 ED, EC 1	23°47'53.55"N, 91°15'7.18"E	28.10.2021	Dibyendu Banerjee
25	Durjanagar	2004	Yes	33/11 kV AIS	1.Kirloskar 2.Bharat Bijlee	2003 (both)	- -	2	ED Capital Complex, EC 1	23°52'29.0"N, 91°16'4.0"E	28.10.2021	Dibyendu Banerjee

Sl. No.	Name	Year Est.	Operational Status	Type	Transformer Make	Year	Included in UNIDO List as Including PCBs	No. Transformers	Location (Division/District)	Grid Coordinates	Date of Audit	Name of Auditor
26	Vangmung SS	2013	Yes	33/11 kV AIS	1.Areva 2.ABB	Not legible (both)	-	2	Kanchanpur ED, Dharmanagar EC	24° 0'19.94"N, 92°16'46.56"E	29.10.2021	Arijit Choudhury
27	Tillabazar SS	-	Yet to be constructed	33/11 kV AIS	-	-	-	-	Kailashahar ED, Unakoti EC	24°21'5.09"N, 91°59'57.43"E	30.10.2021	Arijit Choudhury

ED: Electrical Division, EC: Electrical Circle; SS: Substation
Source: ADB TA Consultant

D. Findings

7. The environmental audit focused on the 27 existing 33/11kV substations (including one under construction, Charipara and one where construction was only just starting out, Tilabazar at the time of audit) earmarked under the distribution line component. Since it is proposed to upgrade the existing substations as per ADB Safeguard Policy Statement (2009) these qualify as existing facilities requiring an environmental audit.

8. Positives identified based on the environmental audit include:

- All substations are located on TSECL acquired land
- No asbestos containing materials (ACMs) were recorded in the audited substations based on visual inspection. TSECL officials informed that they were not aware of ACMs being used either as insulating material or in other equipment. However, there is no documentary evidence to confirm if asbestos is present or not.
- Many of the substations had first aid/CPR posters in the control rooms.
- Most of the substations have available/vacant area within the existing compound available for renovation/upgradation works.
- None of the substations were affected by noise and/or air pollution.
- Records of breakdown and maintenance, transformer oil changes are available in the substations.
- Two of the substations (Rampur and NSRCC) have 24-hour security guards.

9. The baseline conditions of the substations are provided in Table A2-2 and the audit findings listed in Table A2-3.

Table A2-2: Substation Baseline

Sl. No.	Name	Topography	Land Use within 500m	Buildings in 50m, including community facilities	Distance to Nearest Residential Property	Distance to Habitation	Distance to Surface Water	Ground Water source in 50m	Noise Level dB(A)	EMF uT
1	Jatanbari SS	Flat	Habitation, forest, open land	Houses (5)	50m	50m	Pond 50m	-	51.8	Not measured
2	Killa SS	Flat	Habitation, agriculture, open land, temple, veterinary hospital	Houses (2)	0m, adjacent to SS boundary	300m	None within 500m	-	52.7	Not measured
3	Stadium SS	Flat	Stadium, residential, college	Temple (1), Police hospital, Stadium, Houses (4)	10m	In urban area	Howrah Nadi 2km	-	57.1	Not measured
4	Damchara SS	Flat	Open land, settlements, agriculture,	Houses (8), shops (3-5)	0m	0m	Ponds at 7m	-	55	40
5	Rangrung SS	Flat land with some rolling terrain in the approach road	Located within Tea Garden area	Opposite to a high school (approximately 70m distance)	70 – 75m	75m	Pond 150m	-	57.2	37
6	Kailashahar SS	Flat	Residential, Institutional and Commercial	Located within town limits (commercial setting). ITI within 50m	10m	20m	Pond 40m, Manu River 475m	-	56.7	44
7	Kadamtalla SS	Flat	Open area, settlement, commercial	Residential (4-6), Crematory	10m	10m	Bamunia Stream 2km	-	50.5	45
8	Panisagar SS	Flat land, elevated from road	Forest, open land, agriculture, settlement	Forest Office, Staff Quarters, houses (2-3)	0m	In habitation	Juri river, 2km	Bore well within the SS	52.4	44
9	Digalbagh SS	Flat	Residential, open land, agriculture	Houses (4-6)	10m	150m	Juri river, 500m	Bore well	55	29

Sl. No.	Name	Topography	Land Use within 500m	Buildings in 50m, including community facilities	Distance to Nearest Residential Property	Distance to Habitation	Distance to Surface Water	Ground Water source in 50m	Noise Level dB(A)	EMF uT
								within the SS		
10	Manu SS	Flat	Residential (semi urban)	Semi urban setting within residential areas. Presence primary school within 50m and high school within 70m	35m	35m	185m (Manu River)	-	51	41
11	Chawmanu SS	On elevated land	Open land, school, settlement, agriculture, forest	Houses (2)	10m	600m	Manu River 1km	Bore well within the SS	47	Not measured
12	Adharsha Colony SS	Flat	Open land, vegetation, habitation	None	150m	200m	None within 500m	-	51	45
13	Melagarh SS	Flat	Residential (semi urban/rural), agriculture	Outskirts of Melaghar Town within semi urban / rural setting. Residential houses scattered within 50m.	20m	20m	Rudra-sagar Lake (Ramsar site) 2.3 km	-	52.3	42
14	Capital Complex MR SS	Flat	Capital Complex including Assembly, Governor's place, Secretariat, and other government properties, Agartala urban area includes residential, commercial properties and hospital	Within Capital Complex. no residential / sensitive features 40m (government office)	200m	In urban area	810m (pond)	-	54.5	43

Sl. No.	Name	Topography	Land Use within 500m	Buildings in 50m, including community facilities	Distance to Nearest Residential Property	Distance to Habitation	Distance to Surface Water	Ground Water source in 50m	Noise Level dB(A)	EMF μ T
15	College Tilla SS	Flat	University, stadium, open land, army barracks, habitation	Within University Campus, NCC Commando Barrack (10-12 quarters) No private houses	150m	Major habitation beyond 500m, but NCC Barrack at 50m - housing about 10 staff	Howrah River 200m	-	53.5	61
16	NSRCC SS	Flat	Urban settlement, habitation, commercial	Stadium, coaching training center, marketplace – individual shops and businesses along the road across the SS, government office	5m	In urban area	None within 500m	-	54.5	55
17	Rajnagar SS	Plain	Residential (rural / semi urban), agriculture, rubber plantations. Trishna Wildlife Sanctuary boundary approximately 790m and approximately 633m from ESZ boundary	Presence of 6-7 scattered residential houses within 50m.	25m	40m	Pond 130m	Bore well within the SS	50.9	41
18	Hrishamukh SS	Flat land, SS has gentle slope on approach	Agriculture, rural residential	5-6 residences within 50m	40m	170m	Pond 50m	-	37.8	48

Sl. No.	Name	Topography	Land Use within 500m	Buildings in 50m, including community facilities	Distance to Nearest Residential Property	Distance to Habitation	Distance to Surface Water	Ground Water source in 50m	Noise Level dB(A)	EMF uT
19	Jolaibari SS	Flat	Residential, commercial, pond	Residential (7-8), Commercial	10m	10 m	Muhuri River 1.5km	Tube wells in houses at 10m	51	52
20	Mandai SS	Flat	Government offices, stadium, social forestry, open lands, habitation	PWD Water and Sanitation offices, stadium, houses (2)	One isolated house at 5m	50m (single house) otherwise main habitation is 500m	Stream, 1km	-	60	45
21	Takarjala SS	Flat	Agriculture, rural residential, government offices	Presence of scattered residential houses (4-5) Mainly government buildings in the surroundings	30m	30m	240m (river)	-	48	41
22	Vangmung SS	On ridge / hilly terrain	Agriculture, orange garden, betel nut garden, residential, eco-park, hospitals, tourist lodge	3-4 residences. Staff Quarters – 30m, hospital quarters	40m	50m	Rain fed Reservoir 90m	-	Not measured	Not measured
23	Charipara SS	Flat	Agricultural (paddy land), residential, open ground/field, shops	6-7 residences	10m	200m	None within 500m	Bore well within the SS	46	44
24	Tillabazar SS	Flat	School, residential, fields SS has been undertaken under the World Bank funded NERPSIP project and the construction proper	Tilabazar high school – 15m	50m	50m	Pond 200m	-	51.6	Not measured

Sl. No.	Name	Topography	Land Use within 500m	Buildings in 50m, including community facilities	Distance to Nearest Residential Property	Distance to Habitation	Distance to Surface Water	Ground Water source in 50m	Noise Level dB(A)	EMF uT
			is yet to start. Presently the space where the SS shall be constructed is an empty field, land of which has been received from the Education Department. There is a huge banyan tree (<i>Ficus bengalensis</i>) within the proposed SS area which shall not be felled.							
25	Madhupur SS	Flat	Rubber plantation, agricultural field	Government Office (10m) No houses nearby	30m	30m	None within 500m	Bore well inside SS	48	49
26	Durjanagar SS	Flat	Settlement, shops, offices	4-5 houses	5m	In urban area	None within 500m	Bore well inside SS	50	46
27	Rampur SS	Flat	Open land, international integrated check post at 190m, agriculture fields	Fisheries office One vacant house	60m	60m	Pond in 5m	-	51	44

Source: ADB TA Consultant

Table A2-3: Audit Findings of TSECL Substations (Gaps)

Audit Item	Audit Findings and Observations
General	<ul style="list-style-type: none"> • TSECL has not developed any EHS policy or manuals/procedures for substation operation • SS staff are not aware of environmental management systems and procedures • Records of EHS permits are not available at any of the SS sites
Housekeeping/ Waste Management	<ul style="list-style-type: none"> • No guidelines for pollution prevention or waste management, including hazardous wastes management, were available at the substations • Most SS are not having good housekeeping • Most SS are not tidy with waste disposed all over the compound. • No waste storage areas were observed in any of the SS. Solid waste handling was not observed to be undertaken as per statutory requirements of segregation, storage, transport, and disposal. • Empty and filled drums are stored inside offices or in the yards with no impermeable floor. • Storage was mostly in the open due to lack of storage room / area. • End of life batteries are stored at site and then replaced by the vendors, in some cases, used batteries were scrapped and transported to head office / sold as scrap. • Trash (municipal waste) mostly stored / dumped all over the SS yards. • Some signs of burning trash/garbage was also observed at most SS. • End of life equipment including redundant transformers are kept at site and in the open for long term. Defunct units were observed to be significantly rusted, broken and pose significant health and safety hazards to staff as well as locals. As reported some units are taken away to other substations, and some others are scrapped, auctioned.
Transformers and Oil Leakage	<ul style="list-style-type: none"> • Capacitors were not installed in any of the SS • All transformers were oil insulated • Transformer and other oils - there are no dedicated, labelled storage areas for drums, oil storage • Drums are kept in an unorganized manner all over the SS and are a significant health and safety risk. • Drums are not labelled, and content is not provided/disclosed. • Material Safety Data Sheets were not available at any of the SS • Transformer test report not available at any of the SS • Transformer bunds, containment bund / tanks for oil spillage management of 110% capacity are not available in any of the SS. Some have concrete platforms; others have bunds but not up to capacity of 110% and they are not extending beyond the transformer area. • Leaks and oil spills were observed in varying degrees across all SS. • No specific management or handling procedures were observed for hazardous wastes, oil spills, spillage, runoff from leaks off equipment in any of the SS. • Spill management materials like sand, cloth was not available or mostly inadequate. • Spills were left as it is to be soaked in ground resulting in soil contamination. • No PCB labelling in transformers and capacitors, documentations like certifications PCB free are not available onsite • As per UNIDO guidelines, one 1981 make ETE Transformer in Damchara SS was at risk of PCB and another one at Capital Complex MR SS can be at potential risk as some transformers of the Marson's Electrical make include PCBs and the date label is not present, others whilst not listed by UNIDO in their guidance may still be at risk of containing PCBs due to oil changes etc.

Audit Item	Audit Findings and Observations
	<ul style="list-style-type: none"> • Records of transformer oil change were recorded • Maintenance records are available for most of the SS • No high concentration of PCBs was recorded in the baseline monitoring of ground water quality
Escape of SF₆ (sulphur hexafluoride) and other greenhouse/ hazardous gases	<ul style="list-style-type: none"> • Among those visited, one SS (Kadamtala SS) had a Gas Circuit Breaker that is operational and is housed in the switch yard. The labels including that it contains SF6 is visible. No leakage / breakdown was reported, although no SF6 leakage detectors are available at SS. • In another SS (Mandai SS) the Gas Circuit Breaker is redundant and in bad condition with lids not closing and all internal systems exposed. There is a chance that SF6 might have escaped. This Circuit Breaker is defunct for a long time and three times test were conducted for revival and or repair but without success. As reported the Circuit Breaker will stand there until it is taken away by another SS. • No SF6 leakage detectors are installed in any of the SSs even though two SS, Kadamtala (operating CB) and Mandai (broken CB) were GIS CB type • Record of SF6 leakage and other information not kept at any of the SS
Noise, EMF, Lighting and Ventilation	<ul style="list-style-type: none"> • Ambient noise levels were observed to be low with most SS not exposed to traffic or other noise sources. • Spot noise levels near gates, yards, transformer area and inside office using smartphone-based app were mostly in the 44 dB(A) to 55 dB (A) range and within safe limits for OHS • Transformer hum was audible in some cases from nearly 5 meters and spot levels ranged between 48 dB(A) to 59 dB(A) using a smartphone-based app • No high level of air pollution was observed in any of the SS. • Air and noise monitoring was not conducted by SS (baseline monitoring has been conducted at some SS for IEE purposes) • There were no sources of vibrations observed • No EMF warning were present in any SS • No EMF shields were installed in any of the SS. • No EMF monitoring is conducted by SS. • Spot EMF reading using smartphone-based app were mostly low at all locations, inside office and near gates, varying between 44 uT – 50 uT. In few cases the EMF levels were recorded to exceed 75 uT near the transformer and are likely in mid to high range. However, this is compared to ICNIRP exposure limits for occupational exposure of 415-500 uT. • Ventilation was mostly adequate, and vents were not blocked as they are located high up near the ceiling. • Control panels were placed along the walls/windows, and this reduces ventilation and lighting to a degree. • Natural light was mostly adequate across all SS • Artificial lighting working condition inside control rooms varied between 20% to 80%. • Faulty bulbs / tubes were observed in all SS. • Lighting in the SS compound including the switch yard was not adequate, with some SS reporting that the yard remains completely dark as bulbs are not working / not being replaced. • Entry gates and inside paths mostly had no lighting system or were not working
First Aid Equipment	<ul style="list-style-type: none"> • First Aid Kits were not kept in any of the SS visited.

Audit Item	Audit Findings and Observations
Fire Safety Equipment	<ul style="list-style-type: none"> • Fire safety equipment was mostly not adequate. • Sand buckets were limited, with many of them either empty, not available, or not having adequate sand content. • All SS have CO₂ based fire extinguisher although all were either expired or used up and not replaced. • No automatic alarm and fire suppressions systems was found in any of the SS. • No firewalls in any of the SS
Community Health and Safety	<ul style="list-style-type: none"> • Overall, the security of the SS areas is not adequate, and locals can easily access the SS area, control room, as well as the switch yards. • All SS except Panisagar SS and Kadamtala SS had fencing. • Fencing although provided in majority of SS, has breaches / cracks / gaps where humans, domesticated animals, etc. can easily enter. The absence of boundary walls was a cause of concern for locals (raised during consultation) • SS gates remain open 24 hours and excluding the NRSS and Rampur SS, security guards were not available. • Doors to control rooms are reported to be closed only late at night. • Caution / danger signage were not observed at any of the SS entry points or on the boundary / fence and on the electrical equipment • Cattle and livestock were observed to be inside SS areas (even close to transformers) in some cases which could lead to accidents and economic loss. • Sensitive receptors / settlement near SS were observed in some cases (Table A2-2) • Some SS are also housing divisional offices and locals come to pay energy bills (Kadamtala). They have easy access to the SS and possibly exposed to health risks without any signage or caution boards. • Conflicts with SS staff and locals were reported from some SS including office goods damage by locals due to long period of power failure in the area. Conflicts were due to significant power outages and TSECL not repairing the same on time due to lack of staff or transport / equipment. The absence of security guards, and entry prohibitions is lacking on nearly all SS.
Handling Emergencies	<ul style="list-style-type: none"> • No emergency preparedness plan available in any of the SS • Some of the substations have been subjected to low to moderate earthquake and/or flooding during monsoon, although no major impacts reported. • No reported landslide issues • Emergency exit signage was not observed in any of the SSs. • While most SSs had clear entry and exit ways, in some cases the exits were blocked due to control panels and/or defunct unit storage • No emergency response training provided to staff • No staff are trained in first aid in any of the SSs • Posters on medical revival, fire safety and prevention were observed in some cases. • No doctors/emergency health contacts list in case of any emergency was observed in any of the SS • No trainings / workshops on fire safety, first aid or other emergency situations are conducted • Some staff reported they had fire safety training, but documentation / records / certificates were not available • Fire drills and alarm tests are not conducted • Fire safety posters were present in some SS

Audit Item	Audit Findings and Observations
	<ul style="list-style-type: none"> No incident logbook available
Health and Safety of Staff	<ul style="list-style-type: none"> No OHS induction were received No health and safety policies, manuals, and no risk assessment report available No medical tests / health check-up records of staff are available at any of the SS Working at height training/permits not available for SS staff or for contractors who they call in if required No OHS training for staffs, no safety, calibration report and records available. No training materials are available Staffs are aware of PPE although not adequately supplied with them, they were mostly worn out and old. PPE were in short supplies in relation to site staffing power. Staff were not wearing any PPE and majority were wearing slippers and not safety boots. Exposure assessment equipment are not available. Trip hazards, cracks, holes, cracked tiles are observed across all SS both inside the control room and in the compound Gaps, cracks, faulty tiles, missing floor panels in the control buildings. Storage of defunct panels, batteries, small parts, units, cables, wires inside the control rooms, some blocking entry, staircases, bathrooms, basins. In the switch yard and open areas hazards were recorded in the form of trip hazards like open cable channels, broken and unstable drain/channel covers, broken and defunct equipment, drums, rods, cables, broken meter boxes and streetlights, trash, and even equipment stored from other SS and DL lines. No air conditioning and / or heating systems have been installed in any of the SS Building structural status – most of the SS are poorly managed and repair is required although they were structurally sound Cracks were observed in many of the SS walls. Moisture / damp walls, plaster and paints stripped off were observed. One SS was reported and observed to be sinking as it was built in a marshy area. No ACM survey done but asbestos containing materials not observed Most maintenance works are done by onsite staff or nearest TSECL units/offices. Civil works/maintenance are done by hired labours/contractors Pest problems were reported in majority of the SS. Rats, termites and mosquitoes were the main agents. Pest control measures are not conducted. Regarding COVID-19 although they reported that guidelines were followed, observation during the audit was that they did not meet the requirements of adequate masks, hand sanitizers, liquid soaps, etc.
Drainage	<ul style="list-style-type: none"> Drainage and wastewater – in most cases storm drains were absent the SS area. The wastewater from toilets (bathing, basin, urinals) other than WC (latrine) is moved through internal drains and either open into main drains or dumped in the open outside the compound. WC (latrine) wastewater moves to the septic tank. Standing water was not observed in the SS. Although in some SS like Jatanbari drums/redundant equipment were filled with rainwater. In College Tilla SS water was observed in the bund beneath the transformer and elsewhere in the garden. The SS surface was also slimy.
Sanitation and Welfare Facilities	<ul style="list-style-type: none"> Toilets are available on site and inside the buildings. Separate toilets for women are not available in any of the SS. Overall, the toilets were observed to be poorly managed and not clean and hygienic.

Audit Item	Audit Findings and Observations
	<ul style="list-style-type: none"> • Some toilet doors are defunct and broken (Jatanbari SS, Kadamtala SS). • In some cases, door could not be locked (Kadamtala SS). • Access to toilets in some cases was restricted due to storing of equipment and lighting in and around toilets was mostly inadequate. • Septic tanks are available for all the SS although the septic tanks overflow drains off in outside open areas / fields. No soak pits available. Septic tanks mostly are below ground and were observed to be not maintained. • Potable water is available on site. Quality of drinking water, as reported by staff was mostly potable, although some SS staff reported foul smell / high iron content. The source of water is mostly municipal / piped water, while some used pumped ground water. The storage of the water inside the SS was not hygienic and used ceramic filters, which as observed were not regularly cleaned. Testing reports are not available and no periodic potability testing was reported. • No dedicated accommodation / rest rooms are available in any of the SS. The staff, including night shift staff stay within the control rooms and have temporary mats/beds within the control room area. • Cooking is mostly not practised, but in some SS a temporary cooking set up, using electric heaters was observed inside the control/office rooms, which may pose a fire hazard. • Dedicated accommodations, TV/Internet connection AC/Heating area not available.
Other	<ul style="list-style-type: none"> • Birds common to the locality are sometimes sited in the SS areas, a few rare cases of electrocution of birds were reported from some SS • Wildlife conflicts / sightings were not reported from any of the SS • In a few SS (Rangrung SS) presence of highly poisonous snakes was reported within the switch yard and one case of snake bite (non-poisonous) was reported within the Control Room. • Grasses of different heights, shrubs and herbs were observed in almost all SS, they are not maintained or trimmed / managed. No medium/large trees are present. • Presence of numerous honeybee hives were observed on Kailashahar SS control room walls. No case of stinging by honeybee in the SS was reported though

Source: ADB TA Consultant

E. Conclusion

10. Overall waste management, including handling, storage, and disposal, is the principal EHS concern in all substations audited. Pieces of solid wastes (removed parts of transformers, metal scraps etc.) had no specific and designated area for collection and storage, and there was no organized disposal mechanism. Usually, they are seen all over the compound and stored there until transported to another substation. Almost all transformers were leaking oil and without spill bund, etc. Furthermore, sanitation and welfare facilities, safety requirements and training and awareness of staff was found to be woefully inadequate. There are no written hazardous materials or solid and hazardous waste management systems and guidelines for substation personnel; there were no written Environment, Health and Safety procedures or training to prepare staff for emergencies. Inadequate Personal Protective Equipment (PPE) was recorded at all substations. The EHS audit findings reflect the fact that neither the national nor the ADB's SPS 2009 requirements are fully in compliance in any of the substations.

11. The corrective action plan (CAP) for the substations is included in the EMP. CAP actions should be addressed by TSECL before the commencement of activities planned under the TSECL substation component or instead specifically included in the contract for the EPC contractor to address as part of their scope of works. TSECL will complete a detailed report submitted to ADB confirming the completion of the included actions at each substation, for clearance before any project works commence. It will also be the responsibility of the contractor on accepting access to the substation to ensure that the CAP has been implemented, or to have agreed with TSECL how matters will be dealt with under the contract, as from the start of construction they will be responsible for EMP implementation on site.

Table A4-4: Substation Settings

Sl. No	Name	Location (Google Earth) -50m	Access/Boundary	Building/Rooms
1	Jatanbari SS			
2	Killa SS			

Sl. No	Name	Location (Google Earth) -50m	Access/Boundary	Building/Rooms
3	Madhupur SS			
4	Stadium SS			

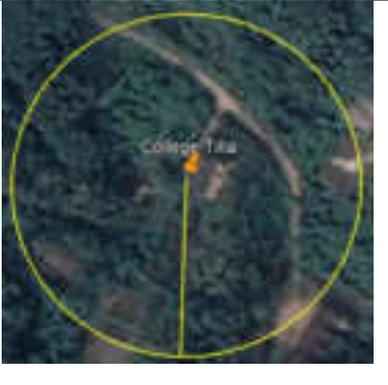
Sl. No	Name	Location (Google Earth) -50m	Access/Boundary	Building/Rooms
5	Damchara SS			
6	Rangrung SS			

Sl. No	Name	Location (Google Earth) -50m	Access/Boundary	Building/Rooms
7	Kailashahar SS			
8	Kadamtalla SS			

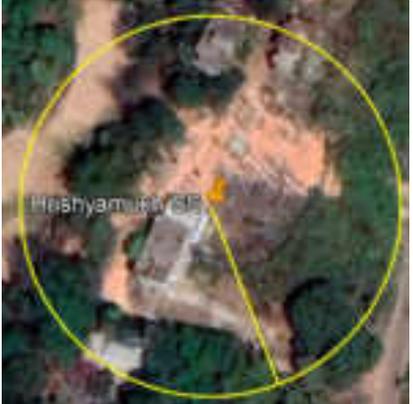
Sl. No	Name	Location (Google Earth) -50m	Access/Boundary	Building/Rooms
9	Panisagar SS			
10	Digalbagh SS			

Sl. No	Name	Location (Google Earth) -50m	Access/Boundary	Building/Rooms
11	Manu SS			
12	Chawman u SS			

Sl. No	Name	Location (Google Earth) -50m	Access/Boundary	Building/Rooms
13	Adharsha Colony SS			
14	Melagarh SS			

Sl. No	Name	Location (Google Earth) -50m	Access/Boundary	Building/Rooms
15	Capital Complex MR SS	 <p>A satellite view from Google Earth showing a rectangular building complex in a green area. A yellow circle highlights the building, and a yellow arrow points to it from the top right.</p>	 <p>A ground-level photograph showing a grassy field with a black metal fence in the foreground. In the background, there are trees and a building with a red roof.</p>	 <p>An interior photograph of a room containing several large white electrical cabinets or control panels. There are also blue barrels and other equipment in the room.</p>
16	College Tilla SS	 <p>A satellite view from Google Earth showing a building complex in a wooded area. A yellow circle highlights the building, and a yellow arrow points to it from the bottom center.</p>	 <p>A ground-level photograph showing a dirt road leading to a building with a yellow facade and a red roof. A metal frame structure is visible in the foreground.</p>	 <p>A ground-level photograph showing a dirt path leading to a building with a rusted metal exterior. A blue tarp is visible on the left side of the path.</p>

Sl. No	Name	Location (Google Earth) -50m	Access/Boundary	Building/Rooms
17	NSRCC SS			
18	Rampur			

Sl. No	Name	Location (Google Earth) -50m	Access/Boundary	Building/Rooms
19	Rajnagar SS			
20	Hrishamukh SS			

Sl. No	Name	Location (Google Earth) -50m	Access/Boundary	Building/Rooms
21	Jolaibari SS			
22	Mandai SS			

Sl. No	Name	Location (Google Earth) -50m	Access/Boundary	Building/Rooms
23	Takarjala SS			
24	Charipara SS			

Sl. No	Name	Location (Google Earth) -50m	Access/Boundary	Building/Rooms
25	Durjanagar SS			
26	Vangmung SS			

Sl. No	Name	Location (Google Earth) -50m	Access/Boundary	Building/Rooms
27	Tillabazar SS			

Source: ADB TA Consultant

Table A2-5: SS Audit Photolog

	
<p>Damchera SS: Livestock grazing inside SS</p>	<p>Tilla SS Boundary is inadequate</p>
	
<p>Tilla SS: although part of the SS, this portion of switch yard is housed outside SS boundary on the village path and close to huts</p>	<p>Damchera SS</p>



Open pits in Chawmanu SS



Crematorium adjacent to Kadamtala SS and used for storing SS equipment



Broken slabs – JatanbariSS



Damaged tiles/covers inside control room – Killa SS



Inadequately covered/loose board control room cable channels – Jolaibari SS



Broken and damaged control room covers/tiles – College Tilla SS



Chowmanu SS: Broken drain covers



Jatanbari SS – access path to toilet



NRSCC SS: Makeshift cooking and resting area for night shift workers / guards



Chowmanu SS: Temporary cooking arrangement using electricity; unhygienic condition



Madhupur SS and Rampur SS: Unhygienic cooking conditions inside control rooms



Kadamtala SS: Control rooms used for storing damaged units/parts and blocking window



Kadamtala SS Toilet areas used for storing damaged meters and other parts. Water supply to most toilets is not provided



Stadium SS: Used drums in SS area



Stadium SS: Temporary storage room – unlabelled and without door



Colle Tilla SS <- drum storage and oil leaks -> Mandai SS



Jatanbari SS: Outside, Unhygienic wash area, cooking utensils cleaned here. Slippery and cables lying all along



Digalbagh SS: Hand washing location – unpaved area, soap not available, unhygienic and slippery.



Madhupur SS: Sewerage drain choked with garbage



Damcherra SS: Sewerage drain from septic tank



Kadamtala SS: Garbage dumps in front of control room entry points



Kadamtala SS: Control room entry point



Kadamtala SS: Broken toilet area, unclean and damaged basin



Kadamtala SS: Broken and defunct toilets, door lock not working and door panel damaged



Adarsh Colony SS Dirty and unclean toilet and wash area



Jolaibari SS: Basin blocked and defunct due to drum storage



Chawmanu SS Unhygienic toilet



Jolaibari SS: Bathroom door mostly blocked by oil drums



Jatanbari SS: Toilets located outside building



Jatanbari SS: Accommodation with no bed; wooden/cardboard panels used for resting



Jatanbari SS: External toilets, uncleaned, with vegetations and damaged



Jatanbari SS: Blocked Emergency Exit



Kadamtala SS: Oil Contaminated soil



Jatanbari SS: Waste and oil contaminated soil



Digalbagh SS: Oil Contaminated soil



Mandai ss: Oil Contaminated soil-transformer area



Kadamtala SS: Spill inside control room



Oil spill inside control room – Kadamtala SS



Snake pit in Rangrung SS



Kadamtala SS: Label on working Circuit Breaker with SF6



Mandai SS: Label on SF6 insulated defunct Circuit Breaker



Mandai SS: Defunct gas filled circuit breaker



Jatanbari SS: motor bike parked inside control room and waste dumped near the SS entrance



Jatanbari SS: Damaged and waste office goods, electricals - termite infested



Chowmanu SS: Exposed and faulty wirings



Digalbagh SS: Cables and wires not secured



Panisagar SS: Cables and wires along control room floor



Chaumanu SS: Faulty wiring and securing



Adarsh Colony SS: Sand buckets -half filled



Kadamtala SS: Expired fire extinguishers



Tilla SS: Expired fire extinguishers



Joliabari SS: Sand buckets

Source: ADB TA Consultant

Template Audit Checklist

Substation Name:	
Year of establishment:	
Type of Substation (GIS/AIS):	
Voltage:	
No. incomers and voltage:	
No. outgoers and voltage:	
Grid Reference:	
Aerial map of substation:	
Photo of substation compound:	
Photo of any control building and details of wall/roof materials:	
No. transformers with make/model, MVA, manufacturer name and dates of manufacture/installation with photo of rating plate:	
Noise level at site entrance, indicative reading:	
Noise level adjacent to transformer, indicative reading:	
EMF level at site entrance, indicative reading:	
EMF level adjacent to transformer, indicative reading:	
Outside temperature, indicative reading:	
Area of substation, and layout map (area in use and available for expansion):	
Photo of vehicle entrance: Is it off a paved road?	

Topography – flat land, sloped, or steep terrain:	
Previous land use (if known):	
Describe the land uses within 500m (supported with photos): Confirm presence or absence of agricultural land-cultivated or uncultivated, protected or environmentally sensitive areas, community or protected forest, water bodies, religious or ancestral cultural resources (e.g. temples, shrines, sacred trees)?	
Nearest protected or key biodiversity area (distance in m)?	
Have endangered species been encountered in the vicinity (elephant, tiger, etc.)?	
No. buildings within 50m and no. inhabitants:	
Nearest individual residence (name and distance in m, mark on aerial map if possible):	
Nearest habitation (name and distance in m, mark on aerial map if possible):	
No. community facilities (schools, health centre etc.) within 50m with estimated no. of visitors (mark on aerial map if possible):	
Nearest surface water (distance in m, mark on aerial map if possible):	
No. groundwater wells/pumps/springs within 50m (mark on aerial map if possible):	
Total staff at substation (technical and non-technical):	
No. men / no. women:	

Audit Checks:	F	P	N	N/A	Remarks (attach photos to support findings)
A. Housekeeping / Waste Management					
Is an environment policy available on site?					Note if one exists at organization level:
Is a pollution prevention manual or procedure available on-site covering hazardous materials management, oil storage etc?					Note if one exists at organization level:
Is a waste management manual or procedure available on-site covering both solid and hazardous waste storage and disposal?					Note if one exists at organization level:
Is there vegetation (grass, trees, shrubs) on site?					Provide details of vegetation and how it is managed, note if trees will need to be cut if further development in compound:
Is the substation kept neat and tidy with no discarded wastes?					
Are there any trip hazards on the ground e.g. open channels, materials, equipment, trash laying around?					
Are there any other features that could post a danger e.g. broken or loose tiles?					
Is there any general waste storage and/or disposal on-site?					Provide details of types of waste stored and how disposed of?
Is solid waste segregated into recycling and waste for disposal?					
Is there a dedicated, labelled storage area for solid waste?					
Does the storage area have an impermeable floor?					
Is the storage area under cover?					
Do garbage bins have lids?					
Are garbage bins enclosed to contain leachates?					
Is any waste burning on site – open burning or incineration?					
Is any composting taking place on-site?					
Is end of life or unused equipment being stored on site?					
Is there a dedicated, labelled storage area for this equipment?					

Are supplies of fuel, oil, chemicals, SF6 tanks being stored on site?					
Are material data sheets for the fuels, oil or chemicals displayed?					
Are there empty drums, old transformers or used batteries on site?					
Are there any hazardous wastes (solid/liquid/gas) being stored and/or disposed of?					How are any hazardous wastes (solid/liquid/gas) being stored and disposed of?
Is there a dedicated, labelled storage area for fuels, oils, and chemicals, SF6 tanks, empty drums, old transformers, and/or hazardous wastes?					
Does the storage area have an impermeable floor?					
Is the storage area under cover?					
Is the storage area locked?					
Does the storage area have a spill containment bund of 110% capacity (see picture glossary at end of checklist for example)?					
Is the storage area drainage connected to sump to collect runoff?					
Are all storage barrels or tanks labelled with their contents and hazard warning signs?					
Are empty storage barrels or tanks sent to stores for onwards disposal?					Site or company level procedures for disposal:
Are redundant transformers sent to stores for onwards disposal?					Site or company level procedures for disposal:
Are used batteries sent to stores for onwards disposal?					Site or company level procedures for disposal:
Has there been any pest problem on site?					
Are any pest control measures undertaken on site?					Provide details of control measures and how often undertaken:
<i>B. Transformers and Oil Leakage</i>					
Is the power circuit breaker oil insulated?					
Are there any oil insulated transformers?					Provide copies transformer oil material data sheets:
Are there any oil filled capacitors?					

Do the transformers and capacitors have a label indicating contains PCB (polychlorinated biphenyl) or is PCB free? ¹¹					
Is any other evidence available on-site to confirm transformers and/or capacitors PCB free e.g. supplier certification, oil test results?					Provide copies of any documentary evidence:
Is it known when the transformer oil was last changed?					Confirm date:
Is a maintenance logbook kept on the premises?					Describe schedule of maintenance:
Are the transformers mounted on an impermeable platform extending beyond the footprint of the transformer?					
Does the transformer platform have a spill containment bund/sump of 110% capacity?					
Is there any evidence of oil leaking or having previously leaked from transformers or other equipment?					
Have any oil spills occurred at the substation in the past 5 years?					If yes, number and details of incidents:
Is there any spill equipment available on site (e.g. sand, cloths, or other absorbent material)?					
C. Escape of SF₆ (sulphur hexafluoride) and other greenhouse/hazardous gases					
Is there presence of SF ₆ at the substation?					
Is this a GIS?					
Is the power circuit breaker gas insulated?					
Is there gas insulated switchgear?					
Are there any gas insulated transformers?					
Are SF6 leakage detectors installed?					
Are portable SF6 leakage detectors available at the substation?					
Are records of SF6 use kept?					Provide indication of annual usage:
Are records of SF6 leakage kept?					
Have any SF6 leakages occurred at the substation in the past 5 years?					Provide indication annual leakage rate:
Is there a SF ₆ retrieval arrangement on-site?					

Is redundant equipment with SF6 sent to stores for onwards disposal?					Site or company level procedures for disposal of equipment containing SF6:
Are there presence of other hazardous gases within equipment or on the substation compound?					
<i>D. Noise, EMF, Lighting and Ventilation</i>					
Are there high levels of noise pollution at or around the site (e.g. traffic, etc.)					
Are there any warning signs noise levels may exceed >85dBA?					If yes, is ear protection available:
Is any transformer hum audible?					
Has noise monitoring been undertaken at the substations in last 5 years?					If yes, provide results if available:
Are there any sources of vibration?					
Are shielding equipment/materials installed to reduce EMF exposure?					
Has EMF monitoring been undertaken at the substations in last 5 years?					If yes, provide results if available:
Is adequate ventilation provided in control building?					
Are all vents free of blockages?					
Is heating and/or air conditioning available and adequate?					
Is adequate natural or artificial lighting provided in control building?					
Is adequate lighting provided in the substation compound at night?					
Are all lights in working order?					
Are there high level of air pollution at or around the site (e.g. dust, traffic, etc.)?					
Has air quality monitoring been undertaken at the substations in last 5 years?					If yes, provide results if available:
<i>E. First Aid Equipment</i>					
Is a first aid kit available on site?					Elaborate on contents:

Is the first aid kit well equipped?					
Is it clearly labelled where the first aid kit is stored?					
Is the first aid equipment within its expiry date?					
Do any staff on site have first aid training?					Confirm how many and the extent of training received:
Is one staff with first aid training present on the site at all times?					
Are there any posters showing first aid procedures especially for electrocution?					
F. Fire Safety Equipment					
Does the substation have any fire detectors and alarm?					Elaborate on equipment provided separately for yard and control room:
Are the alarm systems operational?					
Are any firewalls provided e.g. between transformers?					
Does the substation have automatic fire suppression systems connected to the alarm systems e.g. sprinklers?					Elaborate on system:
Is firefighting equipment present?					Elaborate on equipment provided separately for yard and control room, No. and type fire extinguishers No. of fire buckets filled with sand
Do fire extinguishers have an in-date service record?					
Is a record of fire alarm tests and fire drills available on site?					
Do any staff on site have fire training?					
Is one staff with fire training present on the site at all times?					
Are there any notices or posters describing procedures to be followed in the event of a fire?					
G. Community Health and Safety					
Is there a security fence and gates?					
Does the security fence have any gaps, permitting entry?					
Are the gates kept locked?					

Is 24/7 security guard present?					
Is the door to the control room kept locked?					
Are there written or graphic “danger of electrocution” signs posted on the fence/gates?					
Are there written or graphic “danger of electrocution” signs posted on electrical equipment?					
H. Handling Emergencies					
Is an emergency plan available (e.g. for fire, earthquake, flood, accidents, illness etc.)?					Provide copies of any documentary evidence:
Are any COVID-19 specific precautions being followed on-site?					
Are the staff trained on responding to emergency situations?					
Are emergency exits sign-posted and clear of blockages?					
Is the location and phone number of doctor and hospital posted in a clear location?					Distance to nearest doctor / clinic: Distance to nearest hospital able to treat electrocution accidents and other serious conditions:
Is there an emergency eye wash or shower?					
Is an accident logbook available on site?					Elaborate on incidents recorded:
Has the substation ever been subject to earthquakes?					Describe measures (if any) in place to improve disaster-resilience against earthquakes?
Has the substation ever been subject to flooding?					Describe measures (if any) in place to improve disaster-resilience against flooding?
Has the substation ever been subject to landslides / slope stability issues?					Describe measures (if any) in place to improve disaster-resilience against landslides / slope stability issues?
I. Health and Safety of Staff					
Is a health and safety policy available on site?					Note if one exists at organization level:
Is a health and safety risk assessment available on site?					Note if one exists at organization level:
Is a health and safety manual or procedure available on site?					Note if one exists at organization level:
Are there records of safety inspections, testing and calibration?					

Is there signage indicating to workers the hazards present?					
Is there adequate depth of gravel provided?					
Does the control building look structurally sound?					
Has an asbestos survey ever been undertaken at the substation?					
Is there any evidence of asbestos on site especially lagging and roofing materials?					
Did auditor receive an OHS site induction?					
Have staff on site received OHS training?					
Are training materials and equipment available on site?					
Is maintenance handled by staff on site?					
Is there a strict written procedure available for de-energizing before working on electrical equipment?					
Do external maintenance workers come in to undertake more advanced maintenance?					Clarify division of labour between on-site workers and other in-coming specialised NEA workers:
Are the staff working on operation and maintenance activities trained on working at heights?					
Are the staff working on operation and maintenance activities trained on working with electricity?					
Are medical checks of staff undertaken?					
Are staff informed of appropriate PPE for job e.g. via signage?					
Are staff on site wearing personal protective equipment (PPE)?					
Is there a store of PPE available on site ^[2] ?					List the types of PPE that are available:
Do staff avail of personal exposure monitoring equipment to warn of exceeding exposure levels to electromagnetic fields?					
J. Drainage					
Is there any standing water visible on site?					
Is a drainage system provided?					Identify where it connects to:

K. Sanitation and Welfare Facilities					
Is a toilet available on site?					Are there facilities for male and female?
Is the toilet clean?					
Is the toilet inside staff building or outside it?					
Does the toilet connect to existing municipal sewerage system?					
Does the toilet connect to septic tank?					
Is there also a soakaway for the septic tank overflows?					
Is there any sign on leakage/pollution from septic tank?					
Are handwashing facilities available?					
Is hot and cold water available?					
Is soap provided?					
Does the toilet have lock or vacant indicator?					
Is potable water available on site?					Elaborate on the source:
Is there any evidence of potable water meeting Drinking Water Standards?					Provide copies of any documentary evidence:
Are staff stationed at substation during on-shift hours (including security guards) ?					If so, how many? How long are staffs' shifts? How long are security guards' shifts?
Is there an undercover rest area available?					
Is a food preparation and clean eating area available?					Is the area free from any contamination from work processes?
Is cooking fuel used on site?					Describe fuel(s) used:
Are staff staying at the substation overnight (out of hours) and how many (including security guards)?					
Is there a dedicated accommodation area for staff?					Describe worker accommodation and facilities provided e.g. is it clean, does it protect from wind, rain and sun; does it have a bed; heating; air conditioning etc.?
Is a TV/Radio/Internet connection available for staff?					

Is there a dedicated shelter for any security guards?				Describe shelter e.g. is it clean, does it protect from wind, rain and sun; does it have a bed; heating; air conditioning; do the guards have access to the sanitation and cooking facilities within the compound etc.?
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Consultations on past/present concerns (also inform them of the intended works)	Name/Address	Position/Occupation	Concerns/Issues
Occupants of buildings within 50m:			
Management of community facilities (schools, health center etc.) within 50m:			

Undertaken by:

name/designation/signature

Date: __/__/__

^[1] PCBs are persistent organic pollutants, meaning they are resistant to environmental degradation through time and may remain indefinitely present in the environment.

^[2] E.g., hard hats, safety glasses, steel-toed boots, rated dielectric footwear, insulated gloves, insulated tools, electrical insulation blankets, live-line tools/hot sticks, respiratory equipment etc.

Completed Sample Audit Checklist: Mandai Substation

Project Name: Mandai SS
 Project Location: Mandai Village
 EAMA: 35502
 Date of Audit: 18/8/21

HS&GIS
 SFG CB defective damaged

Mr. Subisako Antoon
 Gen. Mgr
 Tel: 96122 85702

Environmental Audit Checklist for Existing Substations

Substation Name:	Mandai 33kV SS
Year of establishment:	2011
Type of Substation (GIS/AIS):	Oil SW bus, CR-01
Voltage:	33kV
No. incomers and voltage:	
No. outgoers and voltage:	33kV
Grid Reference:	11
Aerial map of substation:	132kV Jirama
Photo of substation compound:	
Photo of any control building and details of wall/roof materials:	
No. transformers with make/model, MVA, manufacturer name and dates of manufacture/installation with photo of rating plate:	01 Tr - 315MVA, ABB, 2007
Noise level at site entrance, indicative reading:	99 dBA
... level adjacent to transformer, indicative reading:	60 dBA
EMF level at site entrance, indicative reading:	45 mV
EMF level adjacent to transformer, indicative reading:	55 mV
Outside temperature, indicative reading:	31°C
Area of substation, and layout map (area in use and available for expansion):	2000m ² (65% covered)
Photo of vehicle entrance:	Not paved
Is it off a paved road?	
Topography - flat land, sloped, or steep terrain:	70m off
Previous land use (if known):	port land
Describe the land uses within 500m (supported with photos):	Stores, Demos and Service Office, PHOENIX, 2 Accidents & Street front / (Public / Market and

1m Circ broken down
 & SFG
 ↓
 broken
 away
 high
 ↓
 Caput to
 replace
 ↓
 leakage
 found

Level Num - Audition for 90m away

PHOENIX - Road 2
 broken
 down

Confirm presence or absence of agricultural land-cultivated or uncultivated, protected or environmentally sensitive areas, community or protected forest, water bodies, religious or ancestral cultural resources (e.g. temples, shrines, sacred trees)?	None.
Nearest protected or key biodiversity area (distance in m)?	Borsamuri RF (10km)
Have endangered species been encountered in the vicinity (elephant, tiger, etc.)?	Nil.
No. buildings within 50m and no. inhabitants:	07 houses buildings (10inhab) (NO/DAS of 25-30)
Nearest individual residence (name and distance in m, mark on aerial map if possible):	Soota community Nash Bandy (0Km) Rajen Debban
Nearest habitation (name and distance in m, mark on aerial map if possible):	Bikhetkum (500m)
No. community facilities (schools, health centre etc.) within 50m with estimated no. of visitors (mark on aerial map if possible):	Nil.
Nearest surface water (distance in m, mark on aerial map if possible):	Stream (Guramara Cross) 1km
No. groundwater wells/pumps/springs within 50m (mark on aerial map if possible):	Nil.
Total staff at substation (technical and non-technical):	Tech: 05
No. men / no. women:	NT: 00 Female: 0

Audit Checks:	F	P	N	N/A	Remarks (date, photos, description)
A. Housekeeping / Waste Management:					
Is an environment policy available on site?			✓	NO	Note if one exits at organization level.
Is a pollution prevention manual or procedure available on-site covering hazardous materials management, oil storage etc?			✓	NO	Note if one exits at organization level.
Is a waste management manual or procedure available on-site covering both solid and hazardous waste storage and disposal?			✓	NO	Note if one exits at organization level.
Is there vegetation (grass, trees, shrubs) on site?				Shrub	Provide details of vegetation and how it

Audit Checks:	F	P	N	N/A	Remarks
			✓		is managed, note if trees will need to be cut if further development in compound:
Is the substation kept neat and tidy with no discarded wastes?			✓	NO	
Are there any trip hazards on the ground e.g. open channels, materials, equipment, trash lying around?			✓	YES	Open Cables, Debris, Trash, Cables etc, Broken rocks
Are there any other features that could post a danger e.g. broken or loose tiles?			✓	YES	Broken tiles / wooden plank
Is there any general waste storage and/or disposal on-site?			✓	NO	Provide details of types of waste stored and how disposed of?
Is solid waste segregated into recycling and waste for disposal?			✓	NO	
Is there a dedicated, labelled storage area for solid waste?			✓	NO	
Does the storage area have an impermeable floor?			✓	NO	
Is the storage area under cover?			✓	NO	
Do garbage bins have lids?			✓	NO	
Are garbage bins enclosed to contain leachates?			✓	NO	
Is any waste burning on site – open burning or incineration?	✓			NO	
Is any composting taking place on-site?			✓	NO	
Is end of life or unused equipment being stored on site?			✓	YES	Defunct CB (SF6 type)
Is there a dedicated, labelled storage area for this equipment?			✓	NO	
Are supplies of fuel, oil, chemicals, SF6 tanks being stored on site?			✓	NO	Oil
Are material data sheets for the fuels, oil or chemicals deployed?			✓	NO	
Are there empty drums, old transformers or used batteries on site?			✓	YES	
Are there any hazardous wastes (solid/liquid/gas) being stored and/or disposed of?			✓	YES	How are any hazardous wastes (solid/liquid/gas) being stored and disposed of? SF6 - CB clamp oil drums
Is there a dedicated, labelled storage area for fuels, oils, and chemicals, SF6 tanks, empty drums, old transformers, and/or hazardous wastes?			✓	NO	
Does the storage area have an impermeable floor?			✓	NO	
Is the storage area under cover?			✓	NO	
Is the storage area locked?			✓	NO	
Does the storage area have a spill containment bund of			✓	NO	

Damaged, leaking, Rusting, Open.

SF6 - CB clamp oil drums

For end of life equip - kept at site 3
 If any oil SS require -> through HD saw to them

Audit Checks	F	P	N	N/A	Remarks (attach photos by support functions)
110% capacity (see picture glossary at end of checklist for example)?			✓	NO	Revised Circuit Platform
Is the storage area drainage connected to pump to collect runoff?			✓	NO	
Are all storage barrels or tanks labeled with their contents and hazard warning signs?			✓	NO	
Are empty storage barrels or tanks sent to stores for onwards disposal?			✓	NO	Site or company level procedures for disposal: Store at Bally
Are redundant transformers sent to stores for onwards disposal?			✓	NO	Site or company level procedures for disposal: - in site
Are used batteries sent to stores for onwards disposal?		✓		Yes	Site or company level procedures for disposal: Kaelgen
Has there been any pest problem on site?	✓			Yes	Must get
Are any pest control measures undertaken on site?		✓		Yes	Provide details of control measures and how often undertaken: keepy Cit-Chamish
B. Transformers and Oil Leakage					
Is the power circuit breaker oil insulated?					Yes - Use Oil Containment (OCS)
Are there any oil insulated transformers?				Yes	Provide copies transformer oil material data sheets:
Are there any oil filled capacitors?				NO	
Do the transformers and capacitors have a label indicating contains PCB (polychlorinated biphenyl) or is PCB free?				NO	
Is any other evidence available on-site to confirm transformers and/or capacitors PCB free e.g. supplier certification, oil test results?				NO	Provide copies of any documentary evidence:
Is it known when the transformer oil was last changed?		Not kept		NO	Confirm date:
Is a maintenance logbook kept on the premises?		✓		NO	Describe schedule of maintenance:
Are the transformers mounted on an impermeable platform extending beyond the footprint of the transformer?		✓		Yes	Mounted on elastic platform in no footprint value
Does the transformer platform have a spill containment bund/sump of 110% capacity?				NO	
Is there any evidence of oil leaking or having previously leaked			Yes	Yes	

(Smoking Chamber)



* PCBs are persistent organic pollutants, meaning they are resistant to environmental degradation through time and may remain indefinitely present in the environment.

Final Checks	F	P	N	N/A	Remarks (attach photos to support findings)
from transformers or other equipment?					
Have any oil spills occurred at the substation in the past 5 years?			✓	✓	If yes, number and details of incidents:
Is there any spill equipment available on site (e.g. sand, cloths, or other absorbent material)?		✓		✓	Sand (not sufficient)
C. Escape of SF₆ (sulphur hexafluoride) and other greenhouse/hazardous gases					
Is there presence of SF ₆ at the substation?			✓	✓	Yes
Is this a GIS?			✓	✓	Yes
Is the power circuit breaker gas insulated?			✓	✓	Yes
Is there gas insulated switchgear?			✓	✓	NO
Are there any gas insulated transformers?			✓	✓	NO
Are SF ₆ leakage detectors installed?			✓	✓	NO
Are portable SF ₆ leakage detectors available at the substation?			✓	✓	NO
Are records of SF ₆ use kept?			✓	✓	NO Provide indication of annual usage:
Are records of SF ₆ leakage kept?			✓	✓	NO Provide indication annual leakage rate: Not known
Have any SF ₆ leakages occurred at the substation in the past 5 years?			✓	✓	NO
Is there a SF ₆ retrieval arrangement on-site?			✓	✓	NO
Is redundant equipment with SF ₆ sent to stores for onward disposal?			✓	✓	NO Site or company level procedures for disposal of equipment containing SF ₆ :
Are there presence of other hazardous gases within equipment or on the substation compound?	NO				
D. Noise, EMI, Lighting and Ventilation					
Are there high levels of noise pollution at or around the site (e.g. traffic, etc.)	NO		✓	✓	NO
Are there any warning signs noise levels may exceed >85dBA?			✓	✓	NO If yes, is ear protection available:
Is any transformer hum audible?	✓				NO
Has noise monitoring been undertaken at the substations in last 5 years?			✓	✓	NO If yes, provide results if available:
Are there any sources of vibration?	✓				NO
Are shielding equipment/materials installed to reduce EMF exposure?			✓	✓	NO
Has EMF monitoring been undertaken at the substations in last 5 years?			✓	✓	NO If yes, provide results if available:
Is adequate ventilation provided in control building?			✓	✓	NO

Small hole in the high pressure tank

Likely from open defect on site

Kept in store

tested multiple times

Not usable

Problem with in SY

Audit checks:	F	P	N	N/A	Remarks (attach photos to support findings)
Are all vents free of blockages?	Yes				
Is heating and/or air conditioning available and adequate?				NO	
Is adequate natural or artificial lighting provided in control building?				NO	
Is adequate lighting provided in the substation compound at night?				NO	Not adequate
Are all lights in working order?				NO	70% working
Are there high level of air pollution at or around the site (e.g. dust, traffic, etc.)?	NO				
Has air quality monitoring been undertaken at the substations in last 5 years?				NO	If yes, provide results if available:
E. First Aid Equipment					
Is a first aid kit available on site?				NO	Elaborate on contents:
Is the first aid kit well equipped?				NO	
Is it clearly labelled where the first aid kit is stored?				NO	
Is the first aid equipment within its expiry date?				NO	
Do any staff on site have first aid training?				NO	Confirm how many and the extent of training received:
Is one staff with first aid training present on the site at all times?				NO	
Are there any posters showing first aid procedures especially for electrocution?				NO	
F. Fire Safety Equipment					
Does the substation have any fire detectors and alarm?				NO	Elaborate on equipment provided separately for yard and control room:
Are the alarm systems operational?				NO	
Are any firewalls provided e.g. between transformers?				NO	
Does the substation have automatic fire suppression systems connected to the alarm systems e.g. sprinklers?				NO	Elaborate on system:
Is firefighting equipment present?				Yes	Elaborate on equipment provided separately for yard and control room, No. and type fire extinguishers - 02 (portable) No. of fire buckets filled with sand - 03
Do fire extinguishers have an in-date service record?	Yes			Yes	Exp 12/20
Is a record of fire alarm tests and fire drills available on site?				NO	

Audit Checks:	F	P	N	N/A	Remarks (attach photos to support findings)
Do any staff on site have fire training?			✓	NO	
Is one staff with fire training present on the site at all times?			✓	NO	
Are there any notices or posters describing procedures to be followed in the event of a fire?			✓	NO	
G. Community Health and Safety					
Is there a security fence and gates?	✓	✓			only fence - gate open during
Does the security fence have any gaps, permitting entry?		✓	✓		one section / broken
Are the gates kept locked?			✓		NO
Is 24/7 security guard present?			✓	NO	
Is the door to the control room kept locked?			✓	NO	
Are there written or graphic "danger of electrocution" signs posted on the fence/gates?			✓	NO	
Are there written or graphic "danger of electrocution" signs posted on electrical equipment?			✓	NO	
H. Handling Emergencies					
Is an emergency plan available (e.g. for fire, earthquake, flood, accidents, illness etc.)?			✓	NO	Provide copies of any documentary evidence:
Are any COVID-19 specific precautions being followed on-site?			✓	NO	
Are the staff trained on responding to emergency situations?			✓	NO	
Are emergency exits sign-posted and clear of blockages?			✓	NO	
Is the location and phone number of doctor and hospital posted in a clear location?			✓	NO	Distance to nearest doctor / clinic: — Distance to nearest hospital able to treat electrocution accidents and other serious conditions: —
Is there an emergency eye wash or shower?			✓	NO	
Is an accident logbook available on site?			✓	NO	Elaborate on incidents recorded: —
Has the substation ever been subject to earthquakes?	✓			NO	Describe measures (if any) in place to improve disaster-resilience against earthquakes?
Has the substation ever been subject to flooding?	✓			NO	Describe measures (if any) in place to improve disaster-resilience against flooding?
Has the substation ever been subject to landslides / slope stability issues?	✓			NO	Describe measures (if any) in place to improve disaster-resilience against

only fence - gate open during one section / broken

NO
Nearest PHE
12km

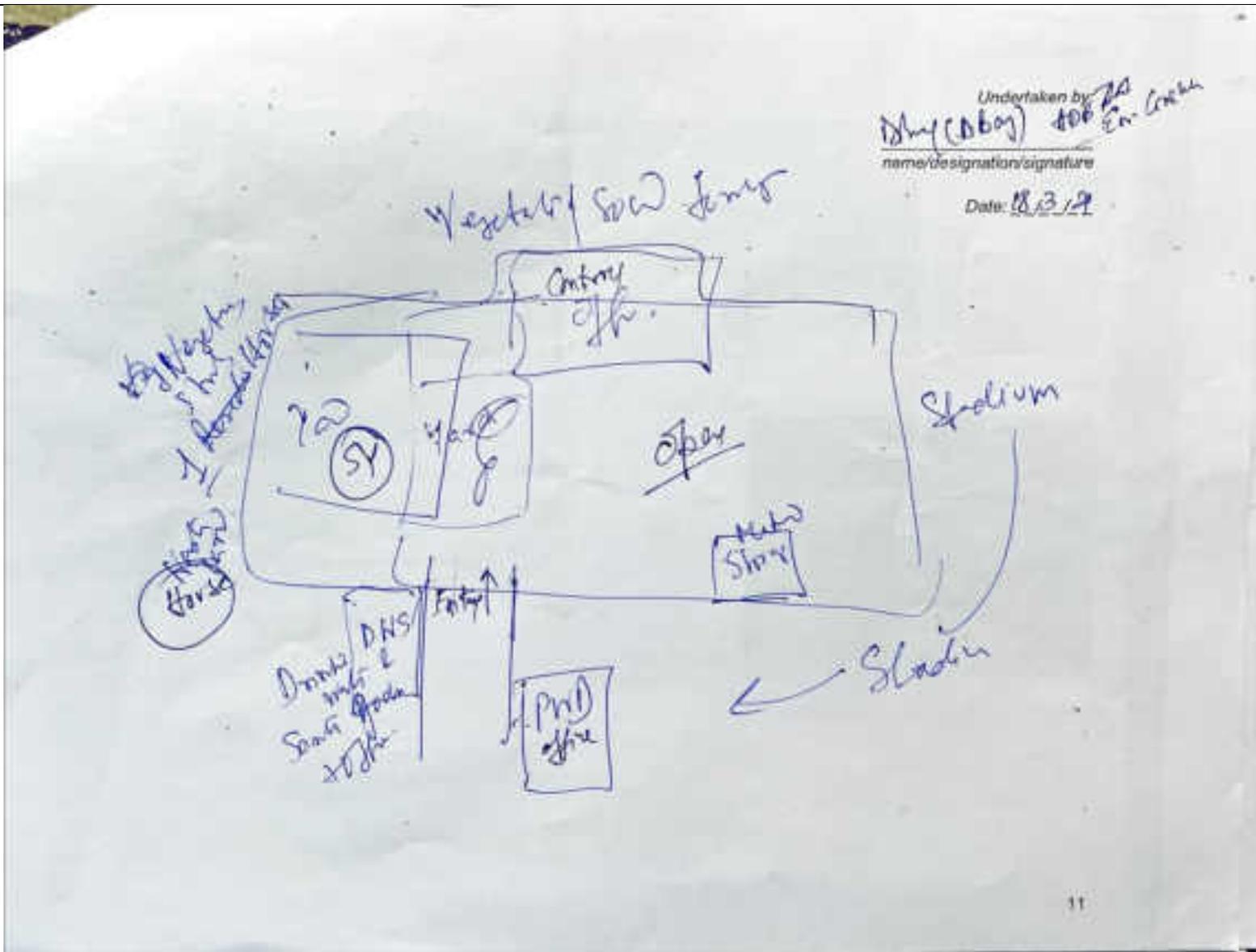
Audit Checks	F	P	N	N/A	Remarks (attach photos to support findings)
					landslides / slope stability issues?
I. Health and Safety of Staff:					
Is a health and safety policy available on site?			✓	NO	Note if one exists at organization level.
Is a health and safety risk assessment available on site?			✓	NO	Note if one exists at organization level.
Is a health and safety manual or procedure available on site?			✓	NO	Note if one exists at organization level.
Are there records of safety inspections, testing and calibration?			✓	NO	
Is there signage indicating to workers the hazards present?			✓	NO	
Is there adequate depth of gravel provided?			✓	NO	
Does the control building look structurally sound?	✓		✓	NO	
Has an asbestos survey ever been undertaken at the substation?			✓	NO	
Is there any evidence of asbestos on site especially lagging and roofing materials?	✓		✓	NO	
Did auditor receive an OHS site induction?			✓	NO	
Have staff on site received OHS training?			✓	NO	
Are training materials and equipment available on site?			✓	NO	
Is maintenance handled by staff on site?			✓	NO	
Is there a strict written procedure available for de-energizing before working on electrical equipment?			✓	NO	
Do external maintenance workers come in to undertake more advanced maintenance?			✓	NO	Clarify division of labour between on-site workers and other in-coming specialised NEA workers. <i>DBCC Drain team</i>
Are the staff working on operation and maintenance activities trained on working at heights?			✓	NO	
Are the staff working on operation and maintenance activities trained on working with electricity?			✓	NO	
Are medical checks of staff undertaken?			✓	NO	
Are staff informed of appropriate PPE for job e.g. via signage?			✓	NO	
Are staff on site wearing personal protective equipment (PPE)?			✓	NO	
Is there a store of PPE available on site?			✓	NO	List the types of PPE that are available: <i>hard hat, gloves.</i>
Do staff avail of personal exposure monitoring equipment to warn			✓	NO	

² E.g. hard hats, safety glasses steel-toed boots, rated dielectric footwear, insulated gloves, insulated tools, electrical insulation blankets, live-line tools/hot sticks, respiratory equipment etc.

Audit Checks:	I	P	N	N/A	Remarks (attach photos to support findings)
of exceeding exposure levels to electromagnetic fields?					
J. Drainage					
Is there any standing water visible on site?	✓			NO	
Is a drainage system provided?				✓ YES	Identify where it connects to <i>outside open</i>
K. Sanitation and Welfare Facilities:					
Is a toilet available on site?	✓			✓ YES	Are there facilities for male and female?
Is the toilet clean?	✓			✓ NO	
Is the toilet inside staff building or outside it?	✓			✓ NO	<i>Inside</i>
Does the toilet connect to existing municipal sewerage system?				✓ NO	
Does the toilet connect to septic tank?	✓			✓ YES	
Is there also a soakaway for the septic tank overflows?				✓ NO	
Is there any sign on leakage/pollution from septic tank?				✓ NO	
Are handwashing facilities available?	✓			✓ YES	
Is hot and cold water available?				✓ YES	
Is soap provided?	✓			✓ YES	
Does the toilet have lock or vacant indicator?				✓ NO	<i>lock</i>
Is potable water available on site?	✓			✓ YES	Elaborate on the source: <i>Supply</i>
Is there any evidence of potable water meeting Drinking Water Standards?				✓ NO	Provide copies of any documentary evidence:
Are staff stationed at substation during on-shift hours (including security guards) ?				✓ YES	If so, how many? <i>03 Staff</i> How long are staffs' shifts? <i>8hr</i> How long are security guards' shifts? <i>NA</i>
Is there an undercover rest area available?				✓ NO	
Is a food preparation and clean eating area available?				✓ NO	Is the area free from any contamination from work processes?
Is cooking fuel used on site?	✓			✓ YES	Describe fuel(s) used
Are staff staying at the substation overnight (out of hours) and how many (including security guards)?				✓ YES	<i>08hr x 2(1)</i>
Is there a dedicated accommodation area for staff?				✓ NO	Describe worker accommodation and facilities provided e.g. is it clean, does it protect from wind, rain and sun; does it have a bed; heating; air conditioning etc.?

Audit Checks:	F	P	N	N/A	Remarks (attach photos to support findings)
Is a TV/Radio/Internet connection available for staff?			✓	No	
Is there a dedicated shelter for any security guards?			✓	No	Describe shelter e.g. is it clean, does it protect from wind, rain and sun; does it have a bed; heating; air conditioning; do the guards have access to the sanitation and cooking facilities within the compound etc.?

Consultations on past/present concerns (also inform them of the intended works)	Name/Address	Position/Occupation	Concerns/Issues
Occupants of buildings within 50m:	Rayon Des Ham Okra	Business	Not involved
Disobey & Santa Office			
Pro-Kad & Kwa-M			
Studio			
02 Residents			
Management of community facilities (schools, health centre etc.) within 50m:	Yedim Okra		



Completed Sample Audit Checklist:

Project Name:
 Project Location: Malagarh St
 EASA:
 Date of Audit: 16th March 2021

ENVIRONMENTAL NOISE & VIBRATION
 Govt 38.20(d)
 Office 32.3(d)(b)
 Transfer 52.5(d)(a)

GMP
 41 MT
 42 MT
 56 MT

Environmental Audit Checklist for Existing Substations

Substation Name:	33/11 kV Malagarh St
Year of establishment:	2003
Type of Substation (GIS/AIS):	AIS
Village:	33/11 KV
No. incomers and voltage:	33KV - 2, 11KV - 2
No. outgoers and voltage:	11KV - 5, 33KV - 1 (Rail Factor)
Grid Reference:	23° 30' 2" N, 91° 30' 37" E
Actual map of substation:	
Photo of substation compound:	
Photo of any control building and details of watertight materials:	
No. transformers with make/model, MVA, manufacturer name and date of manufacture/installation with photo of rating plate:	2 transformer - Kirloskar 3.15 MVA (1998) Bharat Bijali - 7.5 MVA (2022)
Noise level at site entrance, indicative reading:	38 dB(A)
Noise level adjacent to transformer, indicative reading:	52.5 dB(A)
OSPL level at site entrance, indicative reading:	41 MT
OSPL level adjacent to transformer, indicative reading:	66 MT
Outside temperature, indicative reading:	31°C
Area of substation, and layout map (area in use and available for expansion):	4000 ft ²
Photo of vehicle entrance:	
Is it off a paved road?	
Topography - flat land, sloped, or steep terrain:	Flat
Previous land use (if known):	Revenue Khas Land (Barren) Govt. Land
Describe the land uses within 500m (supported with photos):	Road, Residential

District
 Magadar
 Sr. Mg, Inam
 9434 139211
 Substation
 Malagarh
 Govt, Inam

* Found in SS

Confirm presence or absence of agricultural land-cultivated or uncultivated, protected or environmentally sensitive areas, community or protected forest, water bodies, religious or ancestral cultural resources (e.g. temples, shrines, sacred trees)?	ponds - 500m approx 2-3 Temple ksh - 3-5 km (Biswanath) Neesmahal - 4 km (1 km) !! Goruti River - 3 km	Rubber plantations - 200 m Forest - 1 km Jhankarpur RD 1 km
Nearest protected or key biodiversity area (distance in m)?	Neesmahal - 4 km	Shakurpur
Have endangered species been encountered in the vicinity (elephant, tiger, etc.)?	Fox, Leopard cat (<i>Felis bengalensis</i>) NCH, LC, <u>Arundinaceae</u> <u>Stenotaphrum</u> <u>the state</u> Red necked Kestrel <u>Tad snake (Ptyas kates)</u> <u>P. asson</u> <u>not from</u>	
No. buildings within 50m and no. inhabitants:	20 houses approx 100 people	Stripped Hornbill
Nearest individual residence (name and distance in m, mark on aerial map if possible):	Riponkhor Adhral - 20m 985677507	
Nearest habitation (name and distance in m, mark on aerial map if possible):	Chandigarh village	
No. community facilities (schools, health centre etc.) within 50m with estimated no. of visitors (mark on aerial map if possible):	NCH - BSMC - office - 20m	
Nearest surface water (distance in m, mark on aerial map if possible):	Gyandh River - 3km Neesmahal - 4 km	
No. groundwater wells/pumps/springs within 50m (mark on aerial map if possible):	- 1 well, 10 mini bore wells	
Total staff at substation (technical and non-technical):	8, Tech - 3, S'nt (helper)	
No. men / no. women:	all male.	

Audit Checks:	F	P	N	N/A	Remarks (attach photos to walkout forms)
A. Housekeeping / Waste Management					
Is an environment policy available on site?			✓		Note if one exists at organization level
Is a pollution prevention manual or procedure available on-site covering hazardous materials management, oil storage etc?			✓		Note if one exists at organization level
Is a waste management manual or procedure available on-site covering both solid and hazardous waste storage and disposal?			✓		Note if one exists at organization level
Is there vegetation (grass, trees, shrubs) on site?	✓				Provide details of vegetation and how

Vegetation covered, topsoil large grasses, grasses etc.
Eupatorium odoratum

2

Health Checks:	F	P	N	N/A	Remarks (attach photos to support findings)
					is managed, note if trees will need to be cut if further development in compound?
Is the substation kept neat and tidy with no discarded wastes?			✓		
Are there any trip hazards on the ground e.g. open channels, materials, equipment, trash lying around?	✓		✓		
Are there any other features that could pose a danger e.g. broken or loose tiles?	✓				
Is there any general waste storage and/or disposal on-site?	✓				Provide details of types of waste stored and how disposed of?
Is solid waste segregated into recycling and waste for disposal?			✓		
Is there a dedicated, labelled storage area for solid waste?			✓		
Does the storage area have an impermeable floor?				✓	
Is the storage area under cover?				✓	
Do garbage bins have lids?				✓	
Are garbage bins enclosed to contain leachates?				✓	
Is any waste burning on site – open burning or incineration?	✓				
Is any composting taking place on-site?			✓		
Is end of life or unused equipment being stored on site?	✓				
Is there a dedicated, labelled storage area for this equipment?			✓		
Are supplies of fuel, oil, chemicals, SF6 tanks being stored on site?	✓				
Are material data sheets for the fuels, oil or chemicals displayed?			✓		
Are there empty drums, old transformers or used batteries on site?	✓				
Are there any hazardous wastes (solid/liquid/gas) being stored and/or disposed of?	✓				How are any hazardous wastes (solid/liquid/gas) being stored and disposed of?
Is there a dedicated, labelled storage area for fuels, oils, and chemicals, SF6 tanks, empty drums, old transformers, and/or hazardous wastes?			✓		
Does the storage area have an impermeable floor?				✓	
Is the storage area under cover?				✓	
Is the storage area locked?				✓	
Does the storage area have a spill containment bund of				✓	

Audit Checks:	F	P	N	N/A	Remarks
110% capacity (see picture glossary at end of checklist for example)?					attach photos as support for audit
Is the storage area drainage connected to sump to collect runoff?				/	
Are all storage barrels or tanks labelled with their contents and hazard warning signs?			/		
Are empty storage barrels or tanks sent to stores for onwards disposal?			/		Site or company level procedures for disposal
Are redundant transformers sent to stores for onwards disposal?			/		Site or company level procedures for disposal
Are used batteries sent to stores for onwards disposal?			/		Site or company level procedures for disposal
Has there been any pest problem on site?	✓				Rats & snakes
Are any pest control measures undertaken on site?			✓		Provide details of control measures and how often undertaken.
B. Transformers and Oil Leakage					
Is the power circuit breaker oil insulated?	✓				
Are there any oil insulated transformers?	✓				Provide copies transformer oil material data sheets: N/A available
Are there any oil filled capacitors?					No capacitors
Do the transformers and capacitors have a label indicating contains PCB (polychlorinated biphenyl) or is PCB free?			✓		
Is any other evidence available on-site to confirm transformers and/or capacitors PCB free e.g. supplier certification, oil test results?			✓		Provide copies of any documentary evidence: oil test done in sept 2010 - not very
Is it known when the transformer oil was last changed?	✓				Confirm date: top up Oct 2010
Is a maintenance logbook kept on the premises?		✓			Describe schedule of maintenance
Are the transformers mounted on an impervious platform extending beyond the footprint of the transformer?			✓		
Does the transformer platform have a spill containment bund/sump of 110% capacity?			✓		
Is there any evidence of oil leaking or having previously leaked?	✓				

¹ PCBs are persistent organic pollutants, meaning they are resistant to environmental degradation through time and may remain indefinitely present in the environment.

Check	F	P	N	N/A	Remarks (attach photos to support findings)
Are there transformers or other equipment?					
Have any oil spills occurred at the substation in the past 5 years?	✓				If yes, number and details of incidents: 2-3 times
Is there any spill equipment available on site (e.g. sand, cloths, or other absorbent material)?			✓		
C. Escape of SF₆ (sulphur hexafluoride) and other greenhouse/hazardous gases					
Is there presence of SF ₆ at the substation?			✓		
Is this a GIS?			✓		At 5
Is the power circuit breaker gas insulated?			✓		
Is there gas insulated switchgear?			✓		
Are there any gas insulated transformers?			✓		
Are SF ₆ leakage detectors installed?				✓	
Are portable SF ₆ leakage detectors available at the substation?				✓	
Are records of SF ₆ use kept?				✓	Provide indication of annual usage:
Are records of SF ₆ leakage kept?				✓	
Have any SF ₆ leakages occurred at the substation in the past 5 years?				✓	Provide indication annual leakage rate:
Is there a SF ₆ retrieval arrangement on-site?				✓	
Is redundant equipment with SF ₆ sent to stores for onwards disposal?				✓	Site or company level procedures for disposal of equipment containing SF ₆ .
Are there presence of other hazardous gases within equipment or on the substation compound?				✓	
D. Noise, EMF, Lighting and Ventilation					
Are there high levels of noise pollution at or around the site (e.g. traffic, etc.)	✓				
Are there any warning signs noise levels may exceed >65dBSA?			✓		If yes, is ear protection available:
Is any transformer hum audible?	✓				
Has noise monitoring been undertaken at the substations in last 5 years?			✓		If yes, provide results if available:
Are there any sources of vibration?	✓				
Are shielding equipment/materials installed to reduce EMF exposure?			✓		
Has EMF monitoring been undertaken at the substations in last 5 years?			✓		If yes, provide results if available:
Is adequate ventilation provided in control building?	✓		✓		

Audit Checks:	Y	P	N	N/A	Remarks (attach photos to support findings)
Are all vents free of blockages?	✓				
Is heating and/or air conditioning available and adequate?	✓				
Is adequate natural or artificial lighting provided in control building?	✓				
Is adequate lighting provided in the substation compound at night?	✓				
Are all lights in working order?				✓	2 out of 6 working
Are there high level of air pollution at or around the site (e.g. dust, traffic, etc.)?				✓	
Has air quality monitoring been undertaken at the substation in last 5 years?				✓	If yes, provide results if available.
E: First Aid Equipment					
Is a first aid kit available on site?			✓	✓	Elaborate on contents:
Is the first aid kit well equipped?				✓	
Is it clearly labelled where the first aid kit is stored?				✓	
Is the first aid equipment within its expiry date?				✓	
Do any staff on site have first aid training?			✓		Confirm how many and the extent of training received.
Is one staff with first aid training present on the site at all times?				✓	
Are there any posters showing first aid procedures especially for electrocution?			✓		
F: Fire Safety Equipment					
Does the substation have any fire detectors and alarm?			✓		Elaborate on equipment provided separately for yard and control room.
Are the alarm systems operational?			✓	✓	
Are any firewalls provided e.g. between transformers?			✓		
Does the substation have automatic fire suppression systems connected to the alarm systems e.g. sprinklers?			✓		Elaborate on system:
Is firefighting equipment present?	✓				Elaborate on equipment provided separately for yard and control room. No. and type fire extinguishers - 2 CO2 No. of fire buckets filled with sand - 1 not rechecked
Do fire extinguishers have an in-date service record?				✓	
Is a record of fire alarm tests and fire drills available on site?				✓	

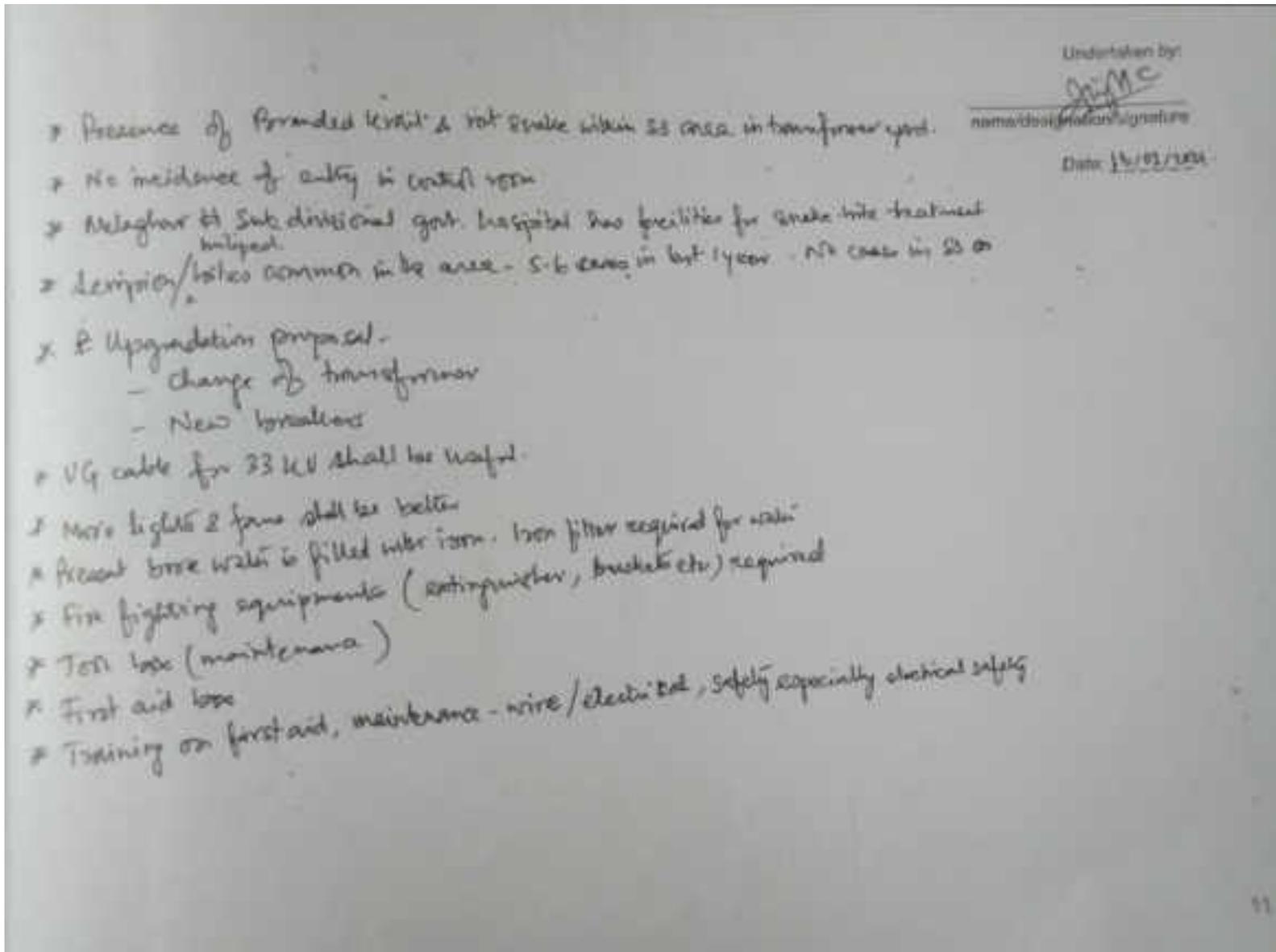
Audit Checks:	F	P	N	N/A	Remarks
Do any staff on site have fire training?			✓		Attach photos to support findings
Is one staff with fire training present on the site at all times?				✓	
Are there any notices or posters describing procedures to be followed in the event of a fire?			✓		
G. Community Health and Safety					
Is there a security fence and gates?	✓				
Does the security fence have any gaps, permitting entry?			✓		
Are the gates kept locked?	✓				
Is 24/7 security guard present?			✓		
Is the door to the control room kept locked?		✓	✓		
Are there written or graphic "danger of electrocution" signs posted on the fence/gates?			✓		
Are there written or graphic "danger of electrocution" signs posted on electrical equipment?			✓		
H. Handling Emergencies					
Is an emergency plan available (e.g. for fire, earthquake, flood, accidents, illness etc.)?			✓		Provide copies of any documentary evidence:
Are any COVID-19 specific precautions being followed on-site?			✓		None
Are the staff trained on responding to emergency situations?			✓		
Are emergency exits sign-posted and clear of blockages?			✓		
Is the location and phone number of doctor and hospital posted in a clear location?			✓		Distance to nearest doctor / clinic: Distance to nearest hospital able to treat electrocution accidents and other serious conditions:
Is there an emergency eye wash or shower?			✓		Elaborate on incidents recorded:
Is an accident logbook available on site?			✓		
Has the substation ever been subject to earthquakes?	✓				Describe measures (if any) in place to improve disaster-resilience against earthquakes? none
Has the substation ever been subject to flooding?			✓		Describe measures (if any) in place to improve disaster-resilience against flooding?
Has the substation ever been subject to landslides / slope stability issues?			✓		Describe measures (if any) in place to improve disaster-resilience against

Audit Checks	F	P	N	N/A	Remarks (attach photos to support findings)
					bertholes / slope stability issues?
L Health and Safety of Staff					
Is a health and safety policy available on site?			✓		Note if one exists at organization level
Is a health and safety risk assessment available on site?			✓		Note if one exists at organization level
Is a health and safety manual or procedure available on site?			✓		Note if one exists at organization level
Are there records of safety inspections, testing and calibration?			✓		
Is there signage indicating to workers the hazards present?			✓		
Is there adequate depth of gravel provided?			✓		
Does the control building look structurally sound?	✓				
Has an asbestos survey ever been undertaken at the substation?				✓	
Is there any evidence of asbestos on site especially lagging and roofing materials?			✓	✓	
Did auditors receive an OHS site induction?			✓		
Have staff on site received OHS training?			✓		
Are training materials and equipment available on site?	✓				
Is maintenance handled by staff on site?			✓		
Is there a strict written procedure available for de-energizing cables working on electrical equipment?			✓		
Do external maintenance workers come in to undertake more advanced maintenance?	✓				Clarify division of labour between on-site workers and other in-coming specialised NEA workers. <i>From Appendix 1, No division of labour</i>
Are the staff working on operation and maintenance activities trained on working at heights?	✓				
Are the staff working on operation and maintenance activities trained on working with electricity?	✓				
Are medical checks of staff undertaken?			✓		
Are staff informed of appropriate PPE for job e.g. via signage?			✓		
Are staff on site wearing personal protective equipment (PPE)?		✓			List the types of PPE that are available:
Is there a store of PPE available on site?			✓		
Do staff avail of personal exposure monitoring equipment to warn					

² E.g. hard hats, safety glasses, steel-toed boots, rated dielectric footwear, insulated gloves, insulated tools, electrical insulation blankets, live-line tools/hot sticks, respiratory equipment etc.

list of PPE, drawings

Audit Checks:	F	P	N	N/A	Remarks
of recording exposure levels to electromagnetic fields?					Contact person to support findings
J. Drainage					
Is there any standing water visible on site?			✓		Identify where it connects to sewer pit head
Is a drainage system provided?	✓				
K. Sanitation and Welfare Facilities					
Is a toilet available on site?	✓				Are there facilities for male and female?
Is the toilet clean?			✓		Yes, do
Is the toilet inside staff building or outside it?	✓				
Does the toilet connect to existing municipal sewerage system?			✓		
Does the toilet connect to septic tank?	✓				
Is there also a soakaway for the septic tank overflows?	✓				
Is there any sign of leakage/pollution from septic tank?			✓		
Are handwashing facilities available?	✓				Only 1/2
Is hot and cold water available?			✓		
Is soap provided?	✓				
Does the toilet have lock or vacant indicator?	✓				Elaborate on the source: Parts well
Is potable water available on site?			✓		Provide copies of any documentary evidence:
Is there any evidence of potable water meeting Drinking Water Standards?					If so, how many? 5 (1 general is 2/2)
Are staff stationed at substation during on-shift hours (including security guards)?	✓				How long are staffs' shifts? 8 hours How long are security guards' shifts? -
Is there an undercover rest area available?			✓		Is the area free from any contamination from work processes?
Is a food preparation and clean eating area available?			✓		Describe fuel(s) used:
Is cooking fuel used on site?					2
Are staff staying at the substation overnight (out of hours) and how many (including security guards)?	✓				
Is there a dedicated accommodation area for staff?			✓		Describe worker accommodation and facilities provided e.g. is it clean, does it protect from wind, rain and sun; does it have a bed, heating, air conditioning etc.?



Source: ADB TA Consultant

APPENDIX 3: NATIONAL AND INTERNATIONAL ENVIRONMENTAL QUALITY STANDARDS AND GUIDELINES

NATIONAL ENVIRONMENTAL QUALITY STANDARDS AIR QUALITY STANDARDS

National Ambient Air Quality Standards

Pollutants	Time-weighted average	Concentration in Ambient Air		Methods of Measurement
		Industrial, Residential, Rural and Other Areas	Ecologically Sensitive Areas (notified by Central Government)	
Particulate Matter (size less than 10 μm) or PM_{10} $\mu\text{g}/\text{m}^3$	Annual*	60	60	<ul style="list-style-type: none"> • Gravimetric • Tapered Element Oscillating Microbalances (TOEM) • Beta attenuation
	24 hours**	100	100	
Particulate Matter (size less than 2.5 μm) or $\text{PM}_{2.5}$ $\mu\text{g}/\text{m}^3$	Annual*	40	40	<ul style="list-style-type: none"> • Gravimetric • TOEM • Beta attenuation
	24 hours**	60	60	
Sulphur Dioxide (SO_2) $\mu\text{g}/\text{m}^3$	Annual*	50	20	<ul style="list-style-type: none"> • Improved West and Gaeke • Ultraviolet fluorescence
	24 hours**	80	80	
Nitrogen Dioxide (NO_2) $\mu\text{g}/\text{m}^3$	Annual*	40	30	<ul style="list-style-type: none"> • Modified Jacob and Hochheiser (Na-Arsenite) • Chemilumiscence
	24 hours**	80	80	
Carbon Monoxide (CO) (mg/m^3)	8 hours**	2	2	<ul style="list-style-type: none"> • Non-Dispersive Infra-Red (NDIR) spectroscopy
Ozone (O_3) $\mu\text{g}/\text{m}^3$	8 hours**	100	100	<ul style="list-style-type: none"> • UV photometric • Chemiluminescence • Chemical Method
	1 hour**	180	180	
Lead (Pb) $\mu\text{g}/\text{m}^3$	Annual*	0.5	0.5	<ul style="list-style-type: none"> • Atomic Absorption Spectrophotometry/ Inductively Coupled Plasma (AAS/ICP) method after sampling on EPM 2000 or equivalent filter paper • Energy Dispersive X-ray Fluorescence (ED-XRF) using Teflon filter
	24 hours**	1	1	
	1 hour**	4	4	
Ammonia (NH_3) $\mu\text{g}/\text{m}^3$	Annual*	100	100	<ul style="list-style-type: none"> • Chemiluminescence
	24 hours**	400	400	

				<ul style="list-style-type: none"> • Indophenol Blue Method
Benzene (C ₆ H ₆) µg/m ³	Annual*	5	5	<ul style="list-style-type: none"> • Gas chromatography based continuous analyzer • Adsorption and Desorption followed by Gas Chromatography (GC) analysis
Benzo(a) Pyrene Particulate Phase only ng/m ³	Annual*	1	1	<ul style="list-style-type: none"> • Solvent Extraction followed by High performance liquid chromatography (HPLC)/ GC analysis
As ng/m ³	Annual*	6	6	<ul style="list-style-type: none"> • AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
Ni ng/m ³	Annual*	20	20	<ul style="list-style-type: none"> • AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual Arithmetic mean of minimum 104 measurements in a year taken twice a week, 24 hourly at uniform interval.; ng: nano gram

** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be compiled with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or monitoring and further investigation.

Source: MoEF&CC Notification dated 16 November 2009

Emission Standards for Diesel Engines ≤ 800 kW for DG sets (2014)

Power Category	Emission limits (g/kW-hr)			Smoke Limit (light absorption coefficient, m ⁻¹)
	CO	NO _x +HC	PM	
P ≤ 19 kW	≤ 3.5	≤ 7.5	≤ 0.3	0.7
More than 19 kW upto 75 kW	≤ 3.5	≤ 4.7	≤ 0.3	0.7
More than 75 kW upto 800 kW	≤ 3.5	≤ 4.0	≤ 0.2	0.7

Notes:

- The abbreviations used in the Table shall mean as under: NO_x – Oxides of Nitrogen; HC – Hydrocarbon; CO – Carbon Monoxide; and PM – Particulate Matter.
 - Smoke shall not exceed above value throughout the operating load points of the test cycle.
 - The testing shall be done as per D2 – 5 mode cycle of ISO: 8178- Part 4.
 - The above-mentioned emission limits shall be applicable for Type Approval and Conformity of Production (COP) carried out by authorised agencies.
 - Every manufacturer, importer or, assembler (hereinafter referred to as manufacturer) of the diesel engine (hereinafter referred to as 'engine') for genset application manufactured or imported into India or, diesel genset (hereinafter referred to as 'product'), assembled or imported into India shall obtain Type Approval and comply with COP of their product(s) for the emission limits which shall be valid for the next COP year or, the date of implementation of the revised norms specified above, whichever earlier. Explanation — The term 'COP year' means the period from 1 April to 31 March.
 - Stack height (in metres), for genset shall be governed as per Central Pollution Control Board (CPCB) guidelines
- Source: MoEF&CC Notification dated 11th December 2013, g/kW-hr: gram per kilowatt hour

NOISE STANDARDS

National Ambient Noise Quality Standards

Category of Area / Zone	Limits in dB(A) Leq	
	Day Time	Night-time
Industrial area	75	70
Commercial area	65	55
Residential area	55	45
Silence Zone	50	40

Note: (1) Day time shall mean from 6.00 a.m. to 10.00 p.m. (2) Nighttime shall mean from 10.00 p.m. to 6.00 a.m. (3) Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority (4) Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

Source: Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended by the Noise Pollution (Regulation and Control) (Amendment) Rules, 2000 vide S.O. 1046(E), dated 22.11.2000 and by the Noise Pollution (Regulation and Control) (Amendment) Rules, 2002 vide S.O. 1088(E), dated 11.10.2002, under the Environment (Protection) Act, 1986.

National Occupational Noise

Occupational permissible exposure limit is permitted to 90 dB(A) for 8 hours/day and shall not be exposed to a noise level exceeding 115 dB(A) at any time. The permissible levels for noise exposure for work zone areas have been prescribed under the Model Rules of the Factories Act, 1948:

Peak sound pressure level in dB	Permitted number of impulses or impacts/day
140	100
135	315
130	1000
125	3160
120	10000

Notes: No exposure in excess of 140 dB peak sound pressure level is permitted. For any peak sound pressure level falling in between any figure and the next higher or lower figure as indicated in column 1, the permitted number of impulses or impacts per day is to be determined by extrapolation on a proportionate basis.

Source: https://moef.gov.in/wp-content/uploads/2017/06/moef_gov_in_citizen_specinfo_noise_html.pdf

Total time of exposure to sound pressure level (continuous or a number in dB(A) of short-term exposures) per day, in hours	Sound pressure level in dB(A)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	107
0.25	110

Notes: No exposure in excess of 115 dB(A) is to be permitted. For any period of exposure falling in between any figure and the next higher or lower figure as indicated in column 1, the permissible sound pressure level is to be determined by extrapolation on a proportionate basis.

Source: https://moef.gov.in/wp-content/uploads/2017/06/moef_gov_in_citizen_specinfo_noise_html.pdf

National Ambient Noise Quality Standards for DG sets

Category	Limits in dB(A) Leq
Diesel generator sets (up to 1000 KVA) manufactured on or after the 1 January 2005 at 1 meter from the enclosure surface	75

Source: Noise Limit for Generator Sets run with Diesel were notified by Environment (Protection) second Amendment Rules vide GSR 371(E), dated 17 May 2002 at serial no.94 and its amendments vide GSR No 520(E) dated 1 July 2003; GSR 448(E), dated 12 July 2004; GSR 315(E) dated 16 May 2005; GSR 464(E) dated 7 August 2006; GSR 566(E) dated 29 August 2007 and GSR 752(E) dated 24 October 2008; G.S.R. 215 (E), dated 15 March, 2011 under the Environment (Protection) Act, 1986

WATER QUALITY STANDARDS

Surface Water Quality Standard

Sl. No.	Designated Best Use	Class of Water	Criteria
1	Drinking Water source (with conventional treatment)	A	<ul style="list-style-type: none"> Total Coliform MPN/100 ml shall be 50 or less pH between 6.5 to 8.5 Dissolved Oxygen 6 mg / l or more Biochemical Oxygen demand (BOD) 5 days 20°C 2 mg/l or less
2	Outdoor bathing (organised)	B	<ul style="list-style-type: none"> Total Coliform MPN/100 ml shall be 500 or less pH between 6.5 to 8.5 Dissolved Oxygen 5 mg / l or more Biochemical Oxygen demand (BOD) 5 days 20°C 3 mg/1 or less
3	Drinking Water source (without conventional treatment)	C	<ul style="list-style-type: none"> Total Coliform MPN/100 ml shall be 5000 or less pH between 6 to 9 Dissolved Oxygen 4 mg / l or more Biochemical Oxygen demand (BOD) 5 days 20°C 3 mg/1 or less
4	Propagation of Wildlife	D	<ul style="list-style-type: none"> pH between 6.5 to 8.5 for fisheries Dissolved Oxygen 4 mg / l or more Free Ammonia (as N) 1.2 mg/l or less
5	Irrigation, Industrial Cooling, Controlled Waste	E	<ul style="list-style-type: none"> pH between 6.0 to 8.5 Electrical Conductivity at 25°C μmhos/cm Max. 2250 Sodium absorption rations Max. 26 Boron, Max.2 mg/l

Source: CPCB (1999). Bio mapping of rivers, Parivesh New Letter, 5 (iv), Central Pollution Control Board, Delhi, PP.20.

General Standards for Discharge Of Environmental Pollutants: Effluents¹

Sl. No.	Parameter	Inland surface water	Public sewers	Land for irrigation	Marine/coastal areas
1	Colour and odour	All efforts should be made to remove colour and unpleasant odour as far as practicable		All efforts should be made to remove colour and unpleasant odour as far as practicable	All efforts should be made to remove colour and unpleasant odour as far as practicable
2	Suspended solids mg/l, max.	100	600	200	(a) For process wastewater (b) For cooling water effluent 10 per cent above total suspended matter of influent.
3	Particle size of suspended solids	shall pass 850 micron IS Sieve	-	-	(a) Floatable solids, solids max. 3 mm (b) Settleable solids, max 856 microns
4	pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0

¹ These standards shall be applicable for industries, operations or processes other than those industries, operations or process for which standards have been specified in Schedule of the Environment Protection Rules, 1989

Sl. No.	Parameter	Inland surface water	Public sewers	Land for irrigation	Marine/coastal areas
5	Temperature	shall not exceed 5°C above the receiving water temperature	-	-	shall not exceed 5°C above the receiving water temperature
6	Oil and grease, mg/l max,	10	20	10	20
7	Total residual chlorine, mg/l max	1.0	-	-	1.0
8	Ammoniacal nitrogen (as N),mg/l, max.	50	50	-	50
9	Total kjeldahl nitrogen (as N) ;mg/l, max. mg/l, max.	100	-	-	100
10	Free ammonia (as NH ₃), mg/l, max.	5.0	-	-	5.0
11	Biochemical oxygen demand (3 days at 27°C), mg/l, max.	30	350	100	100
12	Chemical oxygen demand, mg/l, max.	250	-	-	250
13	Arsenic(as As).	0.2	0.2	0.2	0.2
14	Mercury (As Hg), mg/l, max.	0.01	0.01	-	0.01
15	Lead (as Pb) mg/l, max	0.1	1.0	-	2.0
16	Cadmium (as Cd) mg/l, max	2.0	1.0	-	2.0
17	Hexavalent chromium (as Cr + 6),mg/l, max.	0.1	2.0	-	1.0
18	Total chromium (as Cr) mg/l, max.	2.0	2.0	-	2.0
19	Copper (as Cu) mg/l, max.	3.0	3.0	-	3.0
20	Zinc (as Zn) mg/l, max.	5.0	15	-	15
21	Selenium (as Se)	0.05	0.05	-	0.05
22	Nickel (as Ni) mg/l, max.	3.0	3.0	-	5.0
23	Cyanide (as CN) mg/l, max.	0.2	2.0	0.2	0.2
24	Fluoride (as F) mg/l, max.	2.0	15	-	15
25	Dissolved phosphates (as P),mg/l, max.	5.0	-	-	-
26	Sulphide (as S) mg/l, max.	2.0	-	-	5.0
27	Phenolic compounds (as C ₆ H ₅ OH)mg/l, max.	1.0	5.0	-	5.0
28	Radioactive materials:				

Sl. No.	Parameter	Inland surface water	Public sewers	Land for irrigation	Marine/coastal areas
	(a) Alpha emitters micro curie mg/l, max.	10 ⁻⁷	10 ⁻⁷	10 ⁻⁸	10 ⁻⁷
	(b) Beta emitters micro curie mg/l	10 ⁻⁶	10 ⁻⁶	10 ⁻⁷	10 ⁻⁶
29	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
30	Manganese	2 mg/l	2 mg/l	-	2 mg/l
31	Iron (as Fe)	3mg/l	3mg/l	-	3mg/l
32	Vanadium (as V)	0.2mg/l	0.2mg/l	-	0.2mg/l
33	Nitrate Nitrogen	10 mg/l	-	-	20 mg/l

Notes:

Annexure 1: the state boards shall follow the following guidelines in enforcing the standards specified under Schedule IV:

1. The wastewater and gases are to be treated with the best available technology (BAT) in order to achieve the prescribed standards.
2. The industries need to be encouraged for recycling and reuse of waste materials as far as practicable in order to minimize the discharge of wastes into the environment.
3. The industries are to be encouraged for recovery of biogas, energy and reusable materials.
4. While permitting the discharge of effluents and emissions into the environment, State Boards have to take into account the assimilative capacities of the receiving bodies, especially water bodies so that quality of the intended use of the receiving waters is not affected. Where such quality is likely to be affected, discharges should not be allowed into water bodies.
5. The central and state boards shall put emphasis on the implementation of clean technologies by the industries in order to increase fuel efficiency and reduce the generation of environmental pollutants.
6. All efforts should be made to remove color and unpleasant odour as far as practicable.
7. The standards mentioned in this Schedule shall also apply to all other effluents discharged such as mining, and mineral processing activities and sewage.
8. The limit given for the total concentration of mercury in the final effluent of caustic soda industry, is for the combined effluent from (a) cell house; (b) brine plant; (c) chlorine handling; (d) hydrogen handling; and (e) hydrochloric acid plant.
9. All effluents discharged including from the industries such as cotton textile, composite woolen mills, synthetic rubber, small pulp & paper, natural rubber, petrochemicals, tanneries, paint, dyes, slaughterhouses, food & fruit processing and dairy industries into surface waters shall conform to the BOD limit specified above, namely, 30 mg/l. For discharge of an effluent having a BOD more than 30 mg/l, the standards shall conform to those given above for other receiving bodies, namely, sewers, coastal waters and land for irrigation.
10. Bioassay shall be made compulsory for all the industries, where toxic and nonbiodegradable chemicals are involved.
11. In case of fertilizer industry, the limits in respect of chromium and fluoride shall be complied with at the outlet of chromium and fluoride removal units respectively.
12. In case of pesticides.
 - a. The limits should be complied with at the end of the treatment plant before dilution.
 - b. Bio-assay test should be carried out with the available species of fish in the receiving water, the COD limits to be specified in the consent conditions should be correlated with the BOD limits.
 - c. In case metabolites and isomers of the pesticides in the given list are found in significant concentrations, standards should be prescribed for these also in the same concentration as the individual pesticides.
 - d. Industries are required to analyze pesticides in wastewater by advanced analytical methods such as GLC/HPLC.
13. The chemical oxygen demand (COD) concentration in a treated effluent, if observed to be persistently greater than 250 mg/l before disposal to any receiving body (public sewer, land for irrigation, inland surface water and marine coastal areas), such industrial units are required to identify chemicals causing the same. In case these are found to be toxic as defined in the Schedule-I of the Hazardous Rules, 1989, the state boards in such cases shall direct the industries to install tertiary treatment stipulating time limit.
14. Standards specified in Part A of Schedule VI for discharge of effluents into the public sewer shall be applicable only if such sewer leads to a secondary treatment including biological treatment system otherwise the discharge into sewers shall be treated as discharge into inland surface waters.

Source: GSR 801 (E), EPA, 1986, dated 31 December 1993

Drinking Water Specifications: IS 10500:2012

Sl. No.	Substance / Characteristics	Requirement (acceptable limit)	Undesirable effect outside the desirable limit	Permissible limit in the absence of alternate source	Methods of Test (ref. To IS)	Remarks
Essential Characteristics						
1	Colour, Hazen Units, Max.	5	Above 5, consumer acceptance decreases	15	IS 3025 (Part 4)	Extended to 15 only if toxic substances, in absence of alternate sources.
2	Odour	Agreeable	-	Agreeable	IS 3025 (Part 5)	A test cold and when heated. Test at several dilution
3	Taste	Agreeable	-	Agreeable	IS 3025 (Part 7 & 8)	Test to be conducted only after safety has been established
4	Turbidity NTU, Max.	1	Above 5, consumer acceptance decreases	5	3025 (Part 10): 1984	
5	pH value	6.5 to 8.5	Beyond this range the water will not affect the mucous membrane and /or water supply system	No relaxation	IS 3025 (Part 11)	
6	Total hardness (as CaCO ₃) mg/l, Max.	300	Encrustation in water supply structures an adverse effect on domestic use	600	IS 3025 (Part 21)	
7	Iron (as Fe) mg /l Max.	0.3	Beyond this limit taste/appearance are affected has adverse effect on domestic uses and water supply structures and promotes iron bacteria	No relaxation	IS 3025 (Part 53)	Total concentration of manganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
8	Chlorides (as Cl) mg/1 Max.	250	Beyond this limit, taste corrosion and palatability are affected	1000	IS 3025 (Part 32)	
9	Residual, free chloride, mg/1 Min.	0.2		1	IS 3025 (Part 26)	To be applicable only when water is

Sl. No.	Substance / Characteristics	Requirement (acceptable limit)	Undesirable effect outside the desirable limit	Permissible limit in the absence of alternate source	Methods of Test (ref. To IS)	Remarks
						chlorinated. Tested at consumer end. When protection against viral infection is required, it should be Min. 0.5 mg/l
Desirable characteristics						
1	Dissolved solids mg/1 Max.	500	Beyond the palatability decreases and may cause gastrointestinal irritation	2000	IS 3025 (Part 16)	
2	Calcium (as Ca) mg/1 Max.	75	Encrustation in water supply structure and adverse effects on domestic use	200	IS 3025 (Part 40)	
3	Magnesium (as Mg) mg/1, Max.	30	Encrustation in water supply structure and adverse effects on domestic use	100	IS 3025 (Part 46)	
4	Copper (as Cu) mg/1 Max.	0.05	Beyond taste, discoloration of pipes, fitting and utensils will be caused beyond this	1.5	IS 3025 (Part 42)	
5	Manganese (as Mn) mg/1, Max.	0.1	Beyond this limit taste/appearance are affected, has adverse effect on domestic uses and water supply structures.	0.3	IS 3025 (Part 59)	
6	Sulphate (as SO ₄), mg/1, Max.	200	Beyond this causes gastro-intestinal irritation when magnesium or sodium are present	400	IS 3025 (Part 24)	May be extended up to 400 provided (as Mg) does not exceed 30
7	Nitrate (as NO ₃) mg/l, Max.	45	Beyond this methaemoglobinemia take place	No relaxation	IS 3025 (Part 34)	To be tested when pollution is suspected

Sl. No.	Substance / Characteristics	Requirement (acceptable limit)	Undesirable effect outside the desirable limit	Permissible limit in the absence of alternate source	Methods of Test (ref. To IS)	Remarks
8	Fluoride (as F) mg/1, Max.	1.0	Fluoride may be kept as low as possible. High fluoride may cause fluorosis	1.5	IS 3025 (Part 60)	To be tested when pollution is suspected
9	Phenolic compounds (as C ₆ H ₅ OH) mg/1, Max.	0.001	Beyond this it may cause objectionable taste and odour	0.002	IS 3025 (Part 43)	To be tested when pollution is suspected
10	Mercury (as Hg) mg/1, Max.	0.001	Beyond this the water becomes toxic	No relaxation	IS 3025 (Part 48)	To be tested when pollution is suspected
11	Cadmium (as cd), mg/1, Max.	0.003	Beyond this the water becomes toxic	No relaxation	IS 3025 (Part 41)	To be tested when pollution is suspected
12	Selenium, (as Se). mg/l, Max.	0.01	Beyond this the water becomes toxic	No relaxation	IS 3025 (Part 56)	To be tested when pollution is suspected
13	Arsenic (As) mg/1, Max.	0.01	Beyond this the water becomes toxic	0.05	IS 3025 (Part 37)	To be tested when pollution is suspected
14	Cyanide (as CN) mg/1, Max.	0.05	Beyond this the water becomes toxic	No relaxation	IS 3025 (Part 27)	To be tested when pollution is suspected
15	Lead (as Pb), mg/1, Max.	0.01	Beyond this the water becomes toxic	No relaxation	IS 3025 (Part 47)	To be tested when pollution is suspected
16	Zinc (as Zn) mg/1, Max.	5	Beyond this limit it can cause astringent taste and an opalescence taste and an opalescence in water	15	IS 3025 (Part 49)	To be tested when pollution is suspected
17	Anionic detergents (as MBAS) mg/1, Max.	0.2	Beyond this it can cause a light froth in water	1	Annex K of IS 13428	To be tested when pollution is suspected
18	Chromium (as Cr ₆₊) mg/1, Max.	0.05	May be carcinogenic above this limit	No relaxation	IS 3025 (Part 52)	To be tested when pollution is suspected

Sl. No.	Substance / Characteristics	Requirement (acceptable limit)	Undesirable effect outside the desirable limit	Permissible limit in the absence of alternate source	Methods of Test (ref. To IS)	Remarks
19	Poly nuclear aromatic hydrocarbons (as PAH) mg/1, Max.	0.0001	May be carcinogenic above this limit	No relaxation	APHA 6440	-
20	Mineral oil mg/1, Max.	0.5	Beyond this limit undesirable taste and odour after chlorination take place.	0.03	IS 3025 (Part 39)	-
21	Pesticides mg/1, Max.	-	Toxic	-	-	-
22	Radioactive material	-	-	-	IS 14194	-
23	Alpha emitters bq/1, Max.	0.1	-	No Relaxation	-	-
24	Beta emitter pci/1, Max.	1.0	-	No Relaxation	-	-
25	Total alkalinity (as CaCO ₃), mg/l, max	200	Beyond this limit taste becomes unpleasant	600	IS 3025 (Part 23)	-
26	Aluminium (as Al) mg/1, Max.	0.03	Cumulate effect is reported to cause dementia	0.2	IS 3025 (Part 55)	-
27	Boron mg/1, Max.	0.5	-	1.0	IS 3025 (Part 57)	-

Source: Indian Standard Drinking Water Specification – IS 10500:2012

ELECTRICAL SAFETY**No Approach Zones for High Voltage Power Lines**

Nominal phase-to-phase voltage rating	Minimum distance
750 or more volts, but no more than 150,000 volts	3 meters
More than 150,000 volts, but no more than 250,000 volts	4.5 meters
More than 250,000 volts	6 meters

Source:

[https://cea.nic.in/wp-content/uploads/notification/2021/04/Draft%20 Standard Technical Specification for Steel Pole strcutrues.pdf](https://cea.nic.in/wp-content/uploads/notification/2021/04/Draft%20Standard%20Technical%20Specification%20for%20Steel%20Pole%20structures.pdf)

Safety Distances for Power Lines

Minimum ground clearance			
Voltage	132 kV	220Kv	400kV
Clearance	6.1m	7.0m	8.84m
Vertical clearance from buildings			
Voltage	33 kV	132 kV	220k V
Clearance	3.7m	(3.7+0.9) m	(3.7+1.7) m
Horizontal clearance from buildings			
Voltage	33 kV	132 kV	220 kV
Clearance	2.0 m	(2.0+0.9) m	(2.0+1.7) m

Clearances from buildings of low and medium voltage lines and service lines-

(1) Where a low or medium voltage, overhead line passes above or adjacent to or terminates on any building, the following minimum clearances from any accessible point, on the basis of maximum sag, shall be observed: -

(a) For any flat roof, open balcony, verandah roof and lean-to-roof- (i) When the line passes above the building a vertical clearance of 2.5 metres from the highest point, and (ii) When the line passes adjacent to the building a horizontal clearance of 1.2 metres from the nearest point, and

(b) For pitched roof- (i) When the line passes above the building a vertical clearance of 2.5 metres immediately under the lines, and (ii) When the line passes adjacent to the building a horizontal clearance of 1.2 metres.

(2) Any conductor so situated as to have a clearance less than that specified in sub-rule (1) shall be adequately insulated and shall be attached at suitable intervals to a bare earthed bearer wire having a breaking strength of not less than 350 kg.

(3) The horizontal clearance shall be measured when the line is at a maximum deflection from the vertical due to wind pressure.

Source: <https://www.dgms.net/IErules1956.pdf>

Width of Right of Way (ROW) for Power Lines

Transmission Voltage	Width of ROW (in meters)
0.4 kV	1.2
11 kV	7
33 kV	15
66 kV	18
110 kV	22
132 kV	27
220 kV	35
400 kV S/C	46

Right of Way (RoW) is the strip of land immediately below and adjacent to a power line. The width of RoW required for a line is based on the consideration for safety clearances as per CEA (Measures relating to safety and Electric supply) Regulations 2010, Electromagnetic Field (EMF) exposure limits and design consideration for tower structure. The RoW also provide an access corridor for maintenance of transmission lines.

Source: MOEF&CC guidelines dated 5.5.2014 (Annex A)

Minimum Clearance (m) Between Lines Crossing Each Other

System Voltage	132KV	220KV	400KV	800KV
Low & Medium	3.05	4.58	5.49	7.94
11-66KV	3.05	4.58	5.49	7.94
132KV	3.05	4.58	5.49	7.94
220KV	4.58	4.58	5.49	7.94
400KV	5.49	5.49	5.49	7.94
800KV	7.94	7.94	7.94	7.94

Source: IEA1957

INTERNATIONAL (WB/IFC-EHS GUIDELINE) ENVIRONMENTAL QUALITY STANDARDS²
AIR QUALITY

WHO Ambient Air Quality Guidelines

	Averaging Period	Guideline value in mg/m³
Sulfur dioxide (SO ₂)	24-hour	125 (Interim target-1) 50 (Interim target-2)
	10 minutes	20 (guideline) 500 (guideline)
Nitrogen dioxide (NO ₂)	1-year	40 (guideline)
	1-hour	200 (guideline)
Particulate Matter PM ₁₀	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)
	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)
Particulate Matter PM _{2.5}	1-year	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)
	24-hour	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)

Source: https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines

² https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines

WHO Ambient Air Quality Guidelines of 2021 in Comparison to 2005 Guidelines

Pollutant	Averaging time	Who 2021 air quality guideline	Who 2005 air quality guideline	Change
SO ₂ (µg/m ³)	24-hour	40	20	+100%
	10-minute	500	500	Unchanged
NO ₂ (µg/m ³)	Annual	10	40	-75%
	24-hour	25	N/A	Newly introduced
	1-hour	200	200	Unchanged
PM ₁₀ (µg/m ³)	Annual	15	20	-25%
	24-hour	45	50	-10%
PM _{2.5} (µg/m ³)	Annual	5	10	-50%
	24-hour	15	25	-40%
O ₃ (µg/m ³)	Peak season	60	N/A	Newly introduced
	8-hour	100	100	Unchanged
CO (mg/m ³)	24-hour	4	4	Unchanged
	8-hour	10	10	Unchanged
	1-hour	35	35	Unchanged
	15-minute	100	100	Unchanged

Source: ADB TA Consultant

NOISE

Ambient Noise Level Guidelines

Receptor	One Hour L _{Aeq} (dBA)	
	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational ³	55	45
Industrial; commercial	70	70

Source: Guidelines for Community Noise, World Health Organization (WHO), 1999.

Noise Limits for Various Working Environments

Location / activity	Equivalent level LA _{eq,8h}	Maximum LA _{max, fast}
Heavy Industry (no demand for oral communication)	85 dB(A)	110 dB(A)
Light industry (decreasing demand for oral communication)	50-65 dB(A)	110 dB(A)
Open offices, control rooms, service counters or similar	45-50 dB(A)	-
Individual offices (no disturbing noise)	40-45 dB(A)	-
Classrooms, lecture halls	35-40 dB(A)	-
Hospitals	30-35 dB(A)	40 dB(A)

Source: Guidelines for Community Noise, World Health Organization (WHO), 1999

³ For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO (1999).

WATER QUALITY**Indicative Values for Treated Sanitary Sewage Discharges**

Pollutants	Units	Guideline Value
pH	pH	6 – 9
BOD mg/l 30	mg/l	30
COD mg/l 125	mg/l	125
Total nitrogen mg/l 10	mg/l	10
Total phosphorus mg/l 2	mg/l	2
Oil and grease	mg/l	10
Total suspended solids	mg/l	50
Total coliform bacteria	MPN / 100 ml	400

MPN = Most Probable Number

Source: <https://www.ifc.org/wps/wcm/connect/3d9a54ae-c44c-488d-9851-afeb368cb9f9/1-3%2BWastewater%2Band%2BAmbient%2BWater%2BQuality.pdf?MOD=AJPERES&CVID=Is4Xbfn>

ELECTRICAL SAFETY**ICNIRP Limit Values Concerning Electric and Magnetic Fields (50 Hz)
for the Public and at Working Places**

Source	Electric Field Strength [kV/m]	Magnetic Flux Density [μ T]
Occupational exposure	10	500
General public exposure	5	100

Source: ICNIRP. Guidelines for limiting exposure to electromagnetic fields (up to 300 GHz). 2020

Minimum Working Distance for Trained Employees to AC

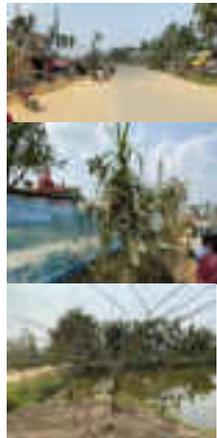
Voltage range phase to phase (kV)	Minimum working and clear hot stick distances (m)
2.1 to 15	0.6
15.1 to 35	0.71

Source: <https://www.ifc.org/wps/wcm/connect/7b65ce6b-129d-4634-99dc-12f85c0674b3/Final%2B-%2BElectric%2BTransmission%2Band%2BDistribution.pdf?MOD=AJPERES&CVID=nPtfp32&iid=1323162154847>

APPENDIX 4: ENVIRONMENTAL SUMMARY OF SAMPLE DISTRIBUTION LINES SURVEYED

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
1	33 KV Mission Tilla - Panisagar-Dhamchara Line	12km New Line on CC Rural, tribal area, dense vegetation	EC: Dharmanagar ED: Dharmanagar North Tripura, Between Panisagar & Damcharra	<ul style="list-style-type: none"> Habitat type: passes through modified habitat, dense vegetated patches with habitat modifications being plantation area, road and intermittent houses Line being moved onto road to avoid dense vegetation Protected Areas: outside the ESZ of Rowa WLS (2.88 km from Panisagar end) Key biodiversity area: None Forest land: None Wetland: None Wildlife of interest: deer (spotted deer) sighted by residents in area Vegetation: grass, herbs, bamboos, shrubs, banana trees, rubber trees, teak trees Trees lost: No felling involved 	<ul style="list-style-type: none"> Elevation: 44m to 196m Topography: rolling hills Ground conditions: some loose soil areas Surface water: ponds, seasonal stream and nallahs Surface water crossings: 2 seasonal stream and nallahs Groundwater springs, wells, pumps: 3 wells, streams, pumps General environmental conditions: pristine, low air and noise pollution, some dusty roads, solid waste along alignment is very limited 	<ul style="list-style-type: none"> Tribal area Land Use: settlements, agriculture, shifting cultivation, banana plantations Settlements: Panisagar, Damcharra, Jalbasa and small tribal settlements Individual properties in ROW: Yes, tribal houses. Shifting of ROW is possible Road, footpath, rail, other utilities: Dharma Nagar – Damchara Road, NH 108, 12 roads crossed Human uses of surface water: washing, plantation and bathing water Human uses groundwater springs, wells, pumps: drinking 	<ul style="list-style-type: none"> None 	

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
2	11 KV Deegalbagh Feeder to bifurcate existing Raghna Feeder	8km New Line on CC Rural, road crossing	EC: Dharmanagar, ED: Dharmanagar North Tripura	<ul style="list-style-type: none"> Habitat type: Modified habitat Protected Areas: None Key biodiversity area: None Forest land: None Wetland: None Wildlife of interest: None Vegetation: intermittent shrubs and trees Trees lost: No felling involved 	<ul style="list-style-type: none"> Elevation: 25m Topography: Flat Ground conditions: stable Surface water: none Surface water crossings: none Groundwater springs, wells, pumps: none General environmental conditions: some dusty stretches – roadside unpaved suspensions, low to moderate noise levels –58 dB(A) in market crossing site Some garbage on road; open areas used for garbage disposal 	<ul style="list-style-type: none"> Not in TTAADC area Land Use: agricultural, commercial/ market, intermittent houses, hospital, open land Settlements: Digalbagh, Jagatpur, Chandrapur, Dharmanagar, intermittent Individual properties in ROW: none are in ROW, houses and intermittent shops in PAI Road, footpath, rail, other utilities: one main road crossing in busy marketplace (Jagatput road cross – Kadamtala road), narrow stretch near market Road, footpath, rail, other utilities crossings: market area crossing Human uses of surface water: drinking, agriculture Human uses groundwater 	<ul style="list-style-type: none"> Kali Mandir at bend – 20m from ROW 	

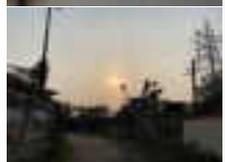
Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
						springs, wells, pumps: none		
3	33 KV Pecharthal SS to 33 KV Panisagar SS	16km New Line on CC Semi-urban, new line on roadside to avoid the existing line through vegetation	EC: Dharmanagar ED: Panisagar North Tripura, Between Pecharthal & Panisagar	<ul style="list-style-type: none"> Habitat type: passes through modified habitat along main road Protected Areas: None Key biodiversity area: None Forest land: None Wetland: None Wildlife of interest: None Vegetation: grass, herbs, shrubs, plantations, trees Trees lost: No felling involved Existing tree felling due to road expansion near Pachertal area 	<ul style="list-style-type: none"> Elevation: 41 m to 101 m Topography: mostly flat, some gradient changes Ground conditions: slope on one side Surface water: ponds, Deo River Surface water crossings: Deo River (9km from Pachertal) will be using overbridge Groundwater springs, wells, pumps: 4 pumps and wells General environmental conditions: road construction works in progress, air and noise pollution observed, dusty roads, noise 47 dB(A) Domestic solid waste/garbage debris on road 	<ul style="list-style-type: none"> Not in TTAADC area Land Use: settlements, agriculture Settlements: Panisagar, Pecharthal and small settlements Individual properties in ROW: Yes, house/shop entrances along alignment Road, footpath, rail, other utilities: two railway lines. Roads congested along some stretches, temporary business-like car repair on footpath/road, material storage in ROW Road, footpath, rail, other utilities crossings: 5 road crossings (NH 44) and railway crossing (UG) on alignment planned Human uses of surface water: 	<ul style="list-style-type: none"> Satsang Vihar religious community building/ temple Buddhist temple (boundary wall 2m to alignment) 	

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
						<p>washing and bathing water</p> <ul style="list-style-type: none"> Human uses groundwater springs, wells, pumps: drinking 		
4	132 kV Gamaitilla SS to 33 kV Kalyanpur SS	15km New line on CC Semiurban , along road	EC: Khowai ED: Teliamura	<ul style="list-style-type: none"> Habitat type: Modified habitat, patchy vegetation Protected Areas: None Key biodiversity area: None Forest land: None Wetland: None Wildlife of interest: None Vegetation: grass, shrubs, roadside trees, mango, teak, sal, jackfruit, betelnut, coconut Trees lost: some need to be felled (10-15) along road, others need to be trimmed 	<ul style="list-style-type: none"> Elevation:48m Topography: flat Ground conditions: dusty, loose soil Surface water: Khowai river runs parallel – 100m nearest point, 7 ponds in settlement area Surface water crossings: None Groundwater springs, wells, pumps: 7-10 handpumps near residences General environmental conditions: dusty roads, noisy in road intersections General wastes observed along roads, stored DL poles observed at one stretch 	<ul style="list-style-type: none"> Not in TTAADC area Land Use: settlement, open land, cropland on one side along the Khowai river Settlements: Gamaitilla, Teliamura, Trisabari, Kamalnagar, Chalitabari, Kalyanpur Individual properties in ROW: Yes-mix of permanent concrete houses and thatched/wooden huts, shops, and business; starting point in a shop gate, multiple schools (Chalitabari High School at 10m, Monarcha High School at 15m, Totabari High School at 10m, Teliamura High 	<ul style="list-style-type: none"> None in PAI Tripureswari Shiv Mandir – 1.78km 	

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
						<p>School at 42m) in ROW on road</p> <ul style="list-style-type: none"> Road, footpath, rail, other utilities: road, road shoulder is wide, no paved footpath Road, footpath, rail, other utilities crossings: Teliamura Rail crossing/bridge; Hatai Kuchak road crossing, Sishu bihar kali mandir road crossing, Teliamura Station road crossing Human uses of surface water: washing Human uses groundwater springs, wells, pumps: handpumps, drinking 		
5	33 KV UG Line from 79 Tilla Grid SS to Rampur SS	6km new UG line Urban	EC: II West ED: Sadar/ Agartala	<ul style="list-style-type: none"> Habitat type: Modified habitat Protected Areas: None Key biodiversity area: None Forest land: None Wetland: None 	<ul style="list-style-type: none"> Elevation: 11m-30m Topography: Flat Ground conditions: Stable Surface water: Haora River – 1.1 km, Banamalipur 	<ul style="list-style-type: none"> Not in TTAADC area Land Use: urban, settlement, Settlements: urban area/city Individual properties in ROW: all along ROW – houses, 	<ul style="list-style-type: none"> Gol-chakkar Sanitata – Temple: 4m Shiv Sahnti Kali 	

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
				<ul style="list-style-type: none"> • Surface water: Haora River • Wildlife of interest: None • Vegetation: patchy urban vegetation grass, shrubs, trees -- mango, jackfruit, neem, teak, betelnut, coconut, banyan • Trees lost: No felling involved 	<ul style="list-style-type: none"> • Lake-100m, 6 ponds • Surface water crossings: None • Groundwater springs, wells, pumps: 10-15 hand pumps near residences • General environmental conditions: dusty, traffic emissions, noise, open drains, overflowing sewage in some sections, garbage dumped on roadside, overflowing bins. General waste dumped along road; municipal wastes stored beside road in some sections 	<ul style="list-style-type: none"> • markets clusters, shops, businesses like corporate offices, banks, car show rooms, restaurants, garages, repair workshops. Integrated check post – 40m. Sishu Bihar School- 30m, Indranagar High School- 25m, Don Bosco school- 25m, Umakanta academy – 60m, Indira Gandhi Memorial Hospital – 60m, Maharaja Bir Bikram University – 750m • Road, footpath, rail, other utilities: unpaved footpath, roads without footpath • Road, footpath, rail, other utilities crossings: Road crossings- Joypur Road, Akhura Road, TG Road, Bardowali Battala Flyover, IGM Crossing, Orient Crossing, Hari Ganga Basak Road; CR Road, 	<ul style="list-style-type: none"> • Temple-2m, • Maa Kali temple Indranagar – 9m, • Gausia Jama Masjid Indranagar- 15m, • Bhalukiya Till Shani Temple- 45m • Ujjayanta Palace state protected monument- 350m 	

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
						<p>Motor Stand Road, Agartala-Sabroom Road, Assam-Agartala Road, Joyguru Road, ITI Road, 79 Tilla Road</p> <ul style="list-style-type: none"> • Human uses of surface water: None • Human uses groundwater springs, wells, pumps: drinking, along with supply water 		
6	33 KV UG Line from SM Nagar SS to Charipara SS	14km New UG Line Urban, roadside	EC: II West ED: Sadar/ Agartala	<ul style="list-style-type: none"> • Habitat type: modified habitat • Protected Areas: None • Key biodiversity area: None • Forest land: None • Wetland: None • Wildlife of interest: None • Vegetation: grass, shrubs, trees – sal, neem, betelnut, • Trees lost: No felling involved 	<ul style="list-style-type: none"> • Elevation: 20m • Topography: Flat • Ground conditions: stable • Surface water: None • Surface water crossings: None • Groundwater springs, wells, pumps: 9 handpumps in residences • General environmental conditions: moderate dust and noise related to traffic • Garbage dumps beside road, roadside in some 	<ul style="list-style-type: none"> • Not in TTAADC area • Land Use: settlement, open space • Settlements: residences, business/shops, markets, Tripura University – 0km; Amtali High school – 30m from ROW, Hapania Agartala International Fir Ground Complex, shopping area • Individual properties in ROW: multiple houses, ONGC assets, workshop – 50m form ROW (as only 	<ul style="list-style-type: none"> • Amtali Shani Mandir – 10m from ROW; Sukan-tapalli Kali Mandir - 90m from ROW 	

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
					area used for construction material and waste storage	<p>a workshop no gas related risk anticipated)</p> <ul style="list-style-type: none"> Road, footpath, rail, other utilities: Shillong-Agartala-Sabroom Road, Vidyasagar Road Road, footpath, rail, other utilities crossings: Agartala-Kamlasagar Road, Nayamura Road Human uses of surface water: None Human uses groundwater springs, wells, pumps: drinking 		
7	33 KV UG Line from Adarsha Colony SS to College Tilla SS	3.5km New UG Line Urban	EC: II West ED: Sadar/ Agartala	<ul style="list-style-type: none"> Habitat type: Modified habitat Protected Areas: None Key biodiversity area: None Forest land: None Wetland: None Surface water: Haora River Wildlife of interest: None Vegetation: patchy urban vegetation grass, shrubs, trees -- mango, 	<ul style="list-style-type: none"> Elevation: 30m Topography: Flat Ground conditions: Stable Surface water: Haora River Surface water crossings: Haora River Groundwater springs, wells, 9-12 pumps: hand pumps near residences General environmental conditions: dusty, 	<ul style="list-style-type: none"> Not in TTAADC area Land Use: urban, settlement, university Settlements: urban area/city, Maharaja Bir Bikram University Individual properties in ROW: all along ROW – houses, food outlets, markets, shops, businesses like garages, steel fabrications, repairs 	<ul style="list-style-type: none"> Jogendra Satsang/ Hindu temple – 50m, Mahakal Kali Mandir – 20m 	 

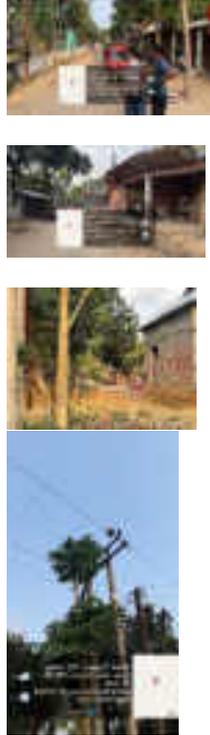
Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
				<p>neem, teak, betelnut, coconut, banyan</p> <ul style="list-style-type: none"> Trees lost: No felling involved 	<p>traffic emissions, noise, open drains, overflowing sewage in some sections</p> <ul style="list-style-type: none"> General waste dumped along road, construction materials like bricks, sand, stone chips stored beside road in some sections 	<ul style="list-style-type: none"> Road, footpath, rail, other utilities: unpaved footpath, road Road, footpath, rail, other utilities crossings: Purba para road crossing Human uses of surface water: None Human uses groundwater springs, wells, pumps: drinking, along with supply water 		
8	New 33kV as UG: Bodhgangnagar to Adarsha Colony	15km New 33kV on UG Urban, along highway and main road	EC: II, West Agartala ED: Sadar	<ul style="list-style-type: none"> Habitat type: Modified habitat Protected Areas: None Key biodiversity area: None Forest land: None Wetland: None Surface water: Haora River and Pond of Chaturdashi Devta Temple Vegetation: Coconut, Jackfruit, Bamboo, Mango, Banyan, etc Trees lost: No felling involved 	<ul style="list-style-type: none"> Elevation: 48m to 23m with lowest point at Haora River crossing (18m) Topography: Mostly flat after Haora River cross up to Bodhgangnagar. Adarsha Nagar to Haora River is highway built by hillock cutting with sharp bends and rolling road sections intermittently. Ground conditions: 	<ul style="list-style-type: none"> Non TTAADC Area Land Use: road, croplands settlements, industrial area/factories, farms, weigh bridges, market, distillery, animal husbandry, individual shops. NEEPCO Residential complex in Bodhgangnagar Industrial area – adjacent to ROW. B Khyerpur Market is congested Settlements: Anandnagar, Aralia, 	<ul style="list-style-type: none"> Chaturdashi Devta Mandir – 90m from ROW and pond adjacent. This large pond, which forms part of the temple, is situated along the NH8, where the UG line will also pass. 	

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
					<p>Stable, some broken roads</p> <ul style="list-style-type: none"> • Surface water in PAI: Haora River, Main Pond of Chaturdashi Devta Temple; 23 other ponds • Surface water crossings: Haora River - Khyerpur Bridge; Stream crossing – Bankiya Bridge • Groundwater springs, wells, pumps: 29 handpump • General environmental conditions: Urban wastes, noise, emissions from congested NH, broken road – dust suspension 	<p>Prataphgarh, Subhas Colony, Ashrampara, Khyerpur Market, Maheshkhola</p> <ul style="list-style-type: none"> • Individual properties: Scattered houses, shops and markets, industrial area/ factories. Water Treatment Plant-20m from ROW near Adarsh Colony end point. Duck farm and water body at 240m from ROW. Bodhgangnagar Industrial Area - last 1 km of line – food factory, paints, battery, steel, fabrication, etc. Rabbit breeding farm – 280m from ROW. College of Veterinary Science and Animal Husbandry –25m from ROW Pallimangal High School adjacent to ROW. 	<ul style="list-style-type: none"> • Kalitala Kali temple- 15m from ROW • Nagichera Kathibaba Ashram- 15m from ROW 	  

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						<p>Oil Agartala High school – 40m from ROW. Bethany School – 120m from ROW.</p> <ul style="list-style-type: none"> • Road, footpath, rail, other utilities in PAI: NH 8, railway over bridge and underpass, footpath, storm water drainage along NH, sewage drains along NH • Road, footpath, rail, other utilities crossings: NH 8 Crossing and two other road crossings • Human uses of surface water in PAI: washing • Human uses groundwater springs, wells, pumps: drinking, commercial 		

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
9	11kV to CC: Ananda Nagar Feeder	18km Conversion 11kV to CC	EC: II, West Agartala ED: Sadar ESD: Ananda Nagar	<ul style="list-style-type: none"> Habitat type: Modified habitat, crop lands, rubber plantation Protected Areas: None Key biodiversity area: None Forest land: None Wetland: None Surface water: No rivers/streams Vegetation: Fragmented. Dense in some sections. Rubber plantation. Tea plantations Others- jackfruit, neem, Coconut, Sal, Teak, Mango, Jamun, Areca nut, etc Trees lost: No felling involved 	<ul style="list-style-type: none"> Elevation: 29m to 59m Topography: mostly flat with some sections elevated, line pass along road, some sections of which have been built by cutting hillock. Ground conditions: Broken roads, some unstable terrain Surface water in PAI: about 2 ponds Surface water crossings: None Groundwater springs, wells, pumps: 5 handpumps General environmental conditions: Roads are moderately dusty and broken. Noise levels are low. 	<ul style="list-style-type: none"> Some TTAADC villages Land Use: semi-urban, houses, croplands, bamboo plantations, tea gardens, roads Settlements: Nagicherra, Dhupchara, Srinagar, Anandanagar, Jharul Bachai Individual properties: houses. DDA High School in ROW (0m). NTFF nurseries in ROW. Road, footpath, rail, other utilities in PAI: Bamboo Plantation in ROW; Road Road, footpath, rail, other utilities crossings: 4 road crossings Human uses of surface water in PAI: None Human uses groundwater springs, wells, pumps: drinking, irrigation 	<ul style="list-style-type: none"> Hindu temple in ROW (0m) 	  

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
								
10	11kv to UG Golchakkar to Dashami-ghat	3.6 km Conversion of 11kV to UG along urban congested road built over flood protection embankment	EC: I, West Agartala ED: Sadar	<ul style="list-style-type: none"> Habitat type: Modified habitat Protected Areas: None Key biodiversity area: None Forest land: None Wetland: None Surface water: Haora River at 10m - runs parallel for about 1.3km Vegetation: none, some roadside trees – sal, shimul, neem, banyan, etc Trees lost: No felling involved as UG 	<ul style="list-style-type: none"> Elevation: 10m Topography: flat Ground conditions: for 1.3km middle to end point the road and ROW runs on a narrow embankment with sloping side with shops on the roadside. Surface water in PAI: Haora River at 10m Surface water crossings: None Groundwater springs, wells, pumps: about 4-5 handpumps General environmental conditions: high noise and air pollution due to traffic 	<ul style="list-style-type: none"> Not in TTAADC area Land Use: mix – road, shops, houses, some open spaces. 190m from Agartala Integrated Checkpost Settlements: Dashamighat, Joypur Individual properties: mostly shops along the ROW. Rajnagar High school - 10m from ROW. Joypur Border Security Force Camp –10m from ROW Road, footpath, rail, other utilities in PAI: roads only Road, footpath, rail, other utilities crossings: one road crossing. 	<ul style="list-style-type: none"> One Hindu temple at 9m from ROW Joypur jama masjid at 115m Golchakkar masjid- 55m 	   

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
					congestions, busy market area and narrow roads	<ul style="list-style-type: none"> Human uses of surface water in PAI: none Human uses groundwater springs, wells, pumps: drinking, washing, commercial 		
11	0.4 kV ESD Sekherkote LT	15km LT to ABC Border Area, mix of rural/Semi-urban Roads	EC-I & II West ED: Sadar/Agartala ESD: Sekherkote	<ul style="list-style-type: none"> Habitat type: Modified habitat Protected Areas: None Key biodiversity area: none Forest land: None Wetland: none Surface water: none Vegetation: teak, papaya, sal, mango, banana plantation, lopping and trimming required 	<ul style="list-style-type: none"> Elevation: 20m Topography: plain Ground conditions: stable, some loose soil/broken roads Surface water in PAI: None recorded Surface water crossings: None Groundwater springs, wells, pumps: about 15-20 handpumps General environmental conditions: semi-urban, some dust, congested roads, open drains 	<ul style="list-style-type: none"> Not in TTAADC but minority area (Muslim dominated) Land Use: built up, houses, shops, market areas, border area. One LT branch runs parallel (0m) to the Bangladesh international border and gate (in ROW). Significant illegal power tapping observed. Settlements: Motinagar, Bhoikhola, Mohinagar Individual properties in ROW: Schools- Motinagar High School-5m from ROW; and Motinagar Junior 	<ul style="list-style-type: none"> Mosque and Matinagar Sahi Eidgah at 0m from start point Matinagar Sahi Jama Masjid – 55m from ROW 	

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
						<p>school-10m from ROW</p> <ul style="list-style-type: none"> Road, footpath, rail, other utilities in PAI: Border Road, Road, footpath, rail, other utilities crossings: 4 road crossings Human uses of surface water in PAI: none Human uses groundwater springs, wells, 15-20 pumps/ handpumps - drinking water 		
12	0.4 kV LT to ABC ESD Mandwi	<p>20km</p> <p>Conversion of LT to ABC</p> <p>Dense vegetation, ROW along road that has fragmented vegetation; passes over houses at some</p>	<p>EC: II, West Agartala</p> <p>ED: Jirania</p> <p>ESD: Mandwi</p>	<ul style="list-style-type: none"> Habitat type: modified habitat along road, dense vegetation with forest land in surroundings Protected Areas: None Key biodiversity area: None Forest land: Dense natural vegetation along some LT alignments – outside ROW. Includes notified 	<ul style="list-style-type: none"> Elevation: Ranges from 34m tot 115m Topography: Mostly flat, some sections in complex terrain Ground conditions: mostly stable, one sections road is made by cutting hillock – unsable soil, metalled roads, no sloping near rows 	<ul style="list-style-type: none"> TTAADC Area with history of communal violence; other minorities reside also Land Use: houses, roads, plantations, crop lands, shops, churches, schools Settlements: Baludhumpara, Sarkimura, Twisarangchar, Iranikami, Para Kwitar, Nal Bagla, Diyari, Khumpani, Harbhang 	<ul style="list-style-type: none"> A banyan tree is present in the ROW in Harbhang village of local importance and during February every year about 2500 visitors 	

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		areas; ONGC rig in area – oversized vehicles pass through main and village roads		<p>Mandwi Forest Range</p> <ul style="list-style-type: none"> Wetland: None Surface water: Ponds Vegetation: dense – Teak, Sal, Gamar, Coconut, Beetle nut, Jackfruit, Banana, Banyan, Moringa, Tamarindus, Emblica, Mango, etc. Trees lost: No felling involved 	<ul style="list-style-type: none"> Surface water in PAI: 15 ponds Surface water crossings: Dakdu River crossing Groundwater springs, wells, pumps: about 8 handpumps General environmental conditions: air and noise pollution is low in the area 	<ul style="list-style-type: none"> Individual properties: Houses in settlement clusters – lines cross houses, army camps, crop lands. Mandwi hospital- 40m from ROW. Mandwi Bazar high school – 30m from ROW. Nec Colony SB School – 55m from ROW Road, footpath, rail, other utilities in PAI: Old Mandwi road Road, footpath, rail, other utilities crossings: 5 Road crossings, no rail crossing Human uses of surface water in PAI: None Human uses groundwater springs, wells, pumps: drinking, irrigation 	<p>come to the site for Nature worship.</p> <ul style="list-style-type: none"> Hindu temple – 55m from ROW St Stephen's Church – 45m from ROW Mandwi Baptist church – 110m from ROW Sridham Kwpra Baptist Church – 150m from ROW 	  
13	66 KV Gokulnagar SS to 33KV	14 km New Line on CC	EC: Sipahijila ED: Bisalgarh	<ul style="list-style-type: none"> Habitat type: passes through modified habitat 	<ul style="list-style-type: none"> Elevation: 34m Topography: Mostly flat 	<ul style="list-style-type: none"> Not in TTAADC area Land Use: Settlement, 	<ul style="list-style-type: none"> One locally important temple 	

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
	Madhupur SS	Urban, some stretches having open fields, fragmented vegetation and crop lands		<ul style="list-style-type: none"> Protected Areas: None Key biodiversity area: None Forest land: None Wetland: None Wildlife of interest: None Vegetation: grass, herbs, shrubs, plantations, trees Trees lost: No felling involved 	<ul style="list-style-type: none"> Ground conditions: stable Surface water: None Surface water crossings: None Groundwater springs, wells, pumps: handpumps General environmental conditions: good, some dust Garbage dumps along roads End point passes adjacent to proposed test laboratory site 	<ul style="list-style-type: none"> plantation, cropland, tea estate Settlements: houses, tea estates, shops, market, Bisalgarh Court is on road through which alignment passes, Bisalgarh English medium high school along road through which alignment passes at a distance of 25m Individual properties in ROW: Yes, houses Road, footpath, rail, other utilities: Agartala-Sabroom road, Bisalgarh Bypass Road, BSF Camp road, Northeast Frontier railway Road, footpath, rail, other utilities crossings: College Road crossing, railway crossing (UG) on alignment planned Human uses of surface water: none Human uses groundwater 	about 100m from line end point	

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
						springs, wells, pumps: drinking		
14	11 kV to CC Dayarampara Feeder	46 km New 11kV on CC Rural, crossing houses and settlements, overhead river crossing	EC: Sipahijila ED: Jampuijhila ESD: Dayarampara	<ul style="list-style-type: none"> Habitat type: Modified habitat Protected Areas: 1.3 km from Sipahijila WLS outside of ESZ Key biodiversity area: Sipahijila WLS Forest land: None Wetland: None Surface water: Haora river -OHL line crosses Vegetation: grass, herbs, shegun, sal, jackfruit, bamboos, shrubs, Areca nut, coconut, banana, rubber trees, teak Trees lost: No felling involved 	<ul style="list-style-type: none"> Elevation: 22m-35m Topography: mix of flat and complex. Some village houses built on flattened hillocks Ground conditions: loose soil, some unstable areas Surface water in PAI: Haora River, about 8-10 ponds, 4-5 irrigational canals Surface water crossings: OHL line crosses Haora River Groundwater springs, wells, pumps: 8-10 handpumps General environmental conditions: low dust and noise levels – rural settings. Minimal traffic 	<ul style="list-style-type: none"> TTAADC area and villages Land Use: houses, pig farms, roads, crop lands and agricultural fields, fragmented vegetation Settlements: Dayarampara, Golaghati, Asharampur, Mohantopara, Jogendrapara, Balurampara, Hirapur, Devendrapara Individual properties: houses on ROW – line crosses houses. Dayarampara Hospital – 10m from ROW. Dayarampara Tripura State Rifles Camp- 10m from ROW. Ujan Golaghat High school - 50m from ROW. Kamchuk Park along Haora River – 300m from ROW. 	<ul style="list-style-type: none"> Nowabari Church- 10m from ROW Hindu temple – 225m 	  

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						<ul style="list-style-type: none"> Road, footpath, rail, other utilities in PAI: village and main road. Haora River bridge - 20m from ROW Road, footpath, rail, other utilities crossings: more than 10 road crossings. Human uses of surface water in PAI: agriculture, plantation Human uses groundwater springs, wells, pumps: drinking 		
15	0.4 kV Lt to AB ESD Boxarnagar	25km LT to ABC Rural, some complex terrain, dense vegetation and mix of settlements	EC: Sipahijila ED: Boxarnagar ESD: Boxarnagar	<ul style="list-style-type: none"> Habitat type: Modified habitat Protected Areas: 8km from Sipahijila WLS Key biodiversity area: Sipahijila WLS at 8km Forest land: Section along Boxarnagar-Bisalgarh Road passes through Boxarnagar Forest Range. Line passing through Boxarnagar Forest 	<ul style="list-style-type: none"> Elevation: 18m-38m Topography: mostly flat with some sections of the line passing along elevated roads Ground conditions: stable, some loose soil along complex terrain Surface water in PAI: 8 medium to large ponds 	<ul style="list-style-type: none"> Some TTAADC villages like Dayalpara Land Use: houses, markets, individual shops, roads, 13 brick fields, Rokhia power plant. Bangladesh Border is about 510m from the section passing along the Boxarnagar Buddhist Stupa Settlements: Rahimpur, Veluachar bazar, 	<ul style="list-style-type: none"> Boxarnagar Buddhist Stupa in ROW is ASI protected monument at 0-1m Boxarnagar Durga temple-65m from ROW 	 

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				<p>range. TSECL to re-align LT lines to non-forest land for those lines passing through RF/PRF/PF etc.</p> <ul style="list-style-type: none"> • Wetland: None • Surface water: Ponds • Vegetation: Dense – mix of trees, herbs and shrubs • Trees lost: No felling involved 	<ul style="list-style-type: none"> • Surface water crossings: Nil • Groundwater springs, wells, pumps: about 7 handpumps and 10 bore wells • General environmental conditions: Moderately polluted in terms of dusty roads, which is mix of rural-unpaved/broken and metaled. Noise level is mostly low, except in town areas/markets like Veluachar Bazar. 	<p>Moynama, Manikyanagar, Ashabari, Boxarnagar Dakshinpara, Putia, Dayalpara, Adampur, Baramura, Thanemura, Motinagar</p> <ul style="list-style-type: none"> • Individual properties: houses, shops. Line passes over houses, shops. Boxarnagar community hall – 185m from ROW. Boxarnagar high school-10m from ROW • Road, footpath, rail, other utilities in PAI: Road, - Boxaranagar-Bisalgarh Raod, Border Road • Road, footpath, rail, other utilities crossings: 14 road crossing, Congested roads in market areas like Boxarnagar, Valuachar. 		 

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						<ul style="list-style-type: none"> Human uses of surface water in PAI: none identified Human uses groundwater springs, wells, pumps: none identified 		
16	66kV Bagfa SS to 33kV Jolaibari SS	18km New line on CC Roadside, crop land	EC: Belonia, ED: Santirbazar ESD: Jolaibari	<ul style="list-style-type: none"> Habitat type: Modified habitat, patchy vegetations Protected Areas: None Key biodiversity area: none Forest land: None Wetland: none Wildlife of interest: None Vegetation: teak, sal, mango, jackfruit, neem, banana plantation, Trees lost: No felling involved 	<ul style="list-style-type: none"> Elevation: 33m Topography: flat Ground conditions: stable, along roadside some loose soil Surface water: Muhuri river crossing; no ponds observed Surface water crossings: Muhuri River Groundwater springs, wells, pumps: 5-7 handpumps in settlements General environmental conditions: good, no major dust/noise pollution; no waste disposal observed 	<ul style="list-style-type: none"> Not in TTAADC area Land Use: open space, intermittent settlements/ houses, crop lands Settlements: intermittent - Jolaibari, Muhuripur, Santirbaza Jolaibari market at start of line Individual properties in ROW: none Road, footpath, rail, other utilities: Agartala-Sabroom Road Road, footpath, rail, other utilities crossings: Shillong-Agartala-Sabroom Road Human uses of surface water: agriculture 	<ul style="list-style-type: none"> None in PAI Saky-amuni Peace Pagoda - 1.3km; Shya-msundar Tilla – 1.77 km; Thakuri tilla- 2.95km; Pujakhola - 2.3 km 	

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						<ul style="list-style-type: none"> Human uses groundwater springs, wells, pumps: drinking 		
17	11 kV Bagfa feeder	15km New line on CC Mostly rubber plantation	EC: Belonia, ED: Santirbazar ESD: Bagafa	<ul style="list-style-type: none"> Habitat type: Modified habitat Protected Areas: Trishna WLS 8.71km Key biodiversity area: Trishna WLS 8.71km Forest land: None Wetland: none Wildlife of interest: None Vegetation: rubber plantation, teak, sal, mango, banana plantation Trees lost: only lopping/trimming required 	<ul style="list-style-type: none"> Elevation: 32m Topography: flat Ground conditions: loose soil Surface water: None Surface water crossings: None Groundwater springs, wells, pumps: 1 handpump General environmental conditions: rural, some dust from the loose soil 	<ul style="list-style-type: none"> Tribal family hut at start but not in TTAADC Land Use: mostly rubber plantation, some open space, start of line has 5-6 huts Settlements: at start, the line starts in the compound of tribal hut Individual properties in ROW: Yes, tribal hut at start of lines Road, footpath, rail, other utilities: road is rural and unmetalled Road, footpath, rail, other utilities crossings: none Human uses of surface water: none Human uses groundwater springs, wells, pumps: handpumps for drinking water 	<ul style="list-style-type: none"> None in ROW Kali Mandir – 95m from end point 	

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16	11kV New CC line: Chittamura Feeder	12km New 11kV CC line	EC: Belonia ED: Belonia	<ul style="list-style-type: none"> Habitat type: Modified habitat Protected Areas: Trishna WLS – 5km Key biodiversity area: Trishna WLS at 5km Forest land: unnotified forest, Muhuri RF Wetland: None Surface water: Muhuri River Vegetation: Fragmented mostly. Some dense on hills cut down to build road. Trees- Sal, Shegun, Neem, Mango, Areca nut, banana, jackfruit, Tamarind, etc Trees lost: No felling involved 	<ul style="list-style-type: none"> Elevation: 9m to 48m with mostly 20m Topography: The alignment is in flat topography along the main road with minor sections passing over cropland and one section from cropland to main road via a brick field. Ground conditions: stable. Some gentle rolling of the road Surface water in PAI: 12 ponds Surface water crossings: Muhuri River Groundwater springs, wells, pumps: None General environmental conditions: Noise levels are low although dusty road sections are observed. 	<ul style="list-style-type: none"> Not TTADC Area Land Use: limited houses. Mostly open and croplands along ROW. Line crosses cropland, brickfield and open field in some sections. 11 brickfields, industrial area at start of line Settlements: Belonia, SBC Nagar, West Kalobaria, Sarasima, Chittamura Individual properties: only at end point – houses and shops. Shop and house in ROW near Chittamura end point. Brindaban Roy Para School – 50m from ROW Road, footpath, rail, other utilities in PAI: roads Road, footpath, rail, other utilities crossings: 11 main road crossings Human uses of surface water in 	<ul style="list-style-type: none"> Lokenath temple - 20m from ROW 	  

Sl. No.	DL Name	ckm and type	Location/ Electrical Circle/ Electrical Division	Key Biological features in PAI	Key Physical features in PAI	Key Socio-economic Setting in PAI	Key physical cultural resource features in PAI	Photolog
						PAI: brickfield, cropland <ul style="list-style-type: none"> Human uses groundwater springs, wells, pumps: none 		
19	0.4kV LT to ABC: ESD Poangbari	20km LT to ABC	EC: Belonia ED: Sabroom ESD: Poangbari	<ul style="list-style-type: none"> Habitat type: Modified habitat Protected Areas: None Key biodiversity area: None Forest land: Tekka RF - 1.2 km from start of line Wetland: none Surface water: No rivers/streams Vegetation: Fragmented vegetation mostly – Bamboo, cane, Sal, Ficus, Areca nut, Jackfruit, etc Trees lost: No felling involved 	<ul style="list-style-type: none"> Elevation: 17m to 31m Topography: Mostly flat topography across rural settings and along main road Ground conditions: Stable Surface water in PAI: 35 ponds. No river/streams Surface water crossings: none Groundwater springs, wells, pumps: 9 handpumps General environmental conditions: Road condition is good with low air and noise pollution. 	<ul style="list-style-type: none"> TTAADC Area Bangladesh International Border runs parallel to the entire route and is about 130m at the nearest point. Land Use: scattered houses, croplands, plantations open fields Settlements: Hrishyamukh, Rojnagar, Krishnanagar, Srinagar, Poangbari, Madhavnagar. Individual properties: houses, shops. Nalua Veterinary dispensary 28m from ROW. Sishutirtha 	<ul style="list-style-type: none"> Jyotiswar a-nanda School, and religious sect school/ Ashram - 5m to ROW Moham-ayabari durga temple – 5m to ROW Shibpur Kali Mandir – 10m from ROW Amtali Durgabari – 30m from ROW 	  

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						<p>Vidyamandir school –50m from ROW Krishnanagar High school – 20m from ROW Hrishyamukh Durgacharan Memorial English medium school – 20m from ROW Hrishyamukh High school –22 m from ROW</p> <ul style="list-style-type: none"> • Road, footpath, rail, other utilities in PAI: Main Road • Road, footpath, rail, other utilities crossings: 6 road crossings • Human uses of surface water in PAI: plantation, washing • Human uses groundwater springs, wells, pumps: drinking 	<ul style="list-style-type: none"> • Ram Thakur Mandir - 25m from ROW • Hrishyamukh Kali Mandir–4 m from ROW 	

Source: ADB TA Consultant

SAMPLE OF COMPLETE FIELD SURVEY CHECKLIST

Altiv. 65m(421) = 58m → 27/m

ENVIRONMENT DUE DILIGENCE - SITE VISIT CHECKLIST

Form No: 2
Date: 10/23/21

Project Name: ESNV Project - 15.000.01
Sector: Power
Location of survey site/route: New ESNV Line by Oya Grande - Section to Pinar Loken

• DI Name/No/Category: ESNV Project to Pinar Loken

• Village/Locality: Pinar Loken Sub-Division: Barahona Dist: A. T. J. Pinar

• GPS Coordinates: 24° 15' 52" N Altitude: 65m Topography: Rolling Hills

Site selection justification (technical basis): from Pinar to Aguas de Pinar along OAT 23ms 6010 - 6015

Weather condition: Sunny, Clear, Dist

RDW/Area covered (km²): 2x/16km Inspection Time: 12:30 PM

• Visiting Team: DATA Consultant (For EDC) with EDC Eng.

12:30 AM → 12:45 PM | EMF - 0.4 micro Tesla

Before a site visit is carried out, the expert is suggested to complete the following:

- Knowledge of the ADB/IFC ESM Policy Document
- PC's EHS - Sector specific
- Detailed review of Site, area & Project documents

Record the Environmental condition during walkover in the web provided table (EHS) form during the planned activity. List the existing key Environmental issues that you are likely to find and the good practice measures to control these risks.

DC/ROM Siting Criteria:

- The siting or location of PCW to be selected/avoided, after having considered various alternatives for the purpose so as to avoid and minimize impacts & risks to physical, biological and social environment. If the PCW is proposed/located, the evaluation shall be done to justify the R/R/ACT, use based on environmental/ecological aspects and socio-economic feasibility in area.
- The site selection shall be done keeping in view the existing environmental and wildlife laws in mind. The site under question should be sufficiently away from the nearby residential areas, wildlife protected areas, other sensitive areas to avoid the adverse impacts due to the project activities.

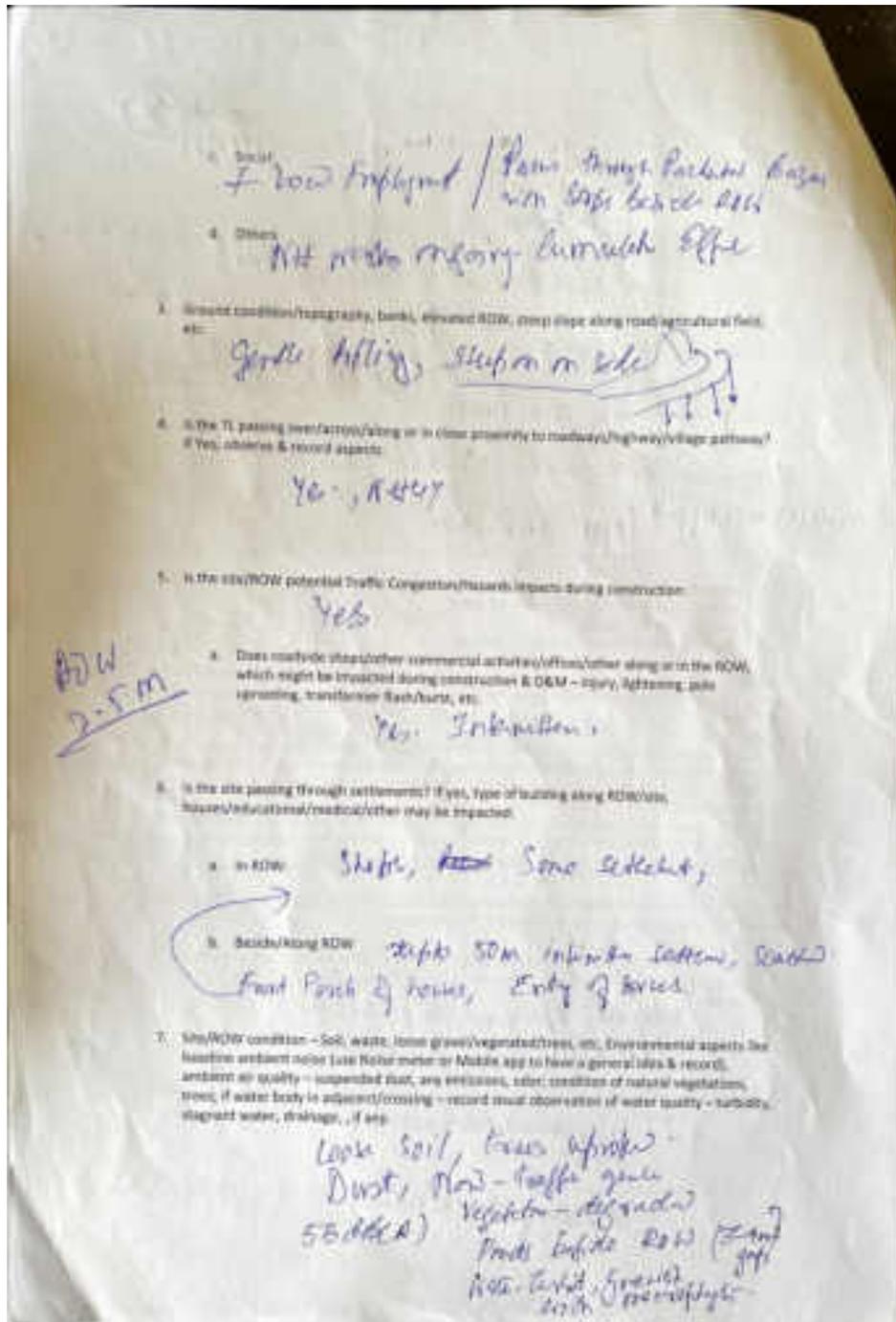
Based on the RDW/site condition, where the implementation is planned and also the anticipated risks & impacts from such projects, record observation for topics below:

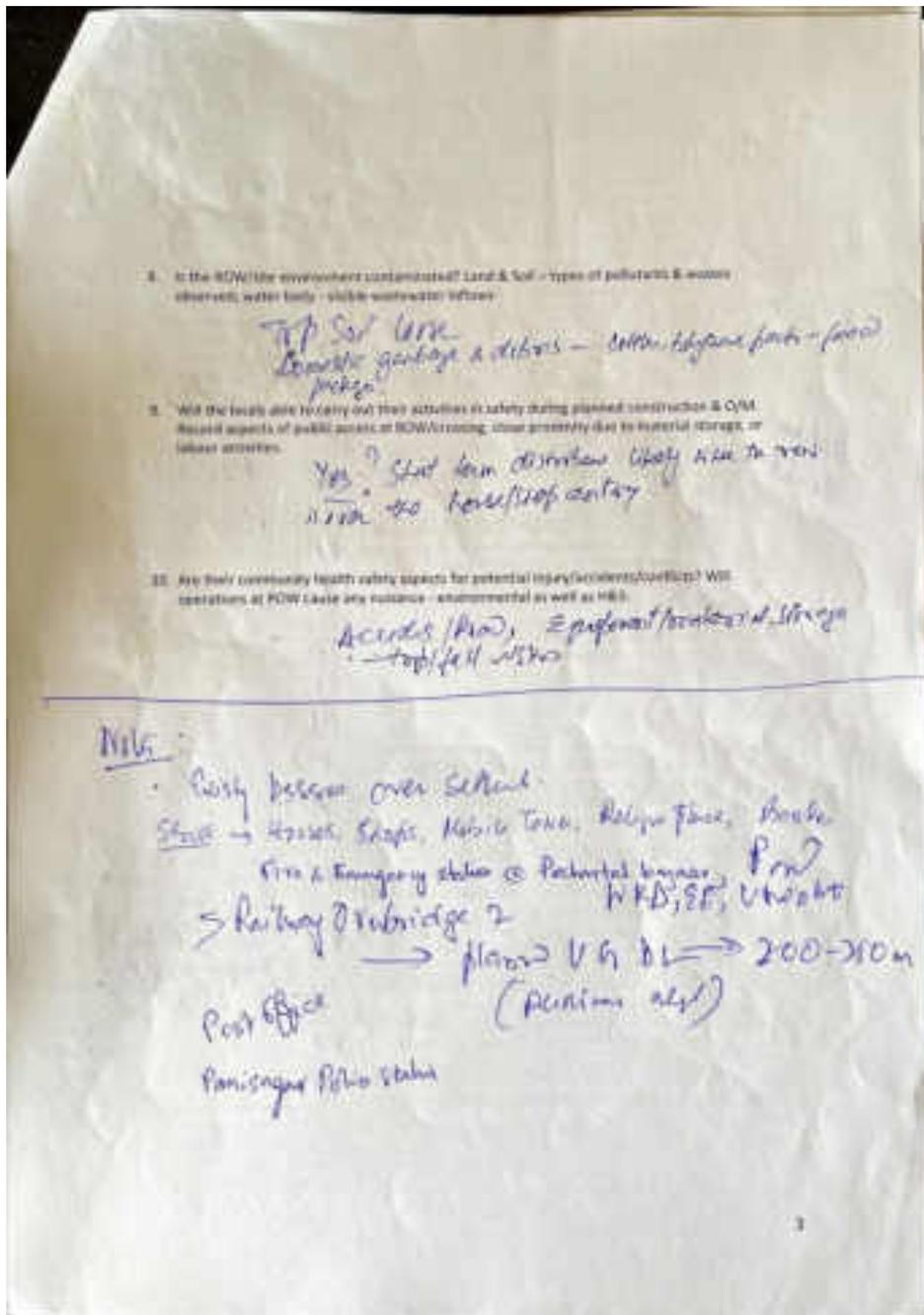
1. Major land use of site (50 m buffer) for planned activity. In ROM, include along up to 50 m water bodies, agricultural fields, settlements, built up, forested, vegetated, others. Record details:
Settlement, open land, agricultural fields, Dec River crossing from bridge

2. What potential EHS & Social risk & impacts can be anticipated based on planned work:

a. Environmental:
Dust, Conversion of land, Conversion of fields

b. Community health & safety:
Corruption, Accident, Storage of materials during road





SITE EVALUATION CHECKLIST

Aspect/Domain	Trigger	Yes/No	Remarks
Protected Areas	Is the project site located in protected areas designated by the country's law or international treaties and conventions?	NO	Early going for me
	Is there a possibility that the project will affect the protected areas?		
Ecosystem	Does the project site/DL encompass primary forests, tropical rain forests, ecologically sensitive habitats (e.g. Corridors, wildlife activity areas)?	NO	
	Does the project site encompass the protected habitats of endangered species designated by the country's law or international treaties and conventions?	NO	
	Are significant ecological impacts anticipated?		tree falling?
	Are adequate measures to be taken to prevent disruption of migration routes and habitat fragmentation of wildlife and fisheries?	NO	
	Is there any possibility that the project will cause the negative impacts, such as destruction of forest, peatland, desertification, reduction in wetland areas, and disturbance of ecosystem?	NO	Road kill
	In cases where the project site is located in underdeveloped areas, is there any possibility that the new development will result in extensive loss of natural environments?	NO	
	Topography	Is there any soft ground on the route of power distribution lines that may cause slope failures or landslides?	YES
Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites?		YES	Yes, early going
Living & Livelihood	Is there a possibility that the project will adversely affect the living conditions of inhabitants?	NO	
	Is Agricultural Land/Cultivation going to be affected by the DL?	NO	
Community Risk	Is there a possibility that diseases, including infectious diseases, such as HIV will be brought due to immigration of workers associated with the project?	NO	
	Is there any possibility that installation of structures, such as power line/towers will cause a radio interference?	NO	
	Is there any possibility that installation of structures, such as power line/towers will cause accidents, electromagnetic, EMF, noise or risk due to natural hazards as settlements are in impact zone?	YES	Check the number of towers, safety of ground along way
Cultural & Heritage	Is there a possibility that the project will damage the local archaeological, historical, cultural, and religious heritage? If any are in the ROW	YES	Supporting bridge, temple house, etc.
Landscape	Is there a possibility that the project will adversely affect the local landscape? Modified Ecosystem?	YES	How water flow, trees, etc.
Indigenous People	Will the power line installation impact the culture and lifestyle of ethnic minorities and indigenous peoples, if any, in the area?	NO	
	Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	NO	

Rubber plantation
 4

CHECKLIST SURVEY FOR ECOLOGY & BIODIVERSITY

Sl. No.	Particulars	Yes / No	Remarks			
			Name	Number	Gift	
1	<p>Trees present fully / partially within ROW?</p> <p>If Yes note the numbers, approximate girth size at breast height in cm and species names (local names in fine) in Remark column.</p> <p>Please take photographs of species that cannot be identified (leaf, leaves & flowers)</p> <p>For those identifiable, a couple of sample photographs shall suffice.</p>	Yes	<p>Leucaena sp.</p> <p>Acacia</p> <p>Shorea</p> <p>Banana</p> <p>Korri (Albizia lebbek?)</p> <p>Mimosa</p> <p>Shrub</p> <p>Jackfruit</p> <p>Fig</p>			Paper in Tajpali Lagerboma Ghoshan
2	Are the trees in good condition?	Yes	Some killed by wood borer			
3	<p>Are signs of tree falling along the ROW?</p> <p>Please note numbers in Remark column.</p>	Yes	due to wood borer			
4	<p>Trees present outside the ROW?</p> <p>If Yes note the numbers, approximate girth size at breast height in cm and species names (local names in fine) in Remark column.</p> <p>Please take photographs of species that cannot be identified (leaf, leaves & flowers)</p> <p>For those identifiable, a couple of sample photographs shall suffice.</p>	Yes	<p>Leucaena</p> <p>Acacia</p> <p>Shorea sp.</p> <p>Korri</p> <p>Banana</p> <p>Lantana camara</p>			
5	<p>Shrubs & Vines present in the ROW?</p> <p>If Yes, note the numbers and species names in Remark column.</p> <p>Please take photographs of species that cannot be identified (whole plant, leaves & flowers)</p> <p>Please note whether are grasses and are they to be noted too.</p>		<p>Banana</p> <p>Ochid / Epiphytes</p> <p>Euphorbia / daisy</p> <p>Trifolium grass</p> <p>Cassia / Pigeon / Some leg</p> <p>Trifolium grass</p> <p>Mimosa</p>			
6	<p>Presence of Waterbody / ponds / seasonal water bodies partially / fully in ROW?</p> <p>Mention the approximate size in m² of pond and name of the river / seasonal body, if known in Remark column.</p>	Yes	Dow River near Pancharol			

Sl. No.	Particulars	Yes/No	Remarks	
	Please take photographs, if present			
7	Is around ECW, what is the approximate distance from the edge of the ECW?			
8	Are presence of fishes and larvae visually assessed?	NO		
9	Are the banks of the waterbody littered or lined with vegetation? If Yes mark the numbers and species names as Remark columns. Please take photographs of species that cannot be identified (bark, leaves & flowers, whole plants)	NO	Name	Number
10	Presence of algae in the waterbody? Please take photographs, if present			
11	Presence of aquatic plants? If Yes mark the numbers and species names as Remark columns. Please take photographs of species that cannot be identified (bark, leaves & flowers, whole plants) For those identifiable, a couple of sample photographs shall suffice	Y	Name	Number
			Palm	
			Chitola	
			Palm	
12	Presence of Dragonflies, damselflies & Butterflies in and around ECW? Please take photographs and note the names & numbers of species if identifiable	NO		
13	Presence of any other insects (both visual & audible) in and around ECW? Please take photographs and note the names & numbers of species if identifiable	NO		
14	Presence of reptiles & amphibians (both visual & audible) in and around ECW? Please take photographs and note the names & numbers of species if identifiable	NO		
15	Presence of birds (both visual & audible) in and around ECW? Please take photographs and note the names & numbers of species if identifiable	Y	Name	Number
			Birds	
			Acrochordus y.	
16	Presence of mammalian animals (both visual & audible) in and around ECW? Please note the names & numbers of species	NO	Name	Number

Sl. No.	Particulars	Yes / No	Remarks	
17	Signs of presence of wild animals (including dung & footprints) in and around R/W? Please take photographs and note the names & numbers of species if identifiable	No	Name	Number
18	Any visible signs of deterioration of animals in birds in and around R/W? Please take photographs and note the names & numbers of species if identifiable	No	Name	Number
19	Are birds seen to perch on the existing Distribution lines / Transmission lines near the walkover site? If Yes, mark the numbers and species names in Research column. Please take photographs of species that are perching	Yes	Name	Number
20	Presence of any signboards for wildlife Corridor near the R/W? Please note the name in the Research column and take photos	No		
21	Presence of any woody / forest area near the R/W? Please note the name, if known in Research column		Present R/W within forest areas. Being re-logged	And Panchayat RS? & Pan sign??

Recorded by:

Persons Consulted during walkover: Now available in molit sheets

S.No.	Name	Residence proximity to DL/site	Services/feedback made		

7

Source: ADB TA Consultant

Shankar Rao - 9736451300, Sr. Manager, SOE - Durgam Cheruvu
 Shekhar Khati Bhai - 9851762982, Manager - SOE - Durgam Cheruvu

ENVIRONMENTAL DUE DILIGENCE - DISTRIBUTION - SITE VISIT CHECKLIST
 Form No: _____

Project No: _____

DL Name/VV/Capacity: 33 kV
 Number of villages supplied: 4 wards of within Agalata Municipal Corporation Area 5 wards of gram panchayat
 Number of households supplied: Approx 14,000 consumers
 Village/Locality: Durgam Cheruvu Sub-Division: Andar District: N.T. State: Telangana
 DL/ROW route map - attach to checklist, use GPS to map during site visit walkover
 DL/ROW length covered (km/m): 8.75 km
 Start Point Connection Location/Type e.g., substation name, 33/11KV transformer: 33, Taha, Grid 102/99 KV CS.
 End Point Connection Location/Type: 23°42'20.74"E 91°26'11.44"W / Durgam Cheruvu 33/11 KV CS.
 GPS Coordinate Start Point: 23°52'0.144"E 91°26'50.014"W GPS Coordinate End Point:
 Altitude: 295m Topography: Plain, rocky
 DL/ROW survey site selection justifications (sensitivity here):
 Weather condition:
 Date: 18th Mar 2021 Inspection Time Start and End: 3:30 PM
 Site Visit Team:

Before a site visit is carried out, the expert is to complete the following

- Knowledge of the ADB SPS 2000 Safeguards Requirement 2
- Knowledge of the IFC's E2000 - Sector Specific
- Desktop review of project documents, the general area in which DL/ROW located, and the existing or proposed DL/ROW alignment

Record the existing physical, ecological, and social environmental condition during site visit walkover. Consider the potential environment, health and safety impacts and risks due to the planned activities. Identify the environmental impacts and risks that are most likely to occur, including under scenarios of natural disaster and human-induced accident and the good practice measures required to manage the impacts or control the risks.

DL/ROW Siting Criteria:

- The siting or routing of a DL/ROW should have been selected after having considered various alternatives to avoid and minimize impacts and risks to physical, ecological, and social environment. If an existing or proposed DL/ROW being surveyed is needed to be altered to avoid or minimize risks, the evaluation shall be done to inform finalization of the DL/ROW with technical, environmental and social feasibility in mind

Based on the existing physical, ecological, and social environmental condition encountered during the DL/ROW site visit walkover, and considering anticipated impacts and risks from the planned activities, record following observations.

1. Record all land uses within each 500m section of the DL/ROW and in 50 m buffer on either side from the start point to the end point - agricultural fields, fallow uncultivated land, settlements, other built-up area, forested, scrubland, grassland, wetland, road, rail, drainage, etc. Record detailed description of major land uses within ROW and adjacent for inclusion in IEE, take photographs of different land uses in context of DL/ROW and mark on a map/sketch map to show how they relate to it.

DL/ROW Survey Section	Agricultural	Settlement (including names)	Forest (note type)	Scrub	Road	Drainage	Other (note type)
-----------------------	--------------	------------------------------	--------------------	-------	------	----------	-------------------

1

Start point to 800m				✓		within 500m 25m
800m to 2km	Chandni	Chandni				
2km to 5.5km						Army area
5.5-8.25	✓	Chandni				
...						
... to End point						

2. Record all habitat types within each 500m section of the DL/ROW and in 50 m buffer on either side from the start point to the end point - modified (e.g., urban, agricultural, plantation) and natural (e.g., forest, scrub, grassland, wetland etc.) and for natural habitat assess its condition. Record detailed description of major habitat types within ROW and adjacent for inclusion in IEE, take photographs of different habitat types in context of DL/ROW and mark on a map/sketch map to show how they relate to it.

* Cynodon dactylon
Chandni sp

DL/ROW Survey Section	Modified	Natural, Highly Degraded	Natural, Degraded	Natural, Good	Natural, Pristine	Other (note type)
Start point to 800m			✓			Scrub area, <u>Lantana</u> , <u>Solanum</u> , <u>Blanca</u>
800m to 2km	✓					
2km to 5.5km	✓					
5.5-8.25	✓		✓			<u>Scrub</u> , <u>Cynodon</u>
...						
... to End point						

3. Is the DL/ROW passing through settlements?
If yes, identify what types of properties and activities are sited alongside the DL/ROW including houses/shops/businesses/informal street vendors/educational/medical/religious structures or buildings that may be directly or indirectly impacted-for example, by blocking access, accidental damage during construction works, lightning strikes, pole uprooting, transformer flash/burst, etc. Record detailed description for inclusion in IEE and take photographs in context of DL/ROW.

- a. In ROW: Commercial near Chandni area & Chandni
- b. On Either Side ROW: Settlement, agri, sugarcane, road, fuel station, Commercial

4. Is the DL/ROW passing through any private land? Yes is Chandni & Chandni

5. Record ground conditions, topography and access conditions encountered. Make particular note if DL/ROW located on a bank, elevated land, or steep slope along road/agricultural field, etc. Also note if foundations of existing poles are compromised. Identify if access and suitable land for temporary construction facilities is readily available, subject to contractor's negotiation with land owner. For

Plain, rolling, bank, agri, roads, any

existing road access note its condition, e.g., whether roads are gravel. Record detailed description for inclusion in IEE, take photographs.

DL/ROW Survey Section	Ground/Soil Conditions	Topography	Road Access/Condition	Land for Temporary Construction Facilities
Start point to 800m	not worked	plain & steep, rocky	with a gate and no roads	available
800m to 2km	"	plain	Yes, beside road	available
2km to SS	"	plain, rocky	Army area, road access	"
SS-8.75	"	plain	Yes	"
... to End point				

6. Record general condition of DL/ROW and 50 m buffer on either side – including presence of open dumped solid waste, loose soil, or gravel, and any visible soil contamination e.g., from oil leaks etc. Environmental aspects like baseline ambient noise (use Noise Meter or Mobile app to have a general idea), ambient air quality – visually identify any suspended dust, sources of emissions, odor, presence and condition of natural vegetation, trees; if water body crossed/adjacent – visual observation of water quality – turbidity, stagnant water, poor drainages, visible wastewater inflows etc. Record detailed description for inclusion in IEE, take photographs:

DL/ROW Survey Section	Open Dumped Waste (types observed)	Visible Pollution (types observed)	Trees and Vegetation	Noise Level	Air	Water Quality/Pollution	Other Remarks
Start point to 800m	tree/plant remain	none seen	Shrubbery hedges	Low	Low	none	with a gate
800m to 2km	household waste	none	woodcut, jackfruit	medium	medium	-	-
2km to SS	none	none	some plantation	none	none	none	Army area
SS-8.75	household	-	hedge	-	-	-	-
... to End point							

7. Record if the DL/ROW is passing over/across/along or in close proximity to roadways/highways/railways/village pathways/other distribution or transmission lines/other public utilities/drains etc.? If yes, observe, take photographs, and record detailed description for inclusion in IEE:

Distance Range Meters	Number of Responses	Belongs	Other Response	DL DATE	DL DATE	DL DATE	DL DATE
0-100	NO	NO	-	Yes	NO	NO	Yes
100-200	NO	NO	-	Yes	NO	NO	Yes
200-300	Yes	NO	NO	Yes	NO	NO	Yes
300-400	Yes	NO	Yes	NO	NO	NO	Yes
400-500	Yes	NO	Yes	NO	NO	NO	Yes
500-600	Yes	NO	Yes	NO	NO	NO	Yes
600-700							
700-800							
800-900							
900-1000							
... To End point							

8. If the DL/ROW is passing over/across/along or in close proximity to transport routes what is the potential for traffic congestion/hazards to vehicles and pedestrians impacts during construction e.g. narrow roads that will be blocked? *Some access roads / local roads might be impacted in Chandmani & Dargy Nagar*
9. What potential site specific environmental impacts and risks can be anticipated based on the planned activities?
 - a. Physical/Ecological Environment: *None anticipated except some disturbance to shrubs & herbs due to storage*
 - b. Community Health and Safety: *Accidents due to restriction of traffic*
 - c. Physical Cultural Resources: *None*
 - d. Others:
10. Will affected persons and communities be able to carry out their day-to-day activities in safety and without injury or risk of accident during construction and maintenance works? Record aspects of public access, crossings, and general presence of people, especially children, in the survey area. *Yes low risk except in Chandmani area where overcrossing present*
11. Will there be potential for social conflicts during the construction and maintenance works as a result of general disruption and disturbance and presence of outside labor in the survey area? *No*
12. Are there any issues with drinking water quality observed or informed by consultees in the survey area? *NO*
13. Are there any issues with sanitation and waste disposal observed or informed by consultees in the survey area?
14. Will temporary construction facilities be required for the construction workforce e.g. due to being beyond reasonable walking distance to toilets at existing TSECL substations or stores? Record nearest TSECL, public or government-managed toilet facilities that could be utilized. *SS areas*
15. Are there any environment, health and safety issues with the existing DL/ROW alignment that require it to be shifted to avoid or minimize impacts e.g. crossing forest land or existing poles, or transformers to be replaced or improved? If yes, record detailed description for inclusion in IEE, take photographs. For alternative alignments identify potential options for any minor deviations and/or major rerouting during site visit walkover. *No transformers. Some issues might arise in grid area*
16. Record condition of all existing transformers connected to the DL. Photographs of all existing transformers along the DL/ROW to be taken including rating plate if visible from ground, and for note if pole mounted transformers are fenced or pole mounted have anti climb deterrents to prevent

2. On-site works - For poles mounted identify if they are covered by a 10m x 10m or 10m x 20m protection zone.

None on the middle top or the other side.

U. No.	Pole or Pitth Mounted	Model and date manufacture	Roaming / Sealed Type (Y/N)	Warning Signs (Y/N)	Force (Y/N)	Are there any base for work Mounted	Is there any base	What will be the surface or ground water source?

17. For connections into existing substations are any works required within the substation to make the connection. If yes, provide description of works required e.g. control panel, circuit breaker, outdoor cabling etc.

Not works within SS

EPI. FORM 2010. 14.07.10. 001

Factor/Category	Question	Y/N/NA	Comments
Soil, Silt and Topography	Is there any silt or sand accumulation in the course of distribution line that may cause siltation or landslides?	N	
	Is there a possibility due to transparency or presence waterbodies that soil runoff will result from temporary soil storage during pole installation and other waterbodies?	N	Approx 3-4 poles to be replaced
Protected and Forest Areas	Is the DL/RDW located in protected or forest area designated by the country's laws or international treaties and conventions? If so, please provide the details	N	
	Is there a possibility that the project will affect the protected or forest area in the wider survey area?	N	
Ecosystem	Does the DL/RDW encompass or pass close to forests, wetlands, ecologically sensitive habitats (e.g. wildlife corridors, wildlife activity areas)?	N	
	Is there any possibility that the project will cause the negative impacts, such as destruction of forest, peatland, desertification, reduction in wetland areas, and disturbance of ecosystem?	N	
	Does DL/RDW encompass or pass close to protected habitats of threatened (CR/EN/VU) species designated by the country's laws or international treaties and conventions? Is there any other evidence of threatened species being supported by survey area?	N	
	Will the project disrupt migration routes and/or result in habitat fragmentation for wildlife and livestock?	N	
	In cases where the project site is in undeveloped areas, is there any possibility that the new development will result in extensive loss of natural habitat?	N	
Landscape and Visual	Is there a possibility that the project will adversely affect the local landscape or have a visual impact e.g. it will be any infrastructure or visual clutter due to many existing DL and TL in area?	N	
Living & Livelihood	Is there a possibility that the project will adversely affect the living conditions of inhabitants?	Partial	Removal of crosscutters & signposts in Chanderman
	Is agricultural land/cultivation/community or private forest going to be affected by the distribution line?	Partial	approx 200m field
Community Risk	Is there any possibility that installation of distribution lines will cause radio interference?	N	existing alignment
	Is there any possibility that installation of distribution line will cause accidents, electrocutions, EMF, corona noise or risk due to natural hazards where settlements are within 50m either side of RDW?	N	EC by existing
	Is there a possibility that diseases, including infectious diseases, such as HIV brought by immigration of workers associated with the project could be spread to community?	N	in urban setting
Physical Cultural Resources	If any are in the RDW plus 50m either side is there a possibility that the project will (accidentally) damage the local archeological, historical, cultural, and religious physical cultural resources?	N	
Indigenous People	Will the power line installation impact the culture and lifestyle of ethnic minorities and indigenous peoples, if any, in the area?	N	
	Will rights of ethnic minorities and indigenous peoples in relation to land and resources be impacted?	N	

CHECKLIST SURVEY FOR SOCIAL ENVIRONMENT

6

(Project area of influence is DL alignment plus 50m either side ROW, site wallover to include perpendicular traverses of street at minimum 20m interval)

Sl. No.	Particulars	Yes / No	Remarks				
			Sl No. (Name)	Use	Other Details	Physical Condition	Distance to DL
1	Individual properties (structures/buildings) present fully / partially within ROW? If Yes provide details of use - residential, shops, business, school, hospital, clinic etc., physical condition, distance to DL center line, and other pertinent details in Remark column. Mark on a map/grid coordinates. Please take photographs of the properties in the context of the DL/ROW	Y					
			Chandana	School		Good	Boundary - 5m
			Army primary school			Good	50m approx
2	Individual properties or groups of properties (structures/buildings) present outside the ROW? What is the approximate distance from the edge of the ROW? If Yes provide details of use, number in case of groups of properties, and other pertinent details in Remark column. Mark on a map/grid coordinates. Please take photographs of the properties in the context of the DL/ROW						
			House	30	Domestic		50m approx
			Shops	10	Commercial	Encroachment	within ROW
			Shops	20	Commercial		10m
3	Community water resources (wells, pumps, springs, surface water) present fully / partially within ROW? If Yes provide details of use, distance to DL center line, and other pertinent details in Remark column.	N					

building) (2m)

No.	Variations	Yes / No	Remarks																																																																		
	<p>What is the approximate distance from the edge of the ROW?</p> <p>If Yes provide a description, determine importance, physical condition, and note other pertinent details in Remarks column.</p> <p>Mark on a map/gpd coordinates.</p> <p>Please take photographs of the physical cultural resources in the context of the DI./ROW</p>		<table border="1" style="width: 100%; height: 100%;"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>																																																																		
7	<p>Presence of any signboards for potential physical cultural resources near the ROW? Please note the name in the Remarks column and take photos</p> <p>Mark on a map/gpd coordinates</p>	N																																																																			
8	<p>Is agriculture or plantation land crossed?</p> <p>If Yes, identify if grazing or crop land, type of livestock and crops grown, if land is irrigated, seasonality of agricultural activities</p>	Y	Paddy field - one crop approx 200 m																																																																		

Source: ADB TA Consultant

APPENDIX 5: FLORA AND FAUNA PHOTOLOG
Photographs of Birds Observed During Site Visits



Error! Hyperlink reference not valid. / Spotted Dove (*Streptopelia chinensis*)



Black Drongo (*Dicrurus macrocercus*)



Eurasian Collared Dove (*Streptopelia decaocto*)



Nest of Eurasian Collared Dove (*Streptopelia decaocto*)



Nest of House sparrow (*Passer domesticus*)



Lesser Whistling-duck (*Dendrocygna javanica*)

Electrocuted Remains of Indian myna (*Acriditheres tristus*) Observed During Site Visit



Photographs of Some Herbs and Shrubs observed in Substations



Melastoma malabathricum (Malabar malestoma)



Leucas aspera



Tabernaemontana divaricata (crape jasmine)



Catharanthus roseus (Pink Periwinkle)



Chromolaena odorata / *Eupatorium odoratum*



Thevetia peruviana (Yellow Oleander)



Diplazium esculentum (fiddlehead / edible fern)



Colocasia sp.



Mikania micrantha



Lantana camera



Cynodon sp.



Senna tora / *Cassia tora* (photo from internet)



Momosa Pudica (Touch me not, photo from internet)



Hibiscus rosa sinensis (Chinese hibiscus, photo from internet)



Clerodendrum infortunatum



Setaria glauca

APPENDIX 6: IBAT ANALYSIS

1. Note: IBAT is not identifying protected areas within Tripura, so proximity maps may not show them as present.

SUBSTATIONS (SS)

2. **33/11 KV Rajnagar Substation:** The SS is located at 633m from the notified ESZ of the Trishna Wildlife sanctuary. IBAT assessment had captured a total of 1591 of floral and faunal species within 50 km radius of the SS. Out of the 1591 species IBAT has suggested the presence of 128 species that has been listed in the IUCN red data list as critically endangered (18 species including 1 floral, 9 pisces all of which are marine species, 4 reptilian out of which two are marine, 3 avian and 1 mammalian species), endangered (44 including 1 floral, 9 mammals, 5 aves, 5 reptilian, 20 fishes out of which 19 are marine, 3 Echinodermata all of which are marine, and 1 cnidaria which is marine species) and vulnerable (66 species including 3 floral, 1 marine Cnidarian, 2 marine Echinodermata, 29 fishes out of which 27 are marine, 7 reptiles including 3 marine species, 8 birds and 16 mammals out of which 4 are marine species). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

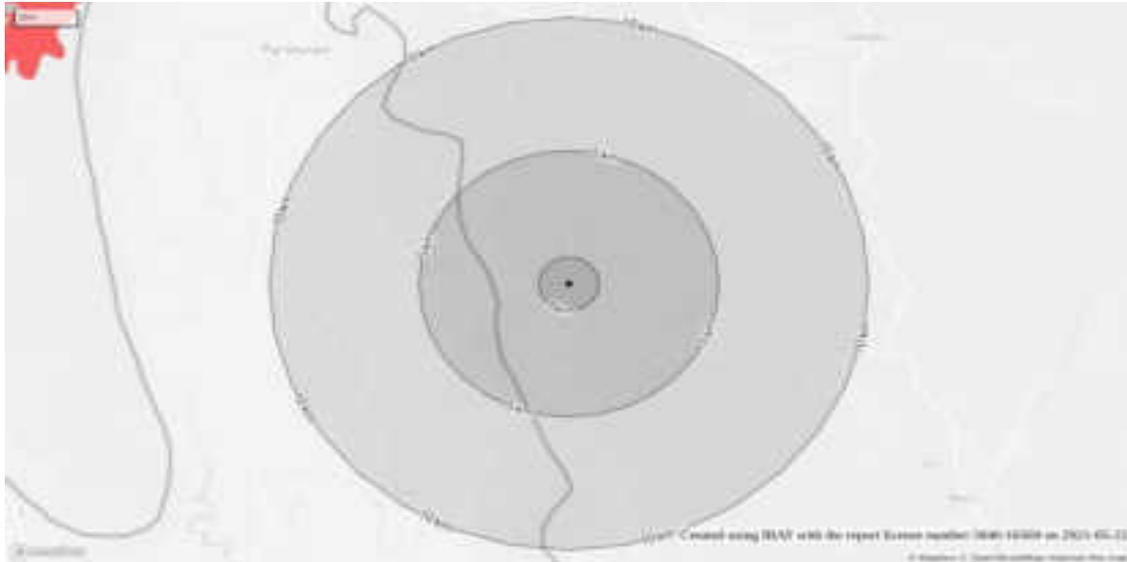
3. Surprisingly Indian Bison which is the key species for Bison National Park (housed within the Trishna WLS) is missing in the IBAT list but known to occur. The Trishna Wildlife Sanctuary is an IBA and a KBA, it is a possible critical habitat for Bengal Slow Loris (*Nycticebus coucang*) an IUCN EN **Error! Hyperlink reference not valid.** *Trachypithecus phayrei* (Phayre's leaf monkey) another IUCN EN and GoI Schedule I species. *Anhinga melanogaster* (Oriental Darter) an IUCN NT and Schedule IV congregatory species has also been reported from the WLS. However, these species are not reported in and around the SS footprint and thus the extent of any critical habitat shall not extend to it.

4. *Melastoma malabathricum* (Malabar melastoma), *Chromolaena odorata*/*Eupatorium odoratum*, *Leucas aspera* etc. were observed in the substation along with *Tectona grandis* (teak), *Artocarpus heterophyllus* (jackfruit) and (bamboo) *Dendrocalamus hamiltonii* and rubber plantations in the surroundings. These are all not evaluated (NE) species as per IUCN. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



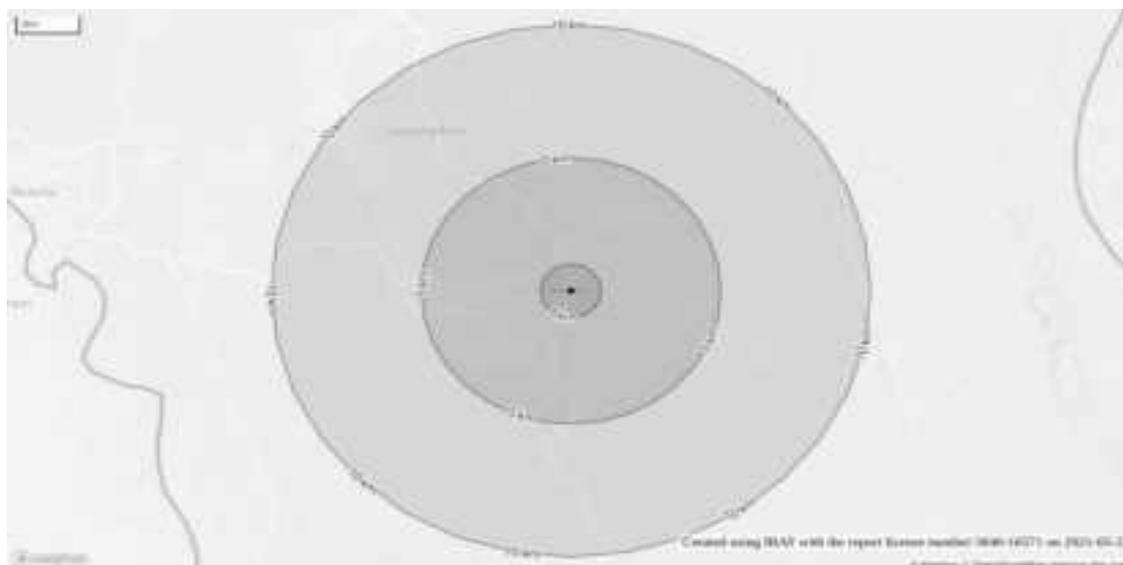
5. **33/11 KV Hrishamukh Substation:** Trishna Wildlife Sanctuary is about 19 km away from the SS. The area where the SS is located has been levelled, to enable its construction in hillock area. IBAT assessment had captured a total of 1606 of floral and faunal species within 50 km radius of the SS. Out of the 1606 species IBAT has suggested the presence of 135 species that has been listed in the IUCN red data list as critically endangered (21 species including 1 floral, 12 marine fishes, 4 reptilians out of which two are marine, 3 avian and 1 mammalian species), endangered (47 including 1 floral mangrove species, 9 mammals including 1 marine species, 6 aves, 5 reptilian, 20 marine and 2 freshwater fishes, 3 marine Echinodermata and 1 marine anthozoan) and vulnerable (67 species including 4 floral 1 marine, 1 marine anthozoan, 2 marine Echinodermata, 29 fishes out of which 27 are marine, 7 reptiles including 3 marine species, 3 birds and 16 mammals out of which 4 are marine species). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

6. *Melastoma malabathricum* (Malabar melastoma), *Chromolaena odorata* / *Eupatorium odoratum* etc. were observed in the substation along with jackfruit and bamboo in the surroundings. These are all NE species as per IUCN. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



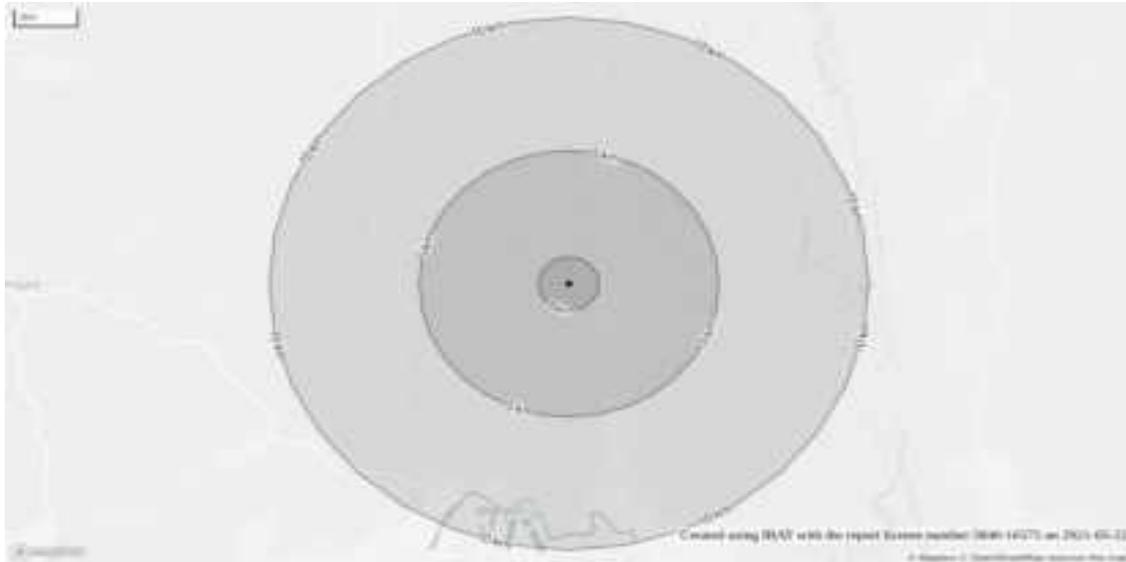
7. **33/11 KV Jolaibari Substation:** The substation is in South Tripura district under Santirbazar Electrical Division. IBAT assessment had captured a total of 1583 of floral and faunal species within 50 km radius of the SS. Out of the 1583 species IBAT has suggested the presence of 118 species that has been listed in the IUCN red data list as critically endangered (11 species including one floral, three marine fishes, three reptilians out of which two are marine, three avian, and one mammalian species), endangered (46 including one floral mangrove species, nine mammals including one marine species, five aves, six reptilian, 19 marine & two freshwater fishes, three marine Echinodermata, and one marine cnidarian species) and vulnerable (61 species including four floral one marine, one marine cnidarian, two marine Echinodermata, 25 fishes out of which 23 are marine, five reptiles including one marine species, eight birds, and 16 mammals out of which two are marine species). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

8. No trees or shrubs are found in the SS. Grasses like *Cynadon dactylon*, shrubs and herbs like marigold, *Clerodendrum infortunatum*, *Chromolena odorata*, *Melastoma malabathricum* (Malabar malestoma), papaya etc. were observed within the SS while trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Acacia auriculiformis*, *Cocos nucifera* (coconut), banana etc. were observed near the SS. All the floral species are either NE or LC as per IUCN. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



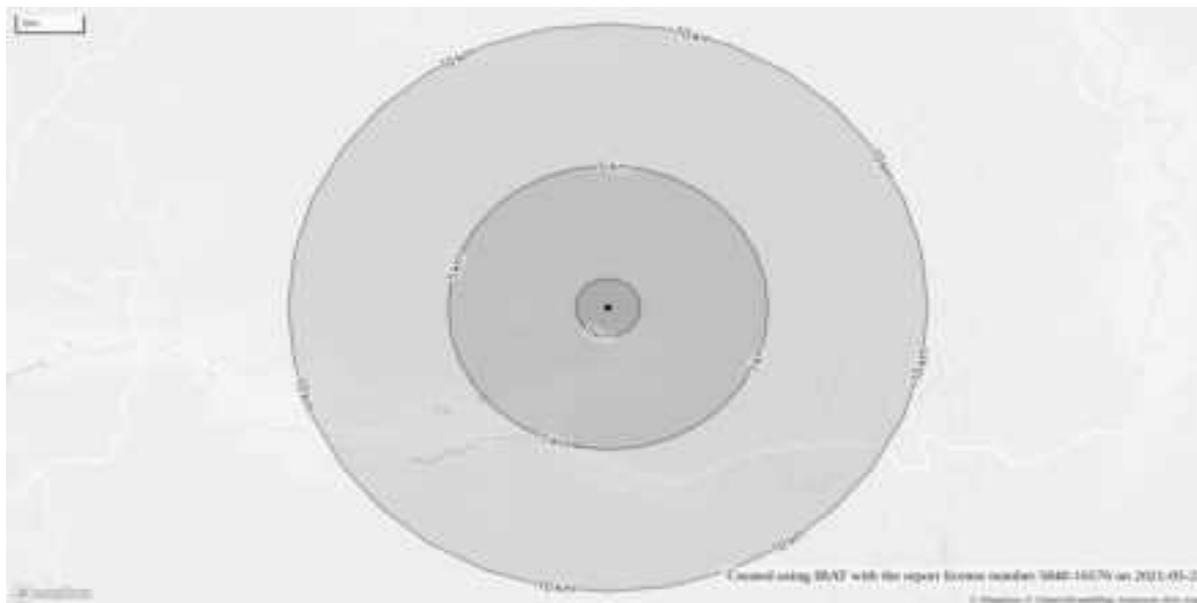
9. **33/11 KV Killa Substation:** The area where the SS is located has a hillock adjacent. IBAT assessment had captured a total of 942 of floral and faunal species within 50 km radius of the SS. Out of the 942 species IBAT has suggested the presence of 60 species that has been listed in the IUCN red data list as critically endangered (8 species including 1 floral, 2 reptilians, 4 avian and 1 mammalian species), endangered (21 including 8 mammals, 5 aves, 6 reptilian and 2 freshwater fishes) and vulnerable (31 species including 4 floral, 2 fishes, 4 reptiles, 7 birds and 14 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of Indian Wildlife Act.

10. *Cynadon* sp., *Chromolena odorata* / *Eupatorium odoratum*, *Mikania* sp., *Solanum nigrum* (nightshade), *Lagenaria siceraria* (bottle gourd) along with *Magnifera indica* (Mango), *Artocarpus heterophyllus* (Jackfruit), palm etc. were observed in the substation. These are all NE species as per IUCN. *Magnifera indica* (Mango), *Areca catechu* (areca nut), and banana was also seen in the surrounding of the SS. *Acridotheres tristis* a LC species, *Nettapus coromandelianus* (cotton teal during winter) a LC species, *Bubulcus ibis* (Cattle egret) a LC species, *Macaca mulatta* (rhesus macaque) a LC species, Cobra (*Naja kauthia*) a NE species, Rat snake (*Ptyas mucosa*) a LC species have been either observed or recorded in the vicinity of the SS. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



11. **33/11 KV Mandwi Substation:** IBAT assessment had captured a total of 971 of floral and faunal species within 50 km radius of the SS. Out of the 971 species IBAT has suggested the presence of 66 species that has been listed in the IUCN red data list as critically endangered (9 species including 1 floral, 2 reptilians, 5 avian and 1 mammalian species), endangered (22 including 8 mammals, 7 aves, 6 reptilian and 1 freshwater fish species) and vulnerable (35 species including 5 floral, 2 fishes, 5 reptiles, 8 birds and 15 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

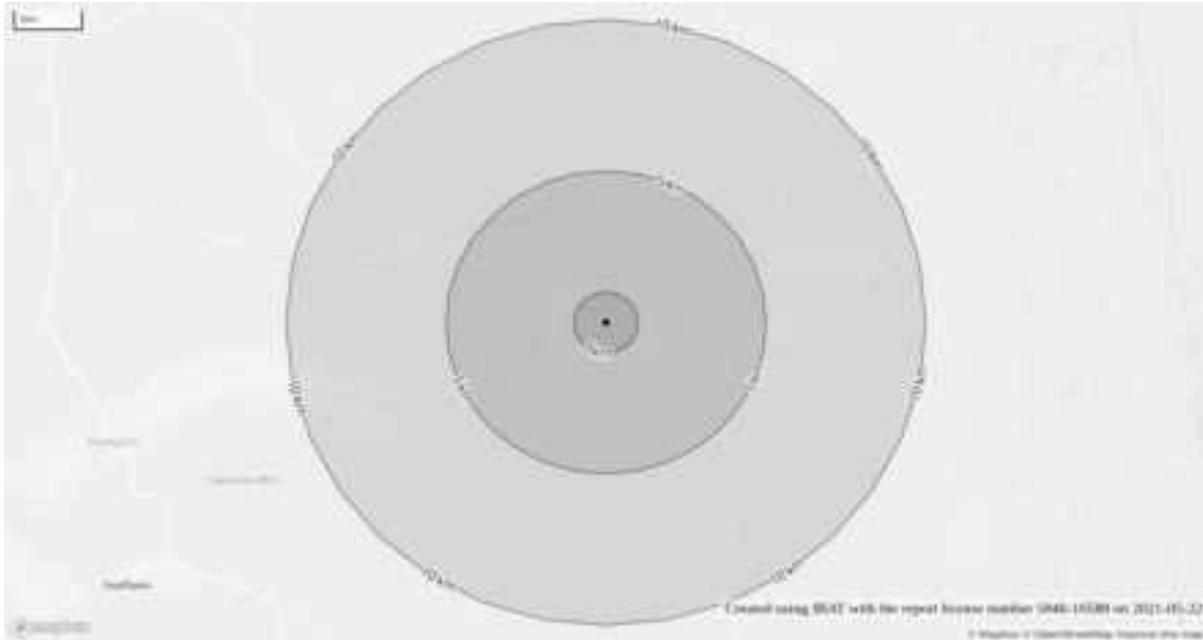
12. The SS compound is devoid of trees. However, grasses like *Cynadon* sp., shrubs and herbs *Leucas aspera*, *Chromolena odorata*, *Catharanthus roseus* (Pink Periwinkle / Nayantara in Bengali) were observed in the SS. Bamboo species like *Bambusa* spp., *Dendrocalamus hamiltonii*, trees like *Areca catechu* (areca nut), *Tectona grandis* (teak), banana etc. were observed near the SS. All the floral species are either NE or LC as per IUCN. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



13. **33/11 KV Takarjala Substation:** IBAT assessment had captured a total of 953 of floral and faunal species within 50 Km radius of the SS, out of which there are 62 species that has been listed in the IUCN red data. There are 8 Critically endangered species (1 floral, 2 reptilians, 4 avian and 1 mammalian species), 21 endangered (8 mammals, 6 aves, 6 reptilian & 1 freshwater fish) and 33 vulnerable species (5 floral, 2 fishes, 5 reptiles, 7 birds and 14 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

14. *Cynadon* sp., *Chromolena odorata* / *Euphatorium odoratum*, *Clerodendrum infortunatum*, *Mikania micrantha*, *Lantana Camara*, along with *Magnifera indica* (Mango), *Artocarpus heterophyllus* (Jackfruit), palm etc. were observed in the vicinity of the substation. These are all NE species as per IUCN red list. *Acridotheres tristis* a LC species, common crow a LC species, *Macaca mulatta* (rhesus macaque) a LC species, Branded Krait (*Bungarus fasciatus*) a LC species, Rat snake (*Ptyas mucosa*) a LC species, Striped Keelback (*Amphiesma stolatum*) LC species and Chequered Keelback (*Fowlea piscator*) LC species have been either observed by the staff or recorded in the vicinity of the SS.

15. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.

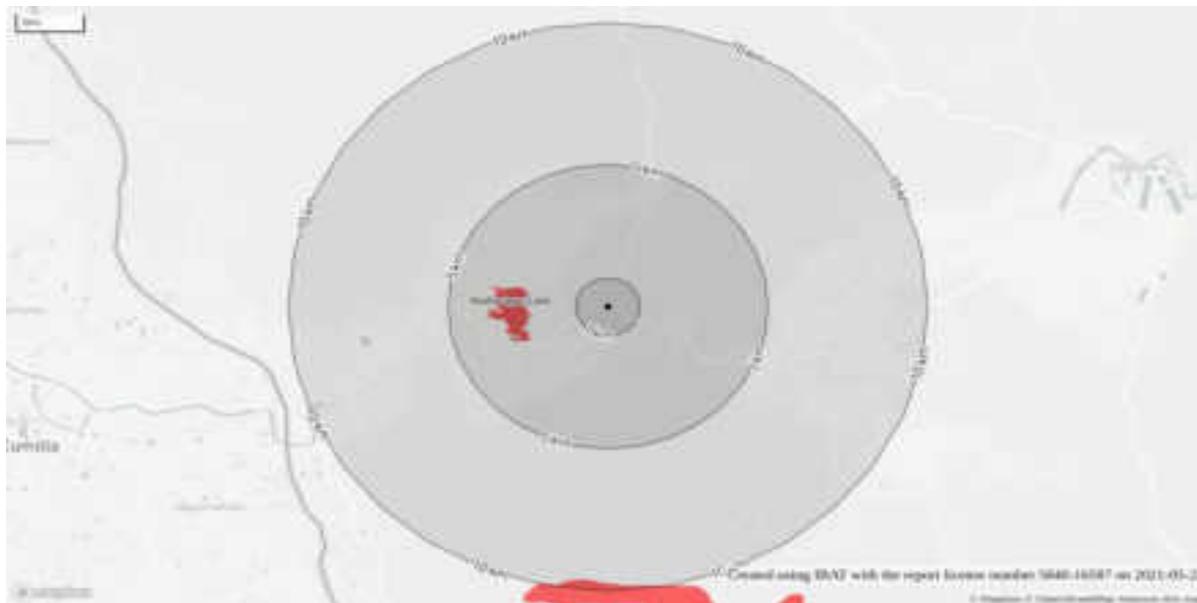


16. **33/11 KV Melaghar Substation:** The SS is within 2.91 km from Rudrasagar lake. It is also approximately 10 km away (aerial distance) away from Trishna WLS a protected area and also a IBA and KBA. IBAT assessment had captured a total of 930 of floral and faunal species within 50 Km radius of the SS, out of which there are 61 species that has been listed in the IUCN red data list. There are 8 critically endangered species (1 floral, 4 reptilians and 3 avian species), 21 endangered (8 mammals, 6 aves, 6 reptilian and 1 freshwater fish) and 32 vulnerable species (4 floral, 2 fishes, 4 reptiles, 8 birds and 14 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of Indian Wildlife Act.

17. Rudrasagar lake, a Ramsar site, is an IBA and is also a critical habitat. *Anas strepera* / *Mareca strepera* (Gadwall), *Dendrocygna javanica* (Lesser Whistling-duck), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Anastomus oscitans* (Asian Openbill) all Schedule IV species as per Indian Wildlife Act and LC species as per IUCN and *Anhinga melanogaster* (Oriental Darter) and *Aythya nyroca* (Ferruginous Duck), both Schedule IV species as per the Indian Wildlife Act and also NT species as per IUCN, and *Aythya baeri* (Baer's Pochard) an IUCN CR and Indian Wildlife Act Schedule IV congregatory species has been reported to visit the lake. However, the species are not reported in and around the SS footprint and thus the extant of the critical habitat shall not extend to the SS footprint.

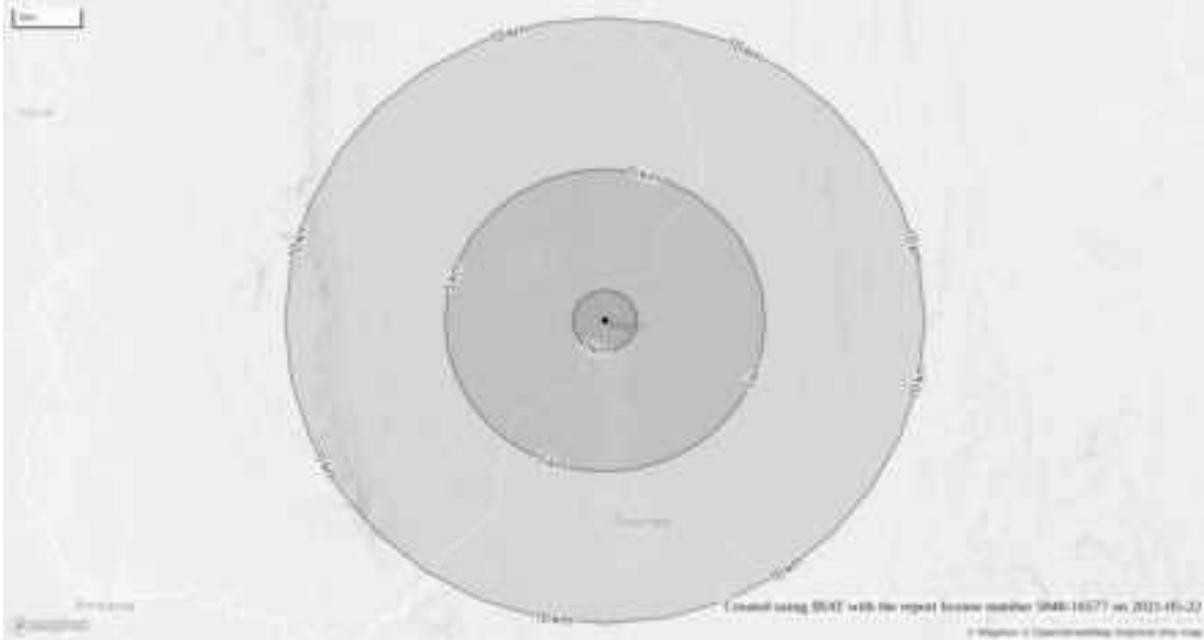
18. *Tabernaemontana divaricate* (Crepe jasmine / Tagar), *Cynadon* sp., *Chromolena odorata* / *Eupatorium odoratum*, *Lantana Camara* are found within the SS while trees like *Magnifera indica* (Mango), *Artocarpus heterophyllus* (Jackfruit), Areca nut etc. were observed in the vicinity of the substation (all NE species). *Acridotheres tristis* and common crow were seen in the SS. Branded Krait (*Bungarus fasciatus*), Rat snake, Striped Keelback (*Amphiesma stolatum*) and Red-necked Keelback (*Rhabdophis subminiatus*) amongst the snake species (all LC species) have been either observed by the staff or recorded in the vicinity of the SS. Foxes and leopard cats were also historically recorded to be present around the SS area. The substations had a

number of beehives on the roof of the control room building, the species of the bees could not be definitely identified as they were at a height but seemed to *Apis indica*, a NE species. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



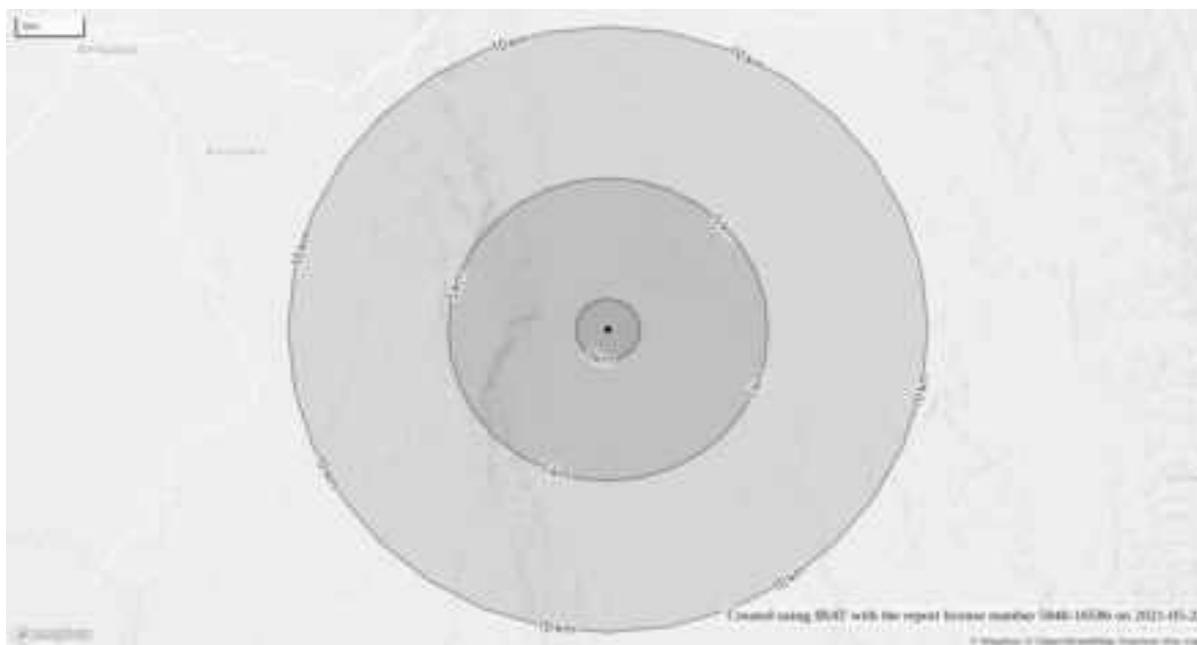
19. **33/11 KV Manu Substation:** IBAT assessment had captured a total of 1090 of floral and faunal species within 50 km radius of the SS, out of which there are 76 species that has been listed in the IUCN red data. There are 12 critically endangered species (1 floral, 4 reptilians, 6 avian and 1 mammalian species), 24 endangered (9 mammals, 7 aves, 6 reptilian & 2 freshwater fishes) and 40 vulnerable species (5 floral, 2 fishes, 5 reptiles, 12 birds and 16 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of Indian Wildlife Act.

20. *Cynadon* sp. and *Lantana Camara* were found within the SS while trees like *Magnifera indica* (Mango), *Artocarpus heterophyllus* (Jackfruit), *Areca* nut etc. (all NE species) were observed in the vicinity of the substation. Rhesus macaque (*Macaca mulatta*), Rat snake, Chequered Keelback (*Fowlea piscator*), Red-necked Keelback (*Rhabdophis subminiatus*) have been either recorded in the vicinity of the SS (all LC species), though none of the species have been seen within the SS area. Grazing of domesticated animals (mainly goats) within the SS area is common. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



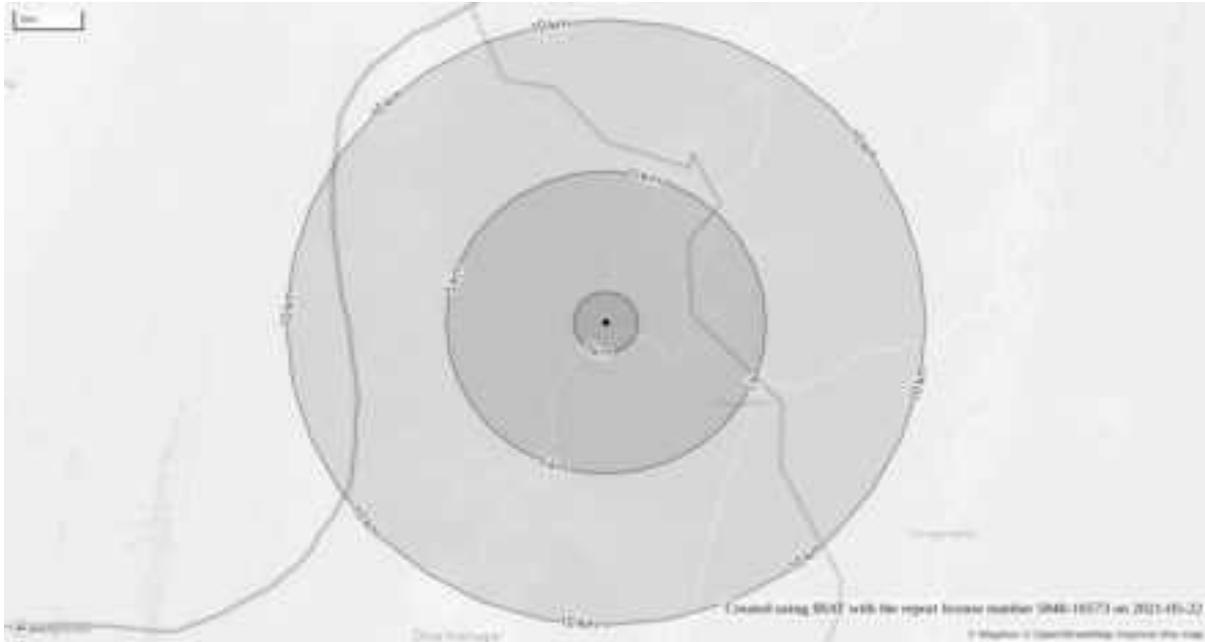
21. **33/11 KV Chamamu Substation:** IBAT assessment had captured a total of 1064 floral and faunal species within 50 km radius of the SS, out of which 72 species has been listed in the IUCN red data list. There are 11 critically endangered species (1 floral, 4 reptilians, 5 avian and 1 mammalian species), 23 endangered (9 mammals, 5 aves, 6 reptilian, 1 amphibian & 2 freshwater fishes) and 38 vulnerable species (6 floral, 2 fishes, 4 reptiles, 11 birds and 15 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

22. The SS is paved outside the switch yard area and thus devoid of vegetation. The switch yard however has uncontrolled tall grass and weeds. Grasses like *Cynadon* sp., *Setaria glauca*, *Saccharum* sp. and shrubs and herbs like *Chromolena odorata*, *Mikania micrantha*, *Lantana Camara* were observed. Shrubs and trees like *Bougainvillea* sp., *Magnifera indica* (mango), *Areca catechu* (areca nut), *Ficus* sp., banana etc. were observed near the SS. All the floral species are either NE or LC as per IUCN. No wildlife encounter/visit was recorded. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



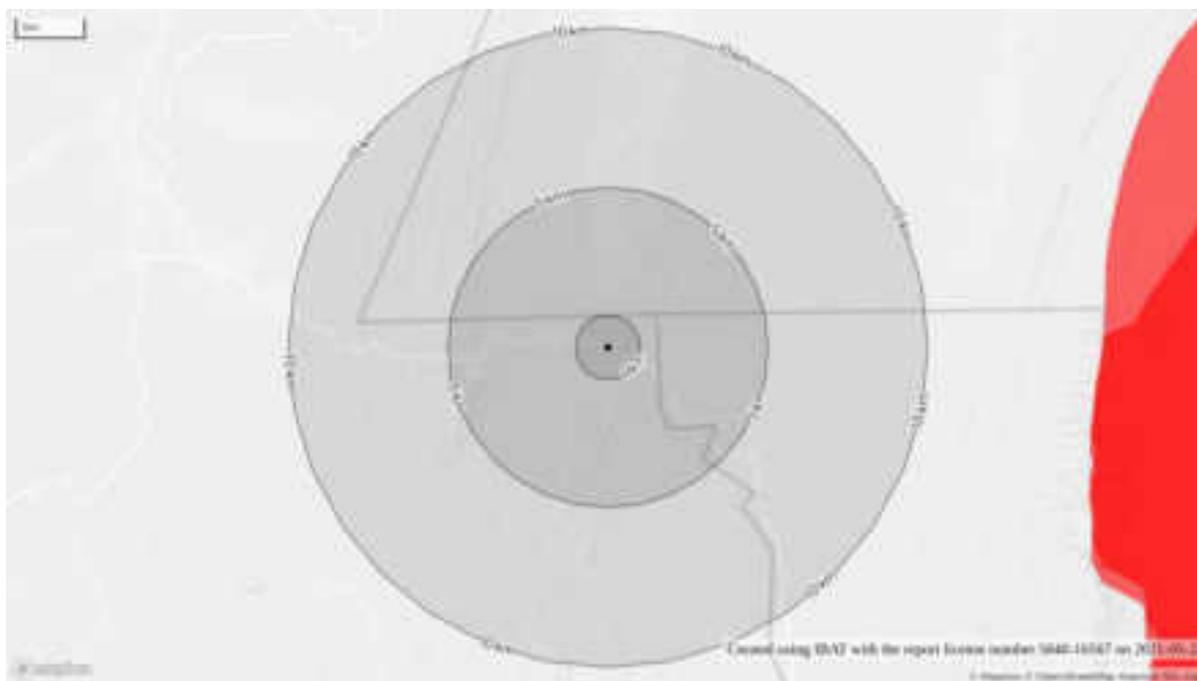
23. **33/11 KV Kadamtala Substation:** IBAT assessment had captured a total of 1094 floral and faunal species within 50 km radius of the SS, out of which 79 species has been listed in the IUCN red data list. There are 13 critically endangered species (1 floral, 4 reptilians, 7 avian and 1 mammalian species), 23 endangered (9 mammals, 7 aves, 6 reptilian and 1 freshwater fish) and 43 vulnerable species (3 floral, 2 arthropods, 2 fishes, 5 reptiles, 15 birds and 16 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

24. The SS area is devoid of trees while grasses like *Cynadon* sp., shrubs and herbs like *Clerodendrum infortunatum*, *Chromolena odorata*, *Mikania micrantha*, *Leucas aspera*, *Melastoma malabathricum* (Malabar malestoma), *Catharanthus roseus* (Pink Periwinkle / Nayantara in Bengali), *Tabernaemontana divaricate* (Crepe jasmine / Tagar in Bengali) were observed in the SS. Bamboo species and trees like *Magnifera indica* (mango), banana etc. were observed near the SS. All the floral species are either NE or LC as per IUCN. No wildlife encounters are recorded. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



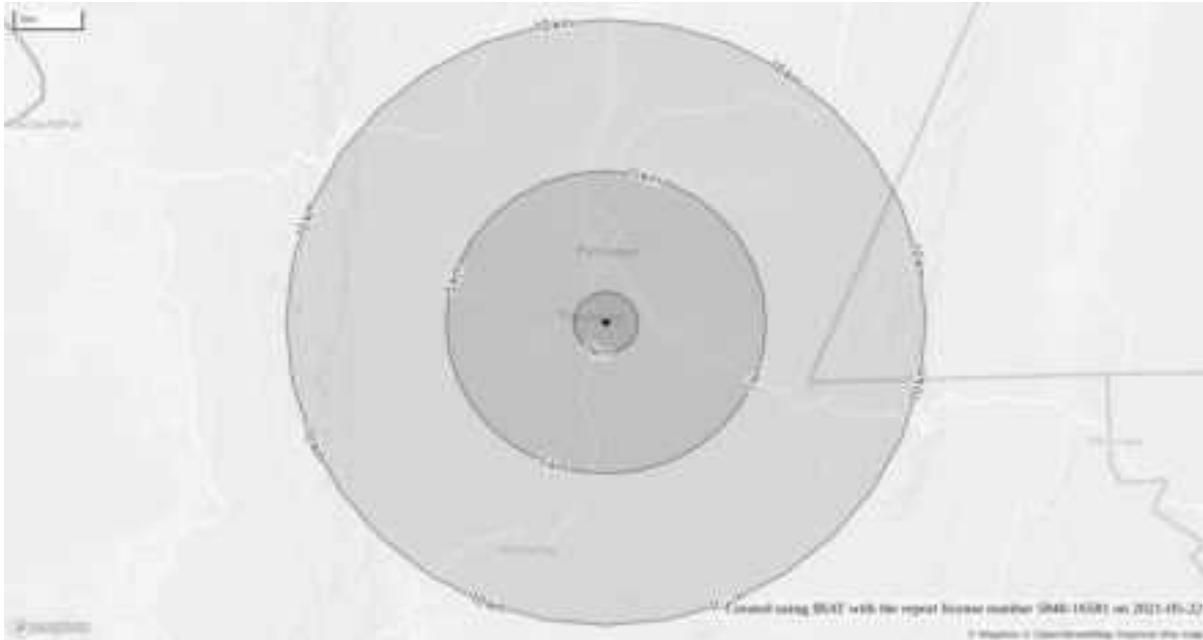
25. **33/11 KV Damcharra Substation:** IBAT assessment had captured a total of 1098 floral and faunal species within 50 km radius of the SS, out of which 74 species has been listed in the IUCN red data list. There are 13 critically endangered species (5 reptilians, 7 avian and 1 mammalian species), 21 endangered (8 mammals, 5 aves, 7 reptilian, and 1 freshwater fish) and 40 vulnerable species (3 floral, 2 fishes, 5 reptiles, 14 birds and 16 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

26. Only grasses were observed in the SS compound. Livestock (goats) observed inside the SS area. An individual of *Duttaphrynus melanostictus* (Common Asian Toad) an IUCN LC species was noted in the SS. No wildlife visits/encounters are recorded. The ecological walkover in the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



27. **33/11 KV Panisagar Substation:** The substation is 2.7 km away from Rowa WLS a protected area declared under the Wildlife Act, 1972 (as per aerial distance measured in Google Earth satellite imageries). However, the area has not been captured under IBAT assessment for unknown reasons. The area where the SS is located is in plain and rolling terrain. IBAT assessment had captured a total of 1072 floral and faunal species within 50 km radius of the SS out of which 72 species has been listed in the IUCN red data list. There are 12 critically endangered species (4 reptilians, 7 avian and 1 mammalian species), 21 endangered (8 mammals, 6 aves, 6 reptilian and 1 freshwater fish) and 40 vulnerable species (3 floral, 2 fishes, 5 reptiles, 14 birds and 16 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

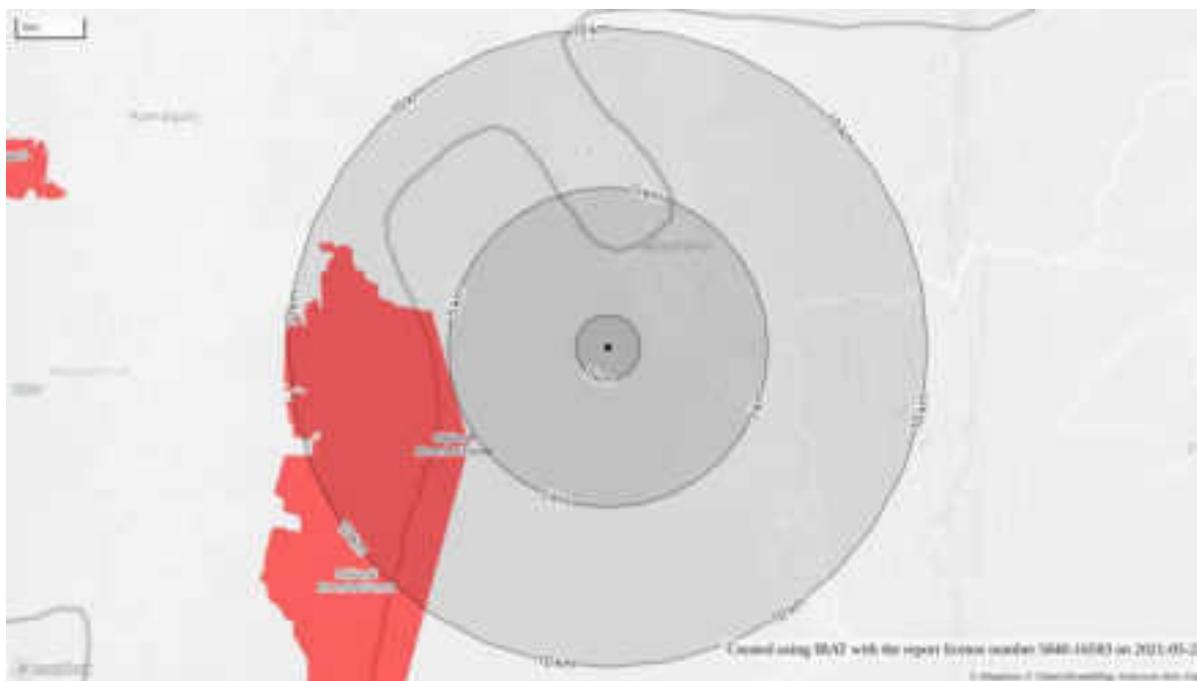
28. Few patches of grass (*Cynadon* sp.), shrubs like *Chromolena odorata*, *Lantana* sp, and one small *Magnifera indica* (mango) tree, *Polyalthia longifolia* (False Ashoka / Debbaru) & *Psidium guajava* (guava) was recorded. All the floral species are either NE or LC as per IUCN. The SS has beehives inside the staff offices. These offices are adjacent to the SS control building. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



29. **33/11 KV Rangrung Substation:** Rajkandi RF an Important Bird Area in Moulabi Bazaar district of Bangladesh is about 5 km away from the SS. The area where the SS is located is in plain and rolling terrain within Tea Garden area and inhabited mainly by Bengali and indigenous population. IBAT assessment had captured a total of 1070 floral and faunal species within 50 km radius of the SS, out of which 74 species has been listed in the IUCN red data list as threatened. There are 12 critically endangered species (4 reptilians, 7 avian and 1 mammalian species), 22 endangered species (8 mammals, 6 aves, 7 reptilian and 1 freshwater fish) and 40 vulnerable species (4 floral, 2 fishes, 5 reptiles, 13 birds and 16 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

30. *Chromolena odorata* / *Eupatorium odoratum*, *Diplazium esculentum* (fiddlehead / edible fern), *Leucas aspera*, *Cynadon* sp., *Clerodendrum infortunatum*, *Artocarpus heterophyllus* (Jackfruit) & *Ziziphus* spp. were observed within the SS area (all are either NE or LC). 3 poisonous snakes viz. Monocled Cobra (*Naja kouthia*) (Schedule II (Part II) under Wildlife Act), Branded Krait (*Bungarus fasciatus*) & Viper (both Schedule IV under Wildlife Act) were reported to be present within the Rungrung SS area along with non-poisonous snakes like Indian Rat snake (*Ptyas mucosa*) & Chequered Keelback (*Fowlea piscator*), (both Schedule II (Part II) under Wildlife Act while all the snake species are NE or LC species as per IUCN. A branded krait was killed by the locals a few months back in the front yard of the SS. A case of non-venomous snake bite was reported within the control room a couple of years back.

31. The ecological walkover in the PAI around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



32. **33/11 kV Vangmung Substation:** IBAT assessment had captured a total of 1178 of floral and faunal species within 50 km radius of the SS. Out of these species IBAT has suggested the presence of 81 species that has been listed in the IUCN red data list as threatened. There are 14 critically endangered species (7 reptilians, 6 avian and 1 mammalian species), 25 endangered species (9 mammals, 7 aves, 7 reptilian, 1 amphibian, 1 freshwater and 1 marine fish) and 42 vulnerable species (3 floral, 2 fishes, 8 reptiles, 13 birds and 16 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

33. *Cyrtodactylus montanus*, a CR reptilian species endemic to Jampui Hills in North Tripura district is reported near Vangmung and triggers critical habitat criteria including as areas having special significance for endemic or restricted-range species. However, the species is uncommon in modified habitats within forests. Vangmung SS is in a modified habitat outside forest areas and critical habitat shall not probably extend.

34. *Carica papaya* (Papita) an IUCN Data Deficient (DD) species, *Cynodan dactylon*, *Parkia speciosa* a LC species, teak (*tectona grandis*) a NE species are found within the boundary of the SS. Calls of barbet (*Psilopogon asiaticus*) a LC species was heard.

35. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.

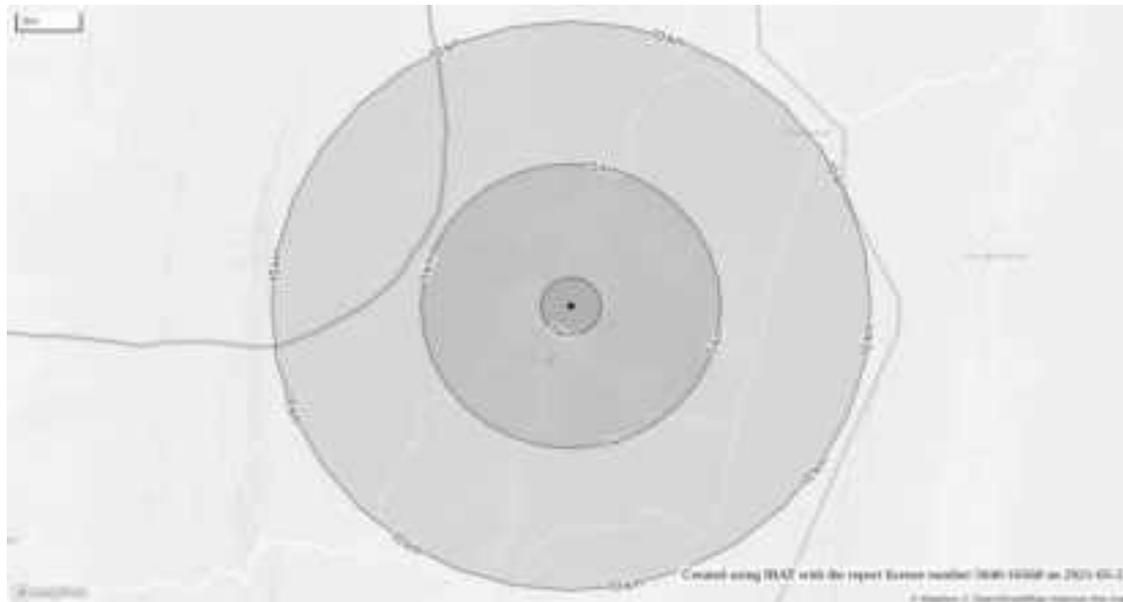


36. **33/11 KV Digalbagh Substation:** IBAT assessment had captured a total of 1084 of floral and faunal species within 50 km radius of the SS, out of which 75 species has been listed in the IUCN red data list as threatend. There are 12 critically endangered species (4 reptilians, 7 avian and 1 mammalian species), 21 endangered species (8 mammals, 6 aves, 6 reptilian & 1 freshwater fish) and 42 vulnerable species (3 floral, 2 arthropods, 2 fishes, 5 reptiles, 14 birds and 16 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

37. Grasses like *Cynadon* sp., *Saccharum* sp., shrubs and herbs like *Chromolena odorata*, *Melastoma malabathricum* (Malabar malestoma), *Lantana camera* were observed in the SS. Bamboo species like *Bambusa* spp., *Dendrocalamus hamiltonii*, & shrubs and herbs like *Chromolena odorata*, *Alocassia* sp. / *Colocassia* sp., and trees like *Areca catechu* (areca nut),

Ficus sp., *Magnifera indica* (mango), *Cocos nucifera* (coconut), banana etc. were observed near the SS. All the floral species are either NE or LC as per IUCN.

38. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



39. **33/11 Durjainagar Substation:** IBAT assessment had captured a total of 1013 of floral and faunal species within 50 km radius of the SS, out of which 68 species has been listed in the IUCN red data list as threatened. There are 10 critically endangered species (1 floral, 3 reptilians, 5 avian and 1 mammalian species), 23 endangered species (1 floral, 8 mammals, 6 aves, 6 reptilian, 1 freshwater and 1 marine fish) and 35 vulnerable species (2 floral, 1 insect, 2 fishes, 6 reptiles, 9 birds and 15 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

40. Grasses like *Cynadon* spp., shrubs and herbs like *Chromolena odorata*, *trinervia* (yellowtops), *Senna tora* / *Cassia tora*, *Leucas aspera*, *Mikania micrantha*, edible ferns / Fiddlehead fern, *Alocassia* sp. / *Colocassia* sp., trees like *Psidium guajava* (guava), *Chukrasia* sp., papaya were observed in the SS while shrubs and herbs like *Tabernaemontana divaricate* (Crepe jasmine / Tagar in Bengali), *Hibiscus mutabilis* (Confederate rose), trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Azadirachta indica* (Neem), *Cocos nucifera* (coconut), *Artocarpus heterophyllus* (jackfruit) were near the SS. All the floral species are either NE or LC as per IUCN. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.

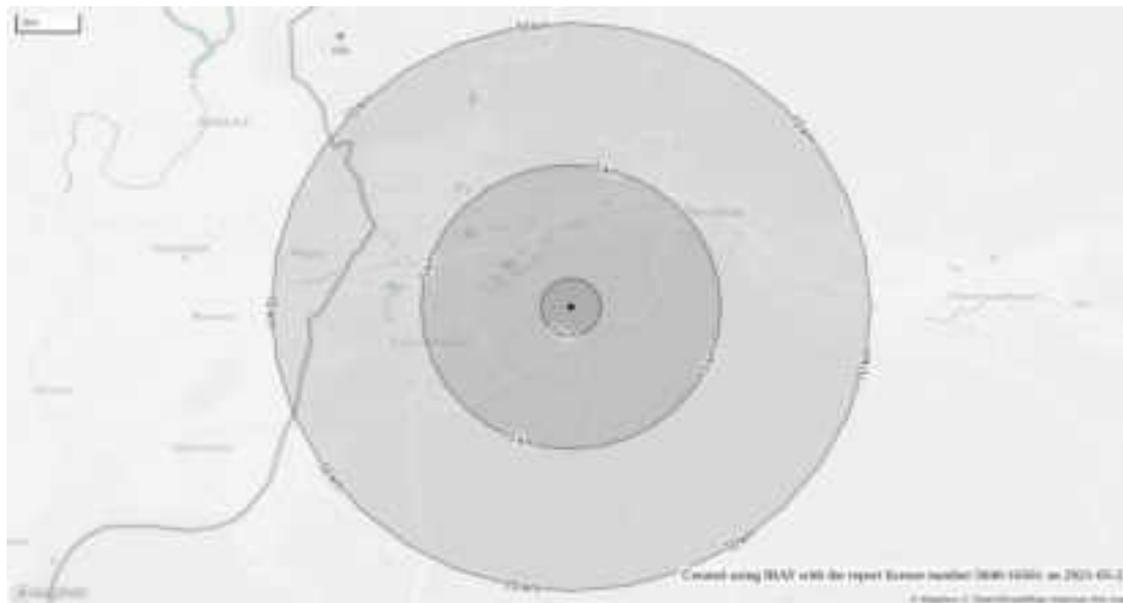


41. **33/11 Rampur Substation:** IBAT assessment had captured a total of 1188 of floral and faunal species within 50 km radius of the SS, out of which 81 species has been listed in the IUCN red data list as threatened. There are 14 critically endangered species (4 reptilians, 6 avian and 1 mammalian species), 25 endangered species (9 mammals, 5 aves, 7 reptilian, 1 amphibian, 2 freshwater and 1 marine fish) and 42 vulnerable species (3 floral, 2 fishes, 8 reptiles, 13 birds and 16 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act. Grasses like *Cynadon* spp., shrubs and herbs like *Leucas aspera*, pumpkin, *Chromolena odorata*, clover leaf plant, *Mikania micrantha*, *Lantana Camara*, *Ficus* sp., papaya, along with trees like *Magnifera indica* (mango), *Cocos nucifera* (coconut), banana etc. were observed in SS. All the floral species are either NE or LC as per IUCN. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



42. **33/11 KV Adarsha Colony Substation:** IBAT assessment had captured a total of 955 of floral and faunal species within 50 km radius of the SS, out of IBAT has suggested there are 65 species that has been listed in the IUCN red data list. There are 9 critically endangered species (1 floral, 2 reptilians, 5 avian and 1 mammalian species), 21 endangered (8 mammals, 7 aves, 5 reptilian and 1 freshwater fish) and 36 vulnerable (5 floral, 2 fishes, 5 reptiles, 9 birds and 14 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of Indian Wildlife Act.

43. *Cynadon* sp. a grass species, shrubs and herbs like *Clerodendrum infortunatum*, *Chromolena odorata*, *Mikania micrantha*, *Lantana Camara*, *Leucas aspera* & trees like *Magnifera indica* (mango), *Psidium guajava* (guava) were observed in the SS. All the floral species are either NE or LC as per IUCN. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



44. **33/11 KV Stadium Substation:** IBAT assessment had captured a total of 961 of floral and faunal species within 50 km radius of the SS, out of which there are 64 species that has been listed in the IUCN red data list. There are 8 critically endangered species (1 floral, 2 reptilians, 4 avian and 1 mammalian species), 20 endangered (8 mammals, 6 aves, 5 reptilian and 1 freshwater fish) and 36 vulnerable (5 floral, 1 insect, 2 fishes, 5 reptiles, 9 birds and 14 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of Indian Wildlife Act.

45. *Lantana camera*, *Mikania micrantha*, *Chromolena odorata*, *Catharanthus roseus* (Pink Periwinkle / Nayantara in Bengali), *Tabernaemontana divaricate* (Crepe jasmine / Tagar in

Bengali), Edible ferns / Fiddlehead fern, *Alocassia* sp. / *Colocassia* sp., *Flaveria trinervia* (yellowtops), were noted along with *Psidium guajava* (guava), *Artocarpus heterophyllus* (Jackfruit), *Citrus maxima* (Pomelo), *Polyalthia longifolia* (False Ashoka / Debdaru) in the substation. *Magnifera indica* (Mango), *Areca catechu* (areca nut) were observed around the SS. All the floral species are either NE or LC as per IUCN. Cobra (*Naja kauthia*) as Schedule II (Part II) and NE as per IUCN have been reported in 33 kV switch yard frequently by the staff along with presence of Rat snake (*Ptyas mucosa*) in the SS area. *Acridotheres tristis* (common myanah), common crow, Eurasian Collar Dove and *Lanius schach* (Shrike) were observed in the SS. These are all LC or NE species. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



46. **33/11 KV College Tilla Substation:** IBAT assessment had captured a total of 963 of floral and faunal species within 50 km radius of the SS, out of which there are 65 species listed in the IUCN red data list as threatened. There are 9 critically endangered species (1 floral, 2 reptilians, 5 avian and 1 mammalian species), 20 endangered (8 mammals, 6 aves, 5 reptilian and 1 freshwater fish) and 36 vulnerable (5 floral, 1 insect, 2 fishes, 5 reptiles, 9 birds and 14 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

47. Thick grass like *Cynadon* sp., was recorded in the compound along with shrubs and herbs species like edible ferns / Fiddlehead fern, *Codiaeum variegatum* (garden croton), *Hibiscus rosa-sinensis*, *Mikania micrantha*, *Clerodendrum infortunatum*, *Chromolena odorata*, *Lantana Camara*, *Leucas aspera*, *Ixora coccinea* (jungle geranium), *Hibiscus mutabilis* (Confederate rose) and tree species like *Artocarpus heterophyllus* (jackfruit), *Azadirachta indica* (Neem), *Magnifera indica* (mango), *Psidium guajava* (guava), *Ficus* sp., banana etc. were observed in the SS. All the floral species are either NE or LC as per IUCN. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



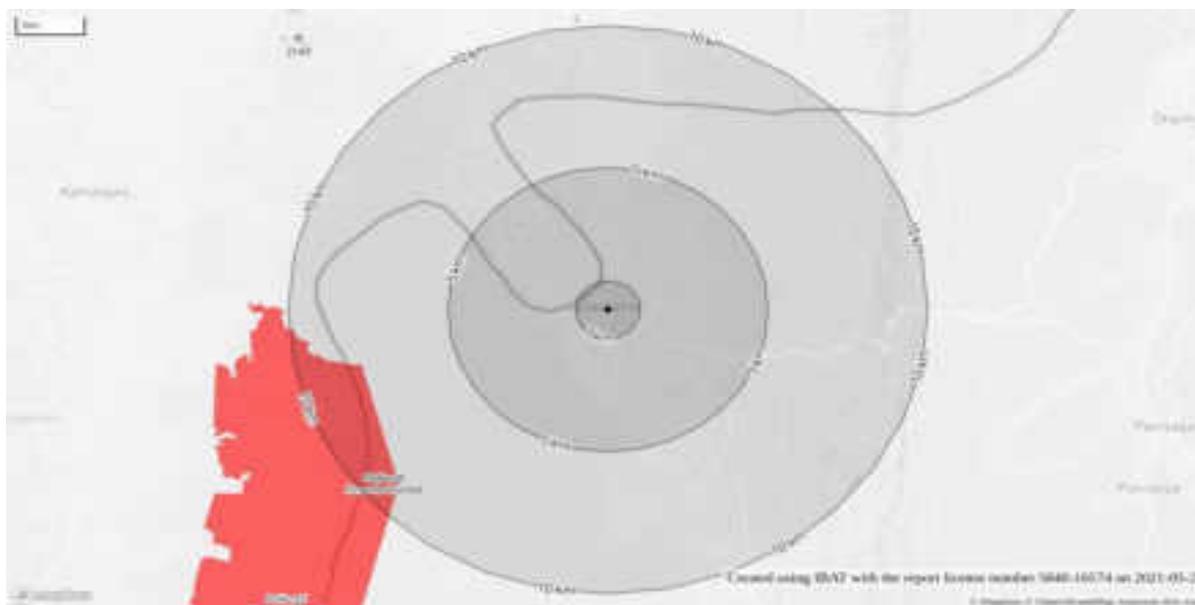
48. **33/11 KV NSRCC Substation:** IBAT assessment had captured a total of 959 of floral and faunal species within 50 km radius of the SS, out of which IBAT has suggested the presence of 64 species that has been listed in the IUCN red data list as threatened. There are 8 critically endangered species (1 floral, 2 reptilians, 4 avian and 1 mammalian species), 20 endangered (8 mammals, 6 aves, 5 reptilian and 1 freshwater fish) and 36 vulnerable (5 floral, 1 insect, 2 fishes, 5 reptiles, 9 birds and 14 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

49. The SS is devoid of vegetation as the compound is paved.

50. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



51. **33/11 KV Kailasahar Substation:** Rajkandi RF an Important Bird Area in Moulabi Bazaar district of Bangladesh is about 7.5 km away from the SS. The area where the SS is located is in plain terrain in Kailasahar town area and inhabited mainly by Bengali speaking population. IBAT assessment had captured a total of 1076 of floral and faunal species within 50 km radius of the SS. Out of these species IBAT has suggested the presence of 75 species that has been listed in the IUCN red data list as threatened. There are 12 critically endangered species (4 reptilians, 7 avian and 1 mammalian species), 22 endangered species (8 mammals, 6 aves, 7 reptilian and 1 freshwater fish) and 41 vulnerable species (4 floral, 2 fishes, 5 reptiles, 14 birds and 16 mammals). Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of Indian Wildlife Act. The SS area is completely paved and devoid of any vegetations except a few ficus saplings sprouting from the cracks in the pavement near boundary walls. However, there are trees like *Ficus benghalensis* (banyan), *Ficus religiosa* (peepal), *magnifera indica* (mango), eucalyptus, areca nuts besides grasses like *Cynadon dactylon* in the vicinity of the SS (outside the SS area). The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



52. **33/11 KV Jatanbari Substation:** Gumti Wildlife Sanctuary, both IBA and KBA is approximately 6 km away from the SS. The area where the SS is located is in plain and rolling terrain and inhabited mainly by Bengali speaking population. IBAT assessment had captured a total of 929 of floral and faunal species within 50 km radius of the SS. Out of these species IBAT has suggested the presence of 69 species that has been listed in the IUCN red data list. There are 7 critically endangered species (1 floral, 2 reptilians, 3 avian and 1 mammalian species), 20 endangered species (8 mammals, 5 aves, 5 reptilian and 2 freshwater fishes) and 34 vulnerable species (6 floral, 2 fishes, 4 reptiles, 8 birds and 14 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

53. The Gumti WLS is an IBA and is also a possible critical habitat for *Aythya baeri* (Baer's Pochard) an IUCN CR and Schedule IV, and *Nycticebus bengalensis* (Bengal Slow Loris) an IUCN EN and schedule I species. It also supports *Hoolock hoolock* (Western Hoolock Gibbon) an IUCN EN and schedule I species and *Trachypithecus pileatus* (Blond-bellied Langur / Capped Langur) an IUCN VU and Schedule I species. *Anas acuta* (Nothorn Pintail) and *Aythya fuligula* (Tufted Duck) both Schedule IV species as per Wildlife Act and LC species as per IUCN and *Anhinga melanogaster* (Oriental Darter) a Schedule IV species as per Wildlife Act and also a NT species as per IUCN as well as the aforementioned *Aythya baeri* (Baer's Pochard) an IUCN CR and Schedule IV congregatory species has been reported to visit the WLS. However, the species are not reported in and around the SS footprint and thus the extant of any critical habitat shall not extend to it.

54. *Lantana camera*, *Mikania micranthia*, *Leucas* sp., *Flaveria trinervia* (yellowtops), *Spermacoce verticillata* (false button weed), broom grass, *Cassia tora* / *Senna tora*, Edible ferns / Fiddlehead fern, *Andrographis paniculate* (green chiretta), *Accacia* sp., *Albizia lebbeck*, and *Ficus* sp. were observed within the substation area. *Magnifera indica* (Mango), *Areca catechu* (areca nut) and banana were noted in the adjoining area of the SS. *Acroditheres tristus* (common mynah) was observed while the staff reported the presence of Cobra (*Naja kauthia*), Rat snake (*Ptyas mucosa*) (both snakes are Schedule II (Part II) as per Wildlife Act), mongoose, jackals,

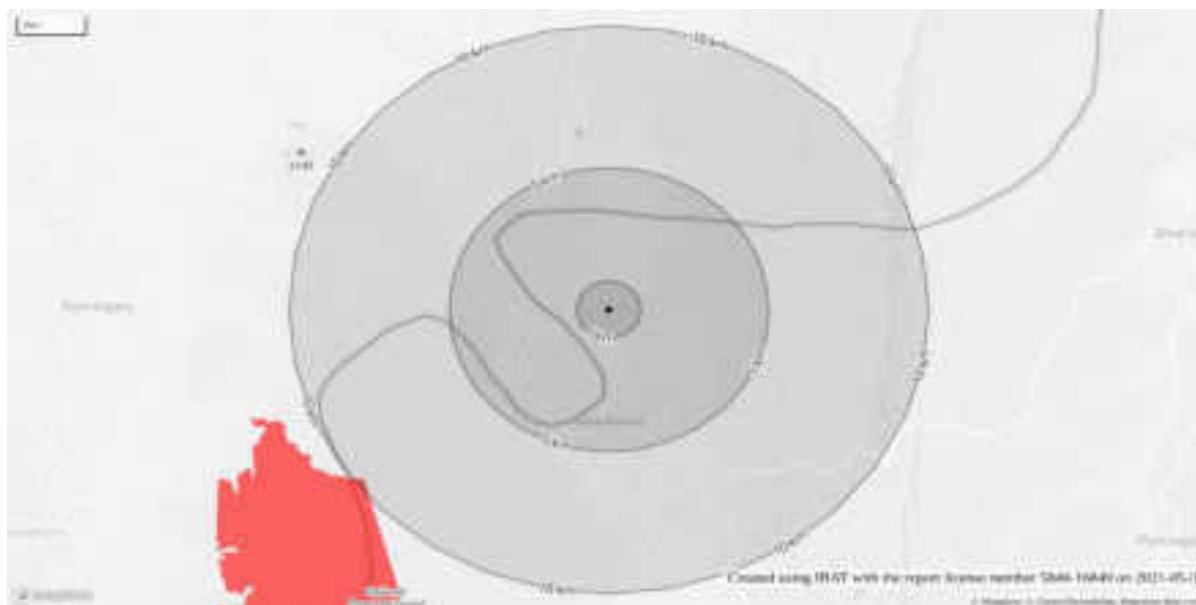
rats, cattle and goats in the neighborhood of the SS. All are NE or LC species. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



55. **33/11 KV Tilabazar Substation:** Rajkandi RF an Important Bird Area in Moulabi Bazaar district of Bangladesh is about 10 km away from the SS. The area is inhabited mainly by Bengali speaking population. IBAT assessment had captured a total of 10916 of floral and faunal species within 50 km radius of the SS. Out of these species IBAT has suggested the presence of 77 species that has been listed in the IUCN red data list. There are 12 critically endangered species (4 reptilians, 7 avian and 1 mammalian species), 22 endangered species (8 mammals, 6 aves, 7 reptilian and 1 freshwater fish) and 43 vulnerable species (4 floral, 2 arthropods, 2 fishes, 5 reptiles, 14 birds and 16 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50 km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in three countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

56. There is a huge banyan tree (*Ficus bengalensis*) within the proposed SS area which shall not be felled. *Clerodendrum infortunatum*, *Cynodon dactylon*, *Chromolaena odorata* / *Eupatorium odoratum*, *Mikania micranthia*, were observed in the SS area. Bamboo groves, *Magnifera indica* (Mango), *Areca catechu* (areca nut), coconut (*Cocos nucifera*) and banana were noted in the adjoining area of the SS. Calls of the barbet were also heard in the SS area. All are LC or NE species.

57. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



58. **33/11 KV Madhupur Substation:** IBAT assessment had captured a total of 1545 of floral and faunal species within 50 km radius of the SS. Out of these species IBAT has suggested the presence of 98 species that has been listed in the IUCN red data list as threatened. There are 14 critically endangered species (2 floral including 1 mangrove species, 5 reptilians including 2 marine species, 4 avian and 3 marine shark species), 32 endangered species (1 mangrove floral species, 1 marine cnidarian, 3 marine Echinodermata species, 10 marine fishes, 5 reptilian, 4 aves and 8 mammals) and 52 vulnerable species (3 floral including 1 marine, 1 coral (cnidarian), 2 marine Echinodermata species, 5 fishes including 2 freshwater species, 6 reptiles including a marine turtle, 8 birds and 15 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. Some of the species mentioned in the IUCN red list are also protected and covered under the schedules of the Indian Wildlife Act.

59. *Mikania micrantha*, *Cassia tora* / *Senna tora*, *Hibiscus rosa sinensis* (Chinese hibiscus), *Melastoma malabathricum* (Malabar malestoma / Indian rhododendron), *Mimosa pudica* (Touch me not), *Chromolena odorata*, Edible ferns / Fiddlehead fern, bamboo, *Alocassia* sp. / *Colocassia* sp., *Citrus limon* (lemon), *Psidium guajava* (guava), *Polyalthia longifolia* (False Ashoka / Debdaru) were observed within the substation area. Rubber plantation was on the eastern side of the SS and tea gardens were reported about 3km away. *Hevea brasiliensis* (rubber) *Areca catechu* (areca nut), banana was noted in the adjoining areas. *Acridotheres tristis*, *Passer domesticus* (sparrow), *Libia columbia* (pigeon) were also seen in the SS. *Macaca mulatta* (rhesus macaque) were reported to be present in the adjoining rubber plantations, however, they do not visit the substation. Cattle and goats were seen grazing in the agricultural field opposite to the SS. A Rat snake (*Ptyas mucosa*) a Schedule II – Part II species as per Wildlife Act, of about 2 feet long was killed by the staff a couple of months back in the SS area. Toads and gecko were reported in the SS area by the staff besides some other non-poisonous snakes. Centipede, *Papilio Memnon* (Great Mormon butterfly), *Catopsilia pomona* (Common emigrant /lemon emigrant butterfly) and dragonflies were observed in the SS area during the visit. All the species are either LC or NE.

60. The ecological walkover around the SS did not find any evidence of any critically endangered, endangered, or vulnerable species.



TEST LABORATORY

61. Sephajibhala Wildlife Sanctuary which is a Category IV protected area and a KBA is approximately 6.5 km away from the test laboratory site. There are no IBA within 10 km radius. IBAT assessment had captured a total of 983 of floral and faunal species within 50 km radius. Out of these species IBAT has suggested the presence of 62 species that has been listed in the IUCN red data list as threatened. There are 8 critically endangered species (1 floral, 3 reptiles and 4 avian species), 20 endangered species (8 mammals, 5 birds, 6 reptiles and 1 fish species) and 34 vulnerable species (3 floral, 2 fishes, 7 reptiles, 8 birds and 14 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the test laboratory site. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries.

62. 19 congregatory species namely *Aythya baeri* (Baer's Pochard) a CR species, *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) and *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species distribution are reported by IBAT in a 50 km radius.

63. Shrubs, herbs and grasses like *Cynadon dactylon*, *Chromolena odorata* and *Clerodendrum infortunatum* and trees like *Polyalthia longifolia* (False Ashoka / Debdaru), *Tectona*

grandis (teak) and *Acacia auriculiformis* were found inside the proposed transformer test laboratory location. While shrubs & herbs like *Lantana Camara*, *Codiaeum variegatum* (garden croton), *Hibiscus rosa-sinensis* and trees like *Areca catechu* (areca nut), *Delonix regia* (gulmohar), *Magnifera indica* (mango), banana, *Camellia sinensis* (tea garden), various shade trees used in tea garden, *Cocos nucifera* (coconut) etc. were observed outside the proposed transformer test laboratory location. All the floral species are either NE or LC as per IUCN. Calls of *Psilopogon lineatus* (lineated barbet) were heard near the location while *Acridotheres tristis* (common myna) was observed in the location. These are both LC species as per IUCN. The ecological walkover around the test laboratory did not find any evidence of any critically endangered, endangered, or vulnerable species.



DISTRIBUTION LINES

64. **33 KV Mission Tilla - Panisagar- Dhamchara Line:** The 12 ckm 33kV new feeder with CC line passes through both plain terrain (predominantly Bengali speaking population) in North Tripura District and hilly terrain within Autonomous District Council Areas (tribal area) (predominantly inhabited by the Reang / Bru and other indigenous tribes). The distribution line is proposed to be provided with covered conductor and some minor realignments are proposed in sections where the line is not easily accessible due to the terrain. The line passes through dense vegetation (rubber and teak plantations) in some sections. Bamboos and ferns are common in the hill area besides commonly found floral species (banana, areca nut) in the plain area. The line terminates at Damcharra 33/11 kV substation. There are no IBA / KBA within 10 km radius. The Panisagar 33/11 KV SS where the line originates is about 2.7 km away from Rowa WLS as per aerial distance measured in Google Earth satellite imageries, however, due to unknown reasons the same was not captured under IBAT assessment. Even though the length of the proposed line is only 12 ckm, IBAT analysis has been done for the entire length of the line from Panisagar SS to Damchara SS as upgradation has been proposed intermittently along the entire length.

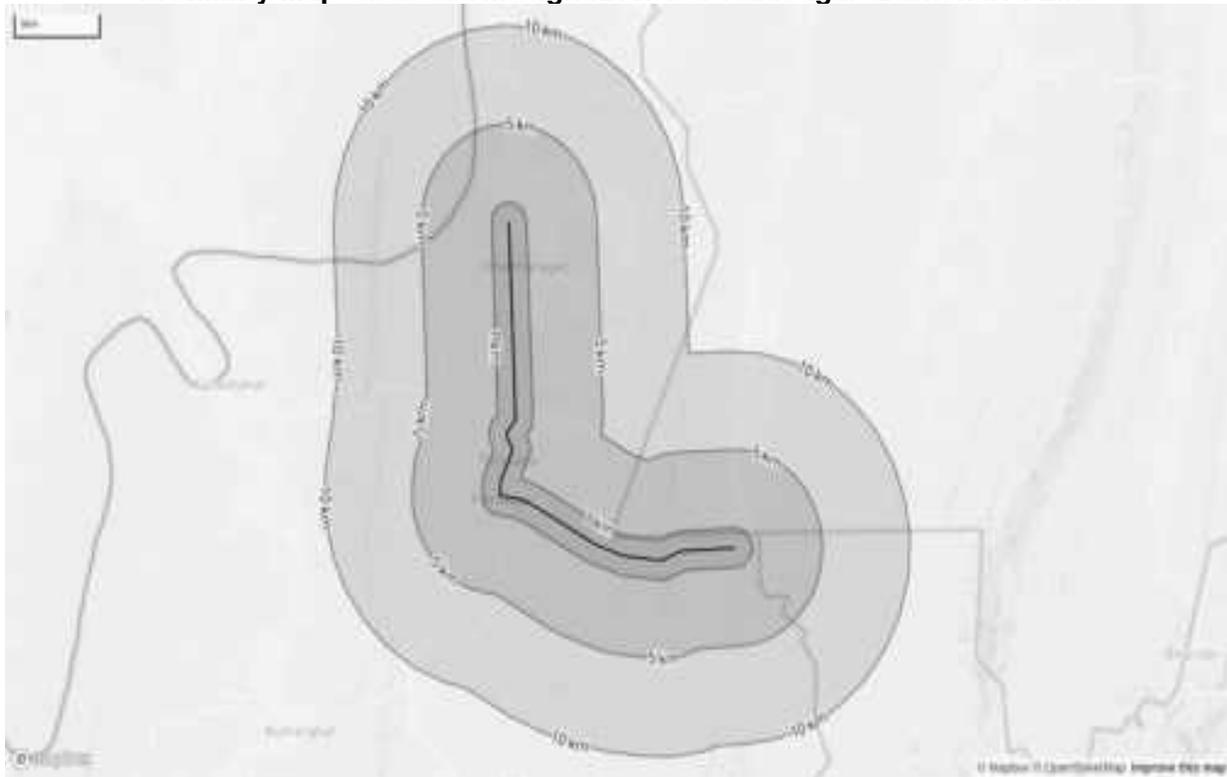
65. IBAT assessment had captured a total of 913 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in the neighbouring states of Mizoram and Assam and in Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius

may not be implied to be found within the project area of influence. Out of the 913 species IBAT has suggested the presence of 75 species that has been listed in the IUCN red data list as critically endangered (14 species including 7 reptilian, 6 avian and 1 mammalian species), endangered (22 including 8 mammals, 6 aves, 8 reptilian species) and vulnerable (39 species including 2 floral, 7 reptiles, 14 birds and 16 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 19 congregatory species namely *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) & *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species distribution are reported by IBAT in a 50 km radius.

66. The ecological walkover along the proposed line did not find any evidence of any critically endangered, endangered, or vulnerable species. Since the proposed line is passing adjacent to areas that have been disturbed due to human interventions (road widening project, settlements) the chances of any threatened IUCN red listed species being found along the ROW can be safely assumed to be quite a rare occurrence.

67. Possible critical habitats for 3 species are supported in the 50 km area around the distribution line for *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, and *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population is low. The species was not observed during the site visit but the EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is more than 100 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. The species was not observed during the site visit and even though the habitat along the alignment is suitable for the presence of the species, the likelihood of occurrence is low to medium. The ecological walkover conducted by the EPC contractor during the final alignment shall reconfirm the absence of the species in the PAI. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT For Panisagar–Damcharra Line



Photographs of Vegetations and Terrain Along Panisagar–Damcharra Line





68. **33 KV Pecharthal Substation to Panisagar Substation Line:** The 16 ckm line starts from the 33/11 kV Pecharthal SS and terminates at Panisagar 33/11 KV SS and passes predominantly through plain and some rolling terrain in North Tripura District. The ethnic distribution along the line is predominantly Bengali with some indigenous tribal population. The line traverses along the existing NH 8 road which is being widened to four lanes. As a result of this widening the existing distribution line poles have already been shifted in the utility corridor (on the edge of the expanded highway) as part of the utility relocation of the highway expansion project in some sections. Underground section is also proposed where the distribution line shall cross the existing railway line. The distribution line is proposed to be provided with covered conductor. In the settlement of Pecharthal, the line passes near to some local religious properties. Areca nut, banana, coconut, jackfruit, *Mikania micrantha*, *Albizia procera*, *Eupatorium odoratum* etc. are the common floral species. Avian species like Eurasian Collared Dove, sparrow, common crow was observed along the line. There were a couple of ponds along the existing line. The Panisagar 33/ 11 KV SS where the line terminates is about 2.7 km away from Rowa WLS as per aerial distance measured in Google Earth satellite imageries, however, due to unknown reasons the same was not captured under IBAT assessment. The line though is distant from the notified ESZ, approximately 2.88km. Even though the length of the proposed line is only 16 ckm, IBAT analysis has been done for the entire length of the line from Pecharthal SS to Panisagar SS as upgradation has been proposed intermittently.

69. IBAT assessment had captured a total of 1090 of floral and faunal species within 50 km radius of the distribution line. This analysis, as discussed above, thus has effectively and erroneously recorded species that may be only available in the neighbouring states of Mizoram and Assam and in Bangladesh and thus the data cannot be presumed to be entirely correct and the species found within the radius may not be implied to be found within the project area of influence. The line is about 18 km (nearest point) away from Rajkandi RF in Bangladesh which is an important bird area. Out of the 1090 species IBAT has suggested the presence of 73 species that has been listed in the IUCN red data list as critically endangered (12 species including 4 reptilian, 7 avian and 1 mammalian species), endangered (21 including 8 mammals, 6 aves, 6 reptilian and 1 fish species) and vulnerable (40 species including 3 floral, 2 fishes, 5 reptiles, 14 birds and 16 mammals). *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the SS. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. Possible critical habitats for 4 species are supported in the 50 km area around the distribution line for *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture)

an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species and *Aythya baeri* (Baer's Pochard) an IUCN CR species. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population is low. The species was not observed during the site visit but the EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is more than 100 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. The species was not observed during the site visit and even though the habitat along the alignment is suitable for the presence of the species, the likelihood of occurrence is low to medium. 13 individuals of *Aythya baeri* (Baer's Pochard) which is a winter migratory water species were reported at Gumti WLS in 2008 and has not been reported post 2012. Since it is approximately 100 km away and the species was last reported 10 years back, the likelihood of occurrence of the species is very low. The ecological walkover conducted by the EPC contractor during the final alignment shall reconfirm the absence of the species in the PAI. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed to ensure construction activities do not threaten the species. However, since the proposed line is passing adjacent to areas that have been disturbed due to human interventions (road widening project, settlements), the chances of any threatened IUCN red listed species along the proposed ROW can be safely assumed to be quite a rare occurrence.

Figure 4-1: Proximity Map Created Through IBAT for Pecharthal–Panisagar Line

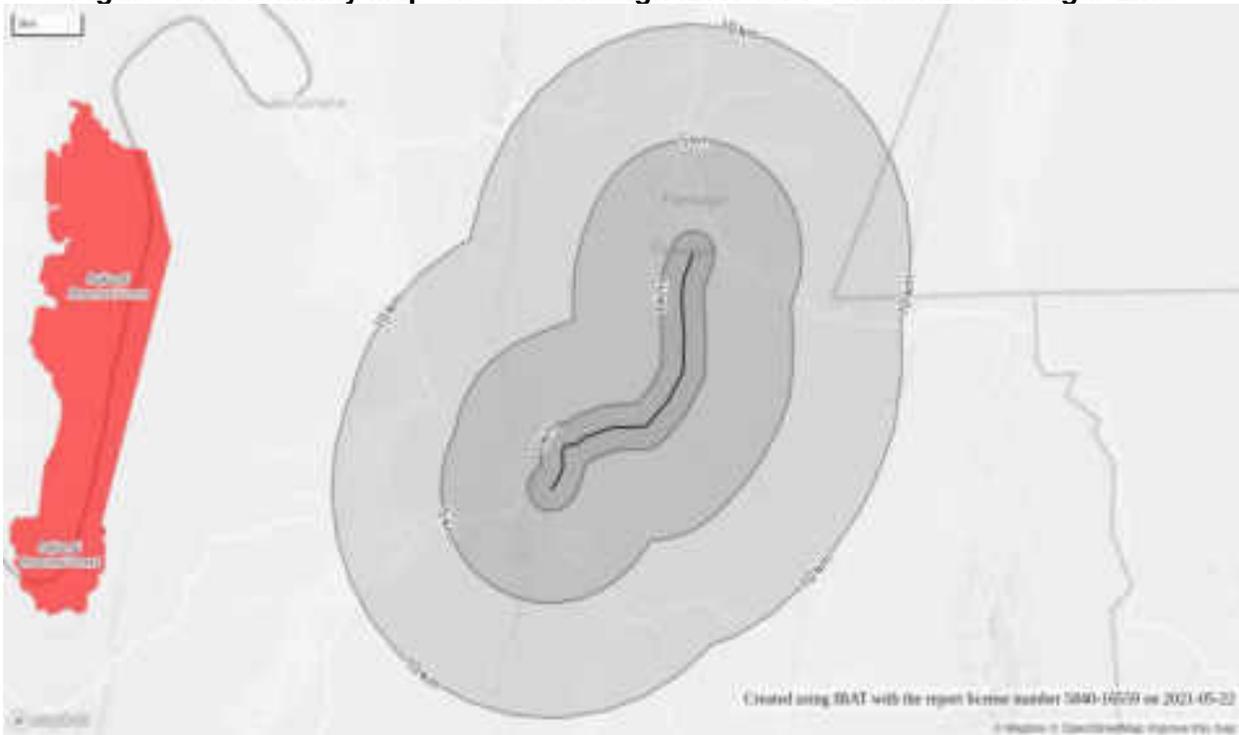


Figure 4-2: Photographs of Vegetations and Terrain Along Pecharthal - Panisagar Line

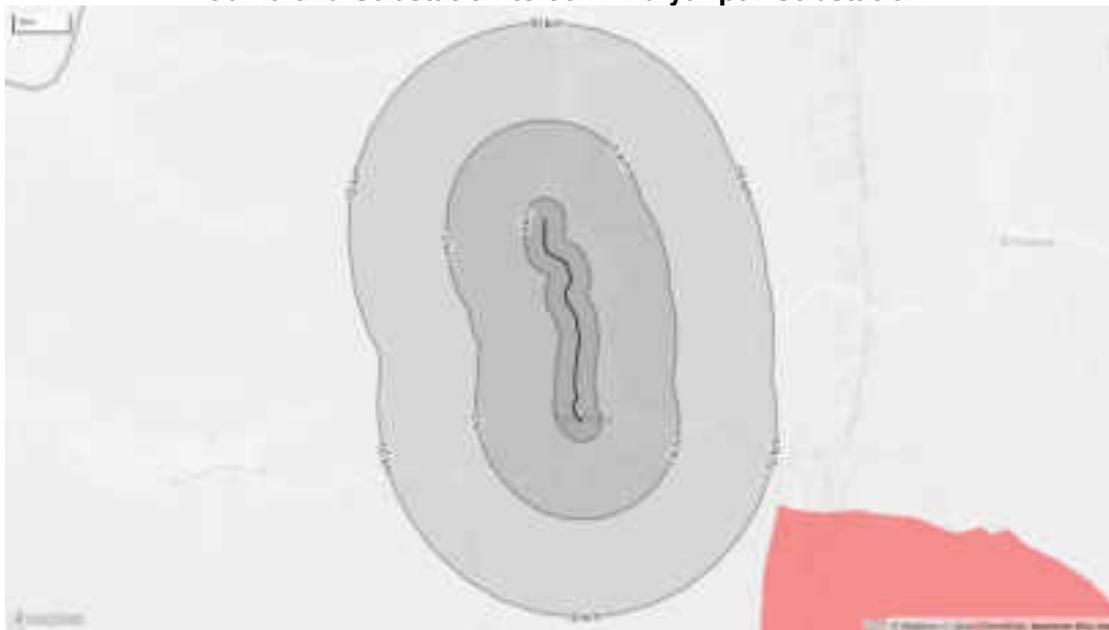


70. **New 33kV CC line from 132 kV Gamaitilla SS to 33kV Kalyanpur SS:** The 15 ckm 33kV CC line in Khowai District passes through flat topography. The Khowai River runs parallel to the ROW at 100m. Land use along route include residences and shops. There are no IBA and KBA within 10km radius of the line as per report generated from IBAT. IBAT assessment had captured a total of 766 of floral and faunal species within 50 km radius of the distribution line. This analysis thus has effectively and erroneously recorded species that may be only found in neighbouring Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 766 species IBAT has suggested the presence of 67 species that have been listed in the IUCN red data list as critically endangered (10 species including 1 floral, 3 reptilian, 5 avian and 1 mammalian species), endangered (21 including 7 mammals, 7 aves and 7 reptilian species) and vulnerable (36 species including 5 floral, 7 reptiles, 9 birds and 15 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 18 congregatory species namely *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) & *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are by IBAT in the 50 km radius. Shrubs and herbs like edible ferns / Fiddlehead fern, clover leaf plant, *Centella asiatica* (Indian pennywort), *Chromolena odorata*, *Mikania micrantha*, *Alocassia* sp. / *Colocassia* sp., along with trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Delonix regia* (gulmohar), *Acacia auriculiformis*, *Cocos nucifera* (coconut) banana etc. were observed near the distribution line. All the floral species are either NE or LC as per IUCN. *Columba livia* (blue rock pigeon), *Acridotheres tristis* (common myna), *Corvus splendens* (house crow), were observed. These are all LC or NE species.

71. Possible critical habitats for 6 species are supported in the 50 km area around the distribution line for *Aquilaria malaccensis* (Agarwood) an IUCN CR species, *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Aquilaria malaccensis* (Agarwood) is a large evergreen tree and is found mainly in the foothills and undulating slopes of evergreen and semi-evergreen forests. The terrain through which the distribution line passes is predominantly plain. There is thus a low likelihood of encountering the species along the alignment, however, a few individuals of the species may present in the vicinity, although none were observed during the site visit. The EPC contractor shall reroute the alignment to avoid the tree species, if chanced upon during ecological walkover during fixing the final alignment. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where

it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population is low. The species was not observed during the site visit but the EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is about 33.61 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. The species was not observed during the site visit and even though the habitat along the alignment is suitable for the presence of the species, the likelihood of occurrence is low to medium. The ecological walkover conducted by the EPC contractor during the final alignment shall reconfirm the absence of the species in the PAI. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Since the distribution line is approximately 33.61 km away from the Sepahijala WLS and even further from the other WLS, the likelihood of occurrence is low – medium. The species was not observed during the site visit but the EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, and montane forest, including degraded forests. Since the distribution line is approximately 33.61km away from the Sepahijala WLS and 45.20 km from Trishna WLS, the likelihood of occurrence is low – medium. The species was not observed during the site visit but absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT for New 33kV Covered Conductor Line from 132 kV Gamaitilla Substation to 33kV Kalyanpur Substation



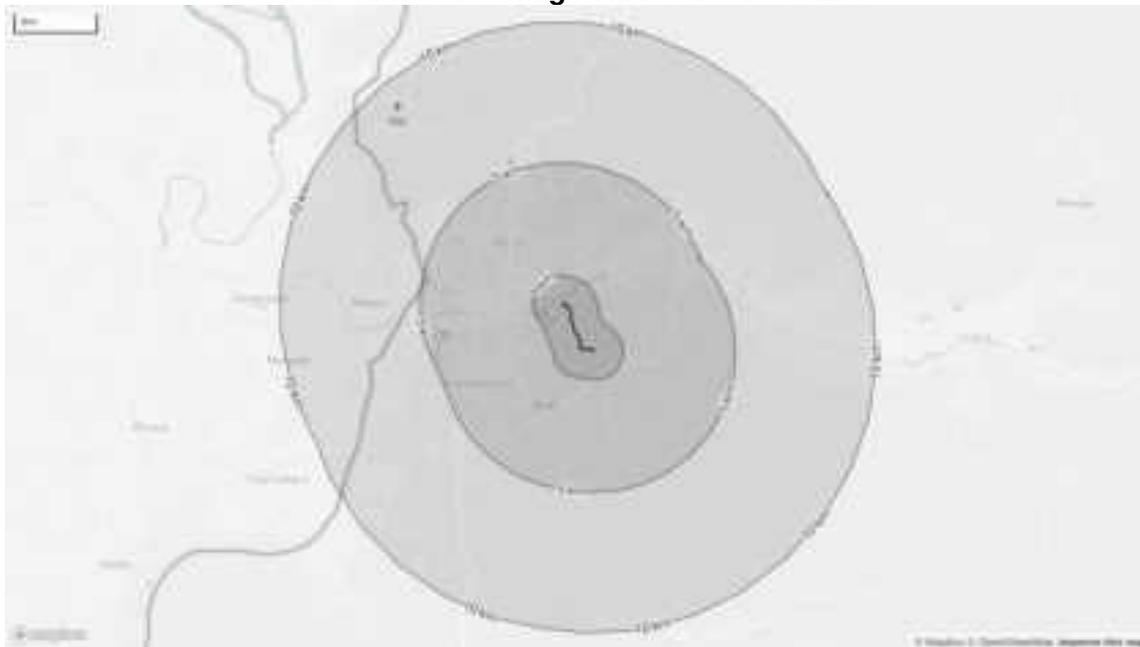
72. **New 33 kV UG from Adarsha Colony SS to College Tilla SS Line:** The 3.5 ckm 33kV UG line in West Tripura district passes through plain terrain. Haora River is crossed by the line. The line is within Agartala Municipal area. There are no IBA and KBA within 10km radius of the line as per report generated from IBAT. IBAT assessment had captured a total of 735 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in neighbouring Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 735 species IBAT has suggested the presence of 62 species that has been listed in the IUCN red data list as critically endangered (9 species including 1 floral, 3 reptilian, 4 avian and 1 mammalian species), endangered (20 including 7 mammals, 7 aves and 6 reptilian species) and vulnerable (33 species including 4 floral, 6 reptiles, 9 birds and 14 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 18 congregatory species namely *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) and *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are reported by IBAT in the 50 km radius. Grasses like *Cynodon dactylon*, *Bambusa spp.*, *Dendrocalamus hamiltonii*, shrubs and herbs like edible ferns / Fiddlehead fern, *Clerodendrum infortunatum*, *Chromolena odorata*, *Mikania micrantha*, *Lantana Camara*, *Alocassia sp.* / *Colocassia sp.*, *Ocimum sanctum* (Tulsi / holy basil) and *hibiscus rosa-sinensis* along with trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Hevea brasiliensis*

(rubber tree), *Artocarpus heterophyllus* (jackfruit), *Delonix regia* (gulmohar), *Acacia auriculiformis*, *Ficus* sp., *Cocos nucifera* (coconut) banana etc. were observed near the DL. All the floral species are either NE or LC as per IUCN. Bird species like *Columba livia* (blue rock pigeon), *Acridotheres tristis* (common myna), *Streptopelia decaocto* (Eurasian collared dove), *Streptopelia orientalis* (oriental turtle dove), *Dicrurus macrocercus* (black drongo), *Corvus splendens* (house crow), *Passer domesticus* (house sparrow), were observed. These are all LC or NE species.

73. Possible critical habitats for six species are supported in the 50 km area around the distribution line for *Aquilaria malaccensis* (Agarwood) an IUCN CR species, *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Aquilaria malaccensis* (Agarwood) is a large evergreen tree and is found mainly in the foothills and undulating slopes of evergreen and semi-evergreen forests. The terrain through which the distribution line passes is predominantly plain and within the municipal corporation of Agartala wherein the land use is predominantly urban settlement. There is thus a low likelihood of encountering the species along the alignment. The EPC contractor shall reroute the alignment to avoid the tree species, if chanced upon during ecological walkover during fixing the final alignment. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population as well as the fact the PAI is predominantly urban settlement is low. The EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is 16.7 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. The likelihood of occurrence can be termed low as the PAI is predominantly urban settlement (Agartala Municipal Corporation area). The ecological walkover conducted by the EPC contractor during the final alignment shall reconfirm the absence of the species in the PAI. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Since the distribution line is approximately 16.7 km away from the Sepahijala WLS and is within Agartala Municipal Corporation area, the likelihood of occurrence is low. The EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal

forest, swamp forest, and montane forest, including degraded forests. Since the distribution line is approximately 16.7 km away from the Sepahijala WLS and within Agartala Municipal Corporation, the likelihood of occurrence is low. Its absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT For 33 kV Underground from Adarsha Colony Substation to College Tilla Substation Line



74. **New 33 kV UG from Grid SS to Rampur SS Line:** The 6 ckm new 33kV UG line is in West Tripura district passing through plain terrain. The line is within Agartala Municipal and its adjoining area. There are no IBA and KBA within 10km radius of the line as per report generated from IBAT. IBAT assessment had captured a total of 1025 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 1025 species IBAT has suggested the presence of 70 species that have been listed in the IUCN red data list as critically endangered (10 species including 1 floral, 3 reptilian, 5 avian and 1 mammalian species), endangered (22 including 9 mammals, 6 aves, 7 reptilian and 2 fish species) and vulnerable (38 species including 4 floral, 1 insect, 2 fishes, 7 reptiles, 9 birds and 15 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 19 congregatory species namely *Aythya baeri* (Baer's Pochard) a CR species, *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus*

(Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) & *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are reported by IBAT in the 50 km radius. Grasses like *Cynodon dactylon*, shrubs and herbs like *Parthenium* sp. (American wheat weed), edible ferns / Fiddlehead fern, (*Chromolaena odorata*, *Mikania micrantha*, *Lantana Camara*, along with trees like *Magnifera indica* (mango), *Azadirachta indica* (Neem), *Lagerstroemia speciosa*, *Areca catechu* (areca nut), *Ficus* sp., *Ziziphus mauritiana* (Indian jujube), *Cocos nucifera* (coconut) etc. were observed. All the floral species are either NE or LC as per IUCN. Bird species like *Acridotheres tristis* (common myna), *Corvus splendens* (house crow), *Passer domesticus* (house sparrow) were observed. These are all LC or NE species.

75. Possible critical habitats for 6 species are supported in the 50 km area around the distribution line for *Aquilaria malaccensis* (Agarwood) an IUCN CR species, *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Aquilaria malaccensis* (Agarwood) is a large evergreen tree and is found mainly in the foothills and undulating slopes of evergreen and semi-evergreen forests. The terrain through which the distribution line passes is predominantly plain and within the municipal corporation of Agartala wherein the land use is predominantly urban settlement. There is thus a low likelihood of encountering the species along the alignment. The EPC contractor shall reroute the alignment to avoid the tree species, if chanced upon during ecological walkover during fixing the final alignment. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population and the PAI is predominantly urban settlement is low. The EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is about 16.7 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. The likelihood of occurrence can be termed low because the PAI is predominantly urban settlement (Agartala Municipal Corporation). The ecological walkover conducted by the EPC contractor during the final alignment shall reconfirm the absence of the species in the PAI. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of

food. Since the distribution line is approximately 16.7 km away from the Sepahijala WLS and is within Agartala Municipal Corporation area, the likelihood of occurrence is low. The EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, and montane forest, including degraded forests. Since the distribution line is approximately 16.7km away from the Sepahijala WLS and is within Agartala Municipal Area, the likelihood of occurrence is low. Its absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT for New 33 kV Underground Line from Grid Substation to Rampur Substation



76. **New 33 kV UG from SM Nagar SS to Charipara SS via Badharghat SS Line:** The 14 ckm 33kV UG line in West Tripura District shall pass through plain terrain in urban area setting. The line passes through the Agartala Municipal area for majority of the length. There are no IBA and KBA within 10km radius of the line as per report generated from IBAT. IBAT assessment had captured a total of 1016 floral and faunal species within 50 km radius of the distribution line. This analysis thus has effectively and erroneously recorded species that may be only found in the neighbouring Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 1016 species IBAT has suggested the presence of 67 species that has been listed in the IUCN red data list as critically endangered (9 species including 1 floral, 3 reptilian, 4 avian and 1 mammalian species), endangered (22 including 8 mammals, 6 aves, 6 reptilian and 2 fish species) and vulnerable (36 species including 4 floral, 1 insect, 2 fishes, 7 reptiles, 8 birds and 14

mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 19 congregatory species namely *Aythya baeri* (Baer's Pochard) a CR species, *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) & *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are reported by IBAT in the 50 km radius. Grasses like *Cynodon dactylon*, *Bambusa spp.*, *Dendrocalamus hamiltonii*, shrubs and herbs like edible ferns / Fiddlehead fern, *Chromolaena odorata*, along with trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Artocarpus heterophyllus* (jackfruit), *Delonix regia* (gulmohar), *Acacia auriculiformis*, *Cocos nucifera* (coconut), banana etc. were observed. All the floral species are either NE or LC as per IUCN. Bird species like *Columba livia* (blue rock pigeon), *Acridotheres tristis* (common myna), doves, *Corvus splendens* (house crow), *Passer domesticus* (house sparrow), were observed. These are all LC or NE species.

77. Possible critical habitats for 6 species are supported in the 50 km area around the distribution line for *Aquilaria malaccensis* (Agarwood) an IUCN CR floral species, *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Aquilaria malaccensis* (Agarwood) is a large evergreen tree and is found mainly in the foothills and undulating slopes of evergreen and semi-evergreen forests. The terrain through which the distribution line passes is predominantly plain and within the municipal corporation of Agartala wherein the land use is predominantly urban settlement. There is thus a low likelihood of encountering the species along the alignment. The EPC contractor shall reroute the alignment to avoid the tree species, if chanced upon during ecological walkover during fixing the final alignment. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population and the PAI is predominantly urban/semi-urban settlement is low. The EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is at least 10 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. The likelihood of occurrence can be termed low because the PAI is predominantly urban / semi urban settlement.

The ecological walkover conducted by the EPC contractor during the final alignment shall reconfirm the absence of the species in the PAI. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Since the distribution line is at least 10 km away from the Sepahijala WLS and is within Agartala Municipal Corporation area, the likelihood of occurrence is low. The EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, and montane forest, including degraded forests. Since the distribution line is at least 10km away from the Sepahijala WLS and is within Agartala Municipal Area, the likelihood of occurrence is low. Its absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map created through IBAT for 33 kV UG line from SM Nagar SS to Charipara SS



78. **New 33kV UG Bodgangnagar SS to 33 kV Adarsha Nagar Colony SS Line:** The 15 ckm 33kV UG line passes through plain terrain in West Tripura district within Agartala Municipal Corporation area. The land use along the line are settlements, roads, open / vegetated stretches, factories / industrial areas. The line will cross the NH 8 and two other roads and the Hoara River. UG cables to pass through pipelines along the bridge. The distribution line shall pass near to a large pond, which forms part of the Chaturdash Temple, an important local and state level temple situated along the NH8.

79. There are no IBA and KBA within 10km radius of the line as per report generated from IBAT. IBAT assessment had captured a total of 745 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in neighbouring Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 745 species IBAT has suggested the presence of 63 species that has been listed in the IUCN red data list as critically endangered (9 species including 1 floral, 3 reptilian, 4 avian and 1 mammalian species), endangered (20 including 7 mammals, 7 aves and 6 reptilian species) and vulnerable (34 species including 4 floral, 6 reptiles, 9 birds and 15 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 18 congregatory species namely *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) and *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are reported by IBAT in the 50 km radius. Grasses like *Cynadon dactylon*, shrubs and herbs like edible ferns / Fiddlehead fern,

Clerodendrum infortunatum, *Chromolaena odorata*, *Mikania micrantha*, *Lantana Camara*, *Alocassia* sp. / *Colocassia* sp., along with trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Artocarpus heterophyllus* (jackfruit), *Ficus* sp., *Tectona grandis* (teak), *Delonix regia* (gulmohar), *Acacia auriculiformis*, *Polyalthia longifolia* (False Ashoka / Debdaru), *Cocos nucifera* (coconut), banana etc. were observed. All the floral species are either NE or LC as per IUCN. Bird species like *Acridotheres tristis* (common myna), *Corvus splendens* (house crow), were observed. These are all LC or NE species.

80. Possible critical habitats for 6 species are supported in the 50 km area around the distribution line for *Aquilaria malaccensis* (Agarwood) an IUCN CR species, *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Aquilaria malaccensis* (Agarwood) is a large evergreen tree and is found mainly in the foothills and undulating slopes of evergreen and semi-evergreen forests. The terrain through which the distribution line passes is predominantly plain and partly within the municipal corporation of Agartala and its outskirts wherein the land use is predominantly urban and semi urban/rural settlement with agriculture. There is thus a low likelihood of encountering the species along the alignment. The EPC contractor shall reroute the alignment to avoid the tree species, if chanced upon during ecological walkover during fixing the final alignment. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, especially due to proximity of a temple pond the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population and the PAI is predominantly urban/semi-urban/rural settlement is low. The EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is 14.11 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. The likelihood of occurrence can be termed low because the PAI is predominantly urban / semi urban / rural settlement (partly in Agartala Municipal Corporation area). The ecological walkover conducted by the EPC contractor during the final alignment shall reconfirm the absence of the species in the PAI. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Since the distribution line is 14.11 km away from the Sepahijala WLS and is within Agartala Municipal Corporation area, the likelihood of occurrence is low. The EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray

outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, and montane forest, including degraded forests. Since the distribution line is 14.11 km away from the Sepahijala WLS and is within Agartala Municipal Area, the likelihood of occurrence is low. Its absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT for New 33kV Underground Line from Bodgangnagar Substation to 33 kV Adarsha Nagar Colony Substation



81. **New 33kV CC Line from 66 kV Gokulnagar SS to 33 kV Madhupur SS:** The 14 ckm 33kV CC line in Sepahijala district (also presence of TTAADC areas) passes through predominantly plain terrain with some gentle rolling terrain. The land use is semi-urban (settlements) with some agricultural areas.

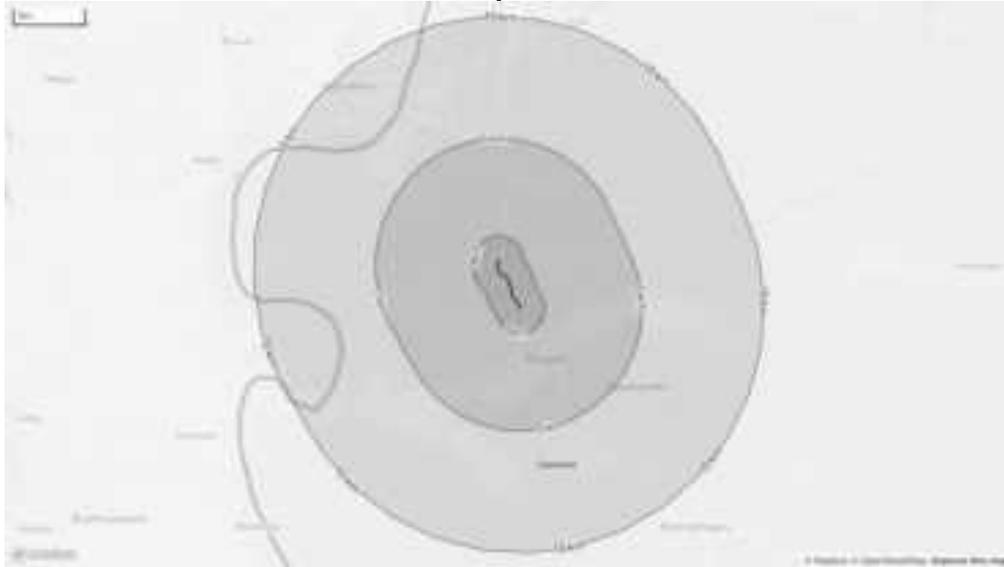
82. The Sepahijala WLS and also a KBA is approximately 3.65 km from the distribution line. IBAT assessment had captured a total of 707 of floral and faunal species within 50 km radius of the distribution line. This analysis thus has effectively and erroneously recorded species that may be only found in neighbouring Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 707 species IBAT has suggested the presence of 56 species that has been listed in the IUCN red data list as critically endangered (7 species including 1 floral, 3 reptilian & 6 avian species), endangered (18 including 7 mammals, 5 aves, and 6 reptilian) and vulnerable (31 species including 3 floral, 6 reptiles, 8 birds and 14 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 18 congregatory species namely *Anas acuta* (Northern Pintail), *Anas strepera / Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag

Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) & *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are reported by IBAT in the 50 km radius. Grasses like *Cynadon dactylon*, *Bambusa spp.*, *Dendrocalamus hamiltonii*, shrubs and herbs like edible ferns / Fiddlehead fern, *Clerodendrum infortunatum*, *Chromolena odorata*, *Mikania micrantha*, along with trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Hevea brasiliensis* (rubber tree), *Artocarpus heterophyllus* (jackfruit), *Delonix regia* (gulmohar), *Acacia auriculiformis*, *Cocos nucifera* (coconut), banana etc. were observed. All the floral species are either NE or LC as per IUCN.

83. Possible critical habitats for 5 species are supported in the 50 km area around the distribution line for *Aquilaria malaccensis* (Agarwood) an IUCN CR species, *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Aquilaria malaccensis* (Agarwood) is a large evergreen tree and is found mainly in the foothills and undulating slopes of evergreen and semi-evergreen forests. The terrain through which the distribution line passes is predominantly plain and the land use is agriculture, plantation and settlement. There is thus a low - medium likelihood of encountering the species along the alignment. The EPC contractor shall reroute the alignment to avoid the tree species, if chanced upon during ecological walkover during fixing the final alignment. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population is low. The EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Since the distribution line is approximately 3.73 km away from the Sepahijala WLS and even further from the other WLS, the likelihood of occurrence is medium - high. The species was not observed during the site visit but the EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal

forest, swamp forest, and montane forest, including degraded forests. Since the distribution line is approximately 3.73km away from the Sepahijala WLS, the likelihood of occurrence is medium - high. The species was not observed during the site visit but absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT for 33kV Line from 66 kV Gokulnagar Substation to 33 kV Madhupur Substation



84. **New 33kV line from 66kV Bagafa SS to 33kV Jolaibari SS:** The 18 ckm 33kV CC line in South Tripura district passes through both plain on flat topography. The line is passing through rural setting with open spaces mostly, intermittent houses, fragmented vegetations and croplands. Trishna WLS both IBA and KBA is approximately 8.5km from the line. IBAT assessment had captured a total of 756 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in neighbouring in Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 756 species IBAT has suggested the presence of 61 species that has been listed in the IUCN red data list as critically endangered (9 species including 1 floral, 4 reptilian, 3 avian and 1 mammalian species), endangered (20 species including 1 floral, 7 mammals, 5 aves and 7 reptilian species) and vulnerable (32 species including 4 floral, 6 reptiles, 8 birds and 14 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 17 congregatory species namely *Anas acuta* (Northern Pintail), *Anas strepera / Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen),

Tadorna ferruginea (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) & *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are recorded by IBAT in the 50 km radius. Grasses like *Cynadon dactylon*, *Bambusa spp.*, *Dendrocalamus hamiltonii*, shrubs and herbs like edible ferns / Fiddlehead fern, *Parthenium* sp. (American wheat weed), along with trees like *Areca catechu* (areca nut), *Lagerstroemia speciosa*, *Tectona grandis* (teak), *Cocos nucifera* (coconut), banana etc. were observed. All the floral species are either NE or LC as per IUCN. Cattle was observed to be grazing in the fields along the DL.

85. Possible critical habitats for 5 species are supported in the 50 km area around the distribution line for *Nilssonia nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Nilssonia nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population is low. The EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is about 45 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. Even though the habitat along the alignment is suitable for the presence of the species, the likelihood of occurrence is low as the distribution line is about 45km from the WLS. The ecological walkover conducted by the EPC contractor during the final alignment shall reconfirm the absence of the species in the PAI. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Since the distribution line is approximately 8.71 km away from Trishna WLS, about 25 km from Gumti WLS, and about 45 km from Sepahijala WLS, the likelihood of occurrence is low. The EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, and montane forest, including degraded forests. Since the distribution line is approximately 8.71 km from Trishna WLS and 45km away from the Sepahijala WLS, the likelihood of occurrence is low. Its absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological

walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT for new 33kV Line from 66kV Bagafa Substation to 33kV Jolaibari Substation



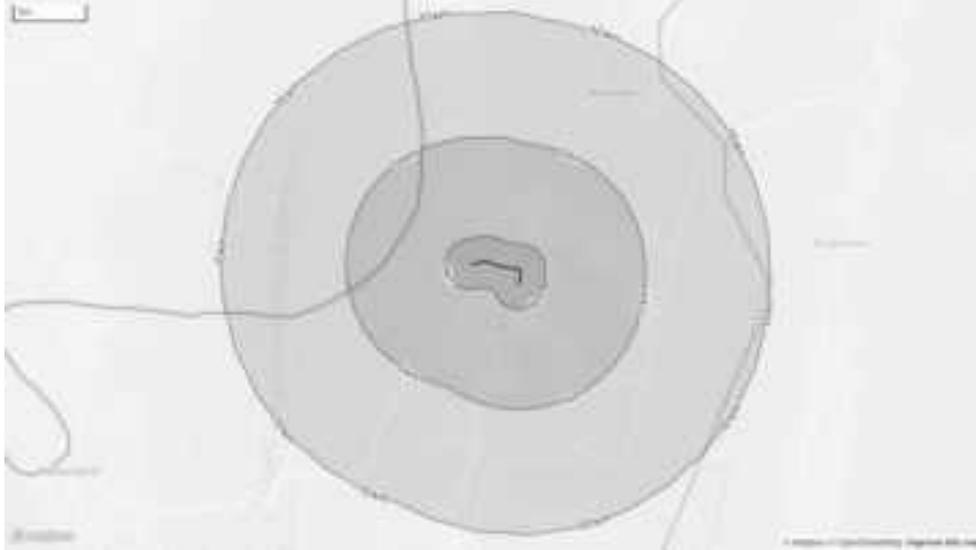
86. **New 11 kV Digalbagh Feeder CC Line:** The 8 ckm 11kV feeder line with CC line in North Tripura district shall pass through flat topography and rural settings. Land uses include croplands, settlements, road, and open lands. The line passes near to the Rowa WLS and the nearest point of the line to the notified ESZ is about 147m away in the eastern side of the line while the distance from the boundary of the Rowa WLS is approximately 379.68m at the nearest point of the line, as per aerial distance measured in Google Earth satellite imageries, however, due to unknown reasons the same was not captured under IBAT assessment. There are no IBA and KBA within 10km radius of the line as per report generated from IBAT. IBAT assessment had captured a total of 872 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in the neighbouring states of Mizoram and Assam and in Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 872 species IBAT has suggested the presence of 72 species that has been listed in the IUCN red data list as critically endangered (12 species including 5 reptilian, 6 avian and 1 mammalian species), endangered (21 including 8 mammals, 6 aves and 7 reptilian species) and vulnerable (39 species including 2 floral, 7 reptiles, 14 birds and 16 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 18 congregatory species namely *Anas acuta* (Northern Pintail), *Anas strepera / Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great

Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) & *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are reported by IBAT in the 50 km radius. Grasses like *Cynodon dactylon* shrubs and herbs *Clerodendrum infortunatum*, *Chromolaena odorata*, *Mikania micrantha*, *Alocassia* sp. / *Colocassia* sp., along with trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Cocos nucifera* (coconut) etc. were observed. All the floral species are either NE or LC as per IUCN.

87. Possible critical habitats for 6 species are supported in the 50 km area around the distribution line for *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species, endemic *Cyrtodactylus montanus* an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population is low. The EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Cyrtodactylus montanus*, is endemic to Jampui Hills in North Tripura district only and the distribution line is approximately 43 km away from the reported location of the species. Further it is in plain area with predominantly settlement and agriculture land use which is different from the habitat preferred by the species and thus the likelihood of occurrence of the species is likely zero. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is more than 100 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. The species was not observed during the site visit and even though the habitat along the alignment is suitable for the presence of the species, the likelihood of occurrence is low. The ecological walkover conducted by the EPC contractor during the final alignment shall reconfirm the absence of the species in the PAI. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Since the distribution line is approximately 379.68m away from Rowa WLS, the likelihood of occurrence is medium - high. The EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest,

and montane forest, including degraded forests. Since the distribution line is more than 100km away from these WLS, the likelihood of occurrence is low. The absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT for New 11 kV Digalbagh Feeder Line



88. **New 11 kV CC Bagfa feeder Line:** The 15 ckm 11kV feeder line with CC in South Tripura district passes through plain terrain within rural settings, mostly across rubber plantation, social forestry and natural vegetations. There are no IBA and KBA within 10km radius of the distribution line as per report generated from IBAT. IBAT assessment had captured a total of 747 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in neighbouring Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 747 species IBAT has suggested the presence of 59 species that has been listed in the IUCN red data list as critically endangered (9 species including 1 floral, 4 reptilian, 3 avian and 1 mammalian species), endangered (20 including 1 floral, 7 mammals, 5 aves and 7 reptilian species) and vulnerable (30 species including 2 floral, 6 reptiles, 8 birds and 14 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the line. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 17 congregatory species namely *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swampphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) & *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are found in the 50 km radius. Grasses like *Cynodon*

dactylon, *Bambusa spp.*, *Dendrocalamus hamiltonii*, shrubs and herbs like edible ferns / Fiddlehead fern, *Chromolena odorata*, *Alocassia sp.* / *Colocassia sp.*, *hibiscus rosa-sinensis*, *Melastoma malabathricum* (Malabar melastoma) and along with trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Hevea brasiliensis* (rubber tree), *Psidium guajava* (guava), banana etc. were observed. All the floral species are either NE or LC as per IUCN.

89. Possible critical habitats for 5 species are supported in the 50 km area around the distribution line for *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population is low. The EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is about 51.09 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. The species was not observed during the site visit and even though the habitat along the alignment is suitable for the presence of the species, the likelihood of occurrence is low given the distance from a WLS. The ecological walkover conducted by the EPC contractor during the final alignment shall reconfirm the absence of the species in the PAI. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Since the distribution line is approximately 14.2 km away from the Trishna WLS and even further from the other WLS, the likelihood of occurrence is low. The EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, and montane forest, including degraded forests. Since the distribution line is approximately 14.2 km away from Trishna WLS and 51.09 km from Sepahijala WLS, the likelihood of occurrence is low. The species was not observed during the site visit but absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works,

EMP measures will be followed to ensure that the construction activities do not threaten these species.

Proximity Map Created Through IBAT for New 11 kV Bagfa Feeder Line



90. **New 11kV Chittamura Feeder Line:** The 12 ckm 11kV feeder with CC line in South Tripura district passes through plain terrain. The land use includes agricultural fields, brick kilns and roads and intermittent settlements. The line shall cross the Muhuri River. Trishna WLS both IBA and KBA is approximately 4.9 km from the distribution line. IBAT assessment had captured a total of 742 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in neighbouring Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 742 species IBAT has suggested the presence of 58 species that has been listed in the IUCN red data list as critically endangered (10 species including 1 floral, 5 reptilian, 3 avian and 1 mammalian species), endangered (19 including 7 mammals, 5 aves, 6 reptilian and 1 floral species) and vulnerable (29 species including 1 floral, 6 reptiles, 8 birds and 14 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 18 congregatory species namely *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) & *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are reported by IBAT in the 50 km radius. Grasses like *Cynadon dactylon*, *Setaria glauca*, shrubs and herbs like edible ferns / Fiddlehead fern,

Parthenium sp. (American wheat weed), *Melastoma malabathricum* (Malabar malestoma), *Chromolena odorata*, *Mikania micrantha*, *Alocassia* sp. / *Colocassia* sp., along with trees like *Magnifera indica* (mango), *Ficus* sp., *Areca catechu* (areca nut), *Hevea brasiliensis* (rubber tree), *Tectona grandis* (teak), *Delonix regia* (gulmohar), *Polyalthia longifolia* (False Ashoka / Debdaru), *Cocos nucifera* (coconut), banana etc. were observed. All the floral species are either NE or LC as per IUCN. Bird species like *Acridotheres tristis* (common myna), green bee-eater were observed. These are all LC or NE species.

91. Possible critical habitats for five species are supported in the 50 km area around the distribution line for *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population is low. The EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is about 41.7 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. The species was not observed during the site visit and even though the habitat along the alignment is suitable for the presence of the species, the likelihood of occurrence is low given the distance from a WLS. The ecological walkover conducted by the EPC contractor during the final alignment shall reconfirm the absence of the species in the PAI. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Since the distribution line is approximately 4.9 km away from the Trisna WLS, the likelihood of occurrence is medium. The EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, and montane forest, including degraded forests. Since the distribution line is approximately 4.9 km away from Trishna WLS, the likelihood of occurrence is medium. Its absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened

species are observed during ecological walkover and construction works, EMP measures will be followed to ensure that the construction activities do not threaten these species.

Proximity Map Created Through IBAT for New 11kV Chittamura Feeder Line



92. **Conversion of existing 11kV to UG line from Golchakar to Dashamighat via Joypur:** The 3.6 ckm existing 11kV line shall be converted to UG line in West Tripura district. The line passes through plain terrain and is within urban area within Agartala city area. The international check post for commercial vehicles is about 190m from the Golchakkar start point of the distribution line.

93. There are no IBA and KBA within 10km radius of the line as per report generated from IBAT. IBAT assessment had captured a total of 732 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in neighbouring Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 732 species IBAT has suggested the presence of 61 species that has been listed in the IUCN red data list as critically endangered (8 species including one floral, three reptilian, three avian, and one mammalian species), endangered (20 species including seven mammals, six aves, six reptilian, and one floral species) and vulnerable (33 species including four floral, six reptiles, nine birds, and 14 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act.

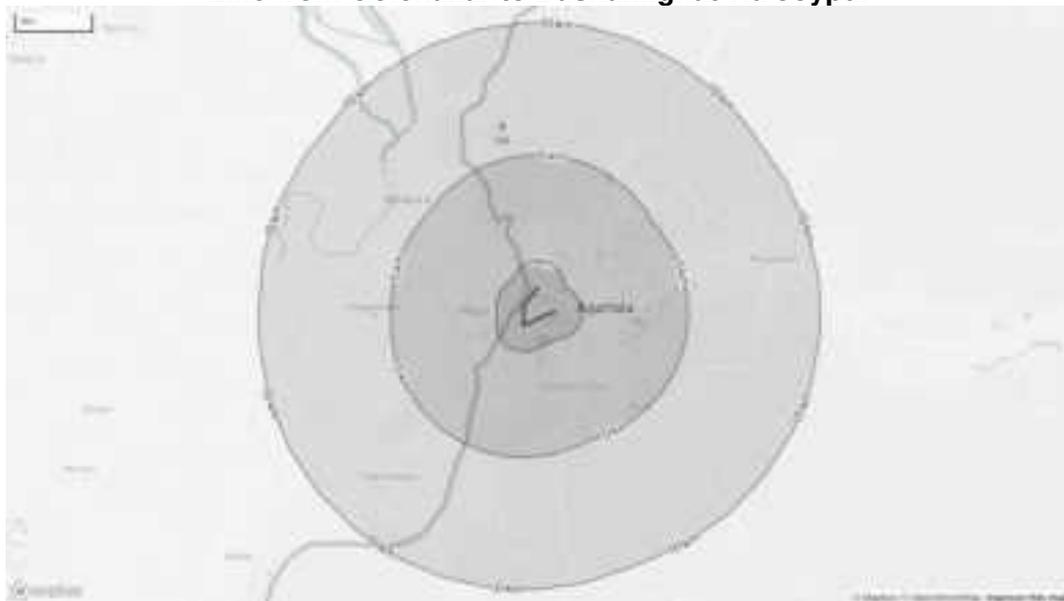
94. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 18 congregatory species namely *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) & *Sarkidiornis melanotos* (African Comb Duck) all LC

species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are reported by IBAT in the 50 km radius. Grasses like *Cynadon dactylon*, shrubs and herbs like *Tabernaemontana divaricate* (Crepe jasmine / Tagar in Bengali), Oleander, *ycnanthes arbor-tristis* (Night-flowering jasmine / Parijat) and along with trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Ficus religiosa* (papeal), *Delonix regia* (gulmohar), *Acacia auriculiformis*, *Cocos nucifera* (coconut), banana etc. were observed. All the floral species are either NE or LC as per IUCN.

95. Possible critical habitats for 6 species are supported in the 50 km area around the distribution line for *Aquilaria malaccensis* (Agarwood) an IUCN CR species, *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Aquilaria malaccensis* (Agarwood) is a large evergreen tree and is found mainly in the foothills and undulating slopes of evergreen and semi-evergreen forests. The terrain through which the distribution line passes is predominantly plain and within the municipal corporation of Agartala wherein the land use is predominantly urban settlement. There is thus a low likelihood of encountering the species along the alignment. The EPC contractor shall reroute the alignment to avoid the tree species, if chanced upon during ecological walkover during fixing the final alignment. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population as well as the fact the PAI is predominantly urban settlement is low. The EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is 17.3 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. The likelihood of occurrence can be termed low as the PAI is predominantly urban settlement (Agartala Municipal Corporation area). The ecological walkover conducted by the EPC contractor during the final alignment shall reconfirm the absence of the species in the PAI. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Since the distribution line is approximately 17.3 km away from the Sepahijala WLS and is within Agartala Municipal Corporation area, the likelihood of occurrence is low. The EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and

semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, and montane forest, including degraded forests. Since the distribution line is approximately 17.3 km away from the Sepahijala WLS and within Agartala Municipal Corporation, the likelihood of occurrence is low. Its absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT for Conversion of Existing 11kV to Underground Line from Golchakar to Dashamighat via Joypur



96. **Conversion of existing 11kV to CC of Ananda Nagar Feeder Line:** The 18 ckm conversion of existing 11kV to CC of Ananda Nagar feeder line in West Tripura district passes through mostly plain terrain and some elevated sections within semi-urban to rural settings. Presence of rubber plantations, social forestry, nurseries and tea plantations.

97. There are no IBA and KBA within 10km radius of the line as per report generated from IBAT. IBAT assessment had captured a total of 726 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in neighbouring Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 726 species IBAT has suggested the presence of 61 species that has been listed in the IUCN red data list as critically endangered (9 species including 1 floral, 3 reptilian, 4 avian and 1 mammalian species), endangered (19 species including 7 mammals, 6 aves and 6 reptilian species) and vulnerable (33 species including 4 floral, 6 reptiles, 9 birds and 14 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act.

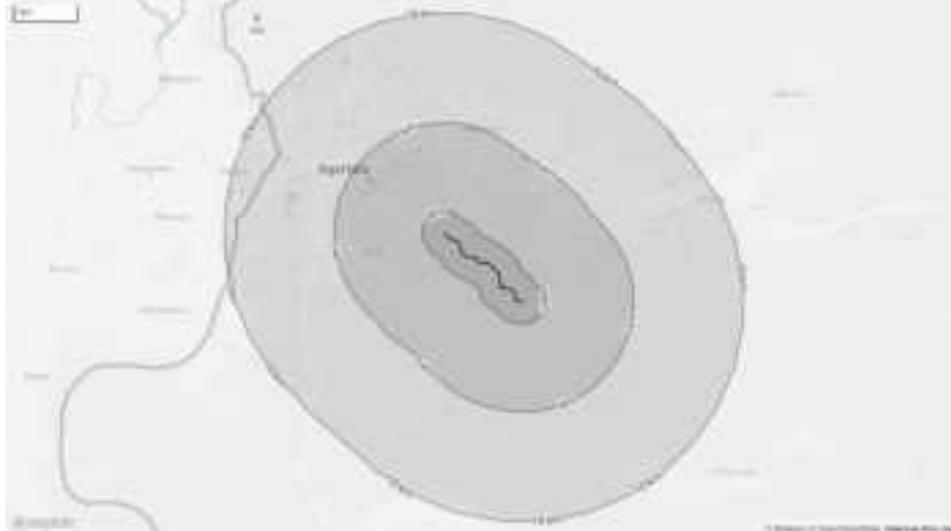
98. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 18 congregatory species namely *Anas acuta*

(Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) & *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are reported by IBAT in the 50 km radius. Grasses like *Cynodon dactylon*, *Bambusa spp.*, *Dendrocalamus hamiltonii*, shrubs and herbs like edible ferns / Fiddlehead fern, *Clerodendrum infortunatum*, *Chromolaena odorata*, *Mikania micrantha*, *Alocassia sp.* / *Colocassia sp.*, along with trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Hevea brasiliensis* (rubber tree), *Artocarpus heterophyllus* (jackfruit), *Psidium guajava* (guava), *Alstonia scholaris*, *Tectona grandis* (teak), *Delonix regia* (gulmohar), *Acacia auriculiformis*, *Polyalthia longifolia* (False Ashoka / Debdaru), *Cocos nucifera* (coconut) etc. were observed. All the floral species are either NE or LC as per IUCN. Cattle were observed to be grazing along the DL.

99. Possible critical habitats for 6 species are supported in the 50 km area around the distribution line for *Aquilaria malaccensis* (Agarwood) an IUCN CR species, *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Aquilaria malaccensis* (Agarwood) is a large evergreen tree and is found mainly in the foothills and undulating slopes of evergreen and semi-evergreen forests. The terrain through which the distribution line passes is predominantly plain and rolling with the land use agricultural and plantation. There is thus a low – medium likelihood of encountering the species along the alignment. The EPC contractor shall reroute the alignment to avoid the tree species, if chanced upon during ecological walkover during fixing the final alignment. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population is low. The EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is 10.81 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. The likelihood of occurrence can be termed medium. The ecological walkover conducted by the EPC contractor during the final alignment shall reconfirm the absence of the species in the PAI. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting

cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Since the distribution line is approximately 10.81 km away from the Sepahijala WLS and there are a number of plantations along the route, the likelihood of occurrence is medium. The EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, and montane forest, including degraded forests. Since the distribution line is approximately 10.81 km away from the Sepahijala WLS but there are a number of plantations along the route, the likelihood of occurrence is medium. Its absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT for 11kV Aananda Nagar Feeder Line



100. **New 11 kV CC Dayarampara Feeder Line:** The 46 ckm 11kV feeder with CC in Sepahijala District passes through mostly plain and some rolling terrain. The Sepahijala WLS a KBA is approximately 1.3 km from the line. IBAT assessment had captured a total of 714 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in neighbouring Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 714 species IBAT has suggested the presence of 75 species that has been listed in the IUCN red data list as critically endangered (7 species including 3 reptilian, 3 avian and 1 floral species), endangered (20 species including 7 mammals, 6 aves, 7 reptilian species) and vulnerable (31 species including 3 floral, 6 reptiles, 8 birds and 14 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 18 congregatory

species namely *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) and *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are reported by IBAT in the 50 km radius. Grasses like *Cynodon dactylon*, *Bambusa spp.*, *Dendrocalamus hamiltonii*, shrubs and herbs like edible ferns / Fiddlehead fern, *Chromolaena odorata*, *Mikania micrantha*, *Lantana Camara*, *Tabernaemontana divaricate* (Crepe jasmine / Tagar in Bengali), *Nyctanthes arbor-tristis* (the Night-flowering jasmine), *hibiscus rosa-sinensis*, papaya, and along with trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Artocarpus heterophyllus* (jackfruit), *Tectona grandis* (teak), *Delonix regia* (gulmohar), *Acacia auriculiformis*, *Cocos nucifera* (coconut), banana etc. were observed. All the floral species are either NE or LC as per IUCN.

101. Possible critical habitats for 5 species are supported in the 50 km area around the distribution line for *Aquilaria malaccensis* (Agarwood) an IUCN CR species, *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Aquilaria malaccensis* (Agarwood) is a large evergreen tree and is found mainly in the foothills and undulating slopes of evergreen and semi-evergreen forests. The terrain through which the distribution line passes is predominantly plain with the land use predominantly agricultural, plantation and rural settlement. There is thus a low likelihood of encountering the species along the alignment. The EPC contractor shall reroute the alignment to avoid the tree species, if chanced upon during ecological walkover during fixing the final alignment. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population is low. The EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Even though the route is about 1.3km from Sepahijala WLS the presence of agricultural fields and settlement between the end point and the WLS boundary reduces the probability of the species straying from the WLS for foraging and food in this direction, the likelihood of occurrence is therefore low. The EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final

alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, and montane forest, including degraded forests. Even though the route is about 1.3km from Sepahijala WLS the presence of agricultural fields and settlement between the end point and the WLS boundary reduces the probability of the species straying from the WLS for foraging and food in this direction, the likelihood of occurrence is therefore low. Its absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT for New 11 kV CC Dayarampur Feeder line



102. **Conversion of existing LT (0.4KV) Line to ABC under ESD Sekherkote:** The 15 ckm Conversion of LT (0.4KV) Line to ABC under ESD Sekherkote line in West Tripura district passes through both plain terrain within a mix of semi-urban and rural settings. There are no IBA and KBA within 10km radius of the distribution line as per report generated from IBAT. IBAT assessment had captured a total of 741 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in neighbouring Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 741 species IBAT has suggested the presence of 59 species that has been listed in the IUCN red data list as critically endangered (10 species including 2 floral, 4 reptilian, 3 avian and 1 mammalian species), endangered (18 species including 7 mammals, 4 aves, 6 reptilian and 1 floral species) and vulnerable (31 species including 2 floral, 7 reptiles, 8 birds and 14 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 18 congregatory species namely *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose),

Aythya fuligula (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) and *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are reported by IBAT in the 50 km radius. Grasses like *Cynodon dactylon*, shrubs & herbs like pumpkin, *Clerodendrum infortunatum*, *Chromolaena odorata*, Papaya and along with trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Artocarpus heterophyllus* (jackfruit), *Delonix regia* (gulmohar), *Acacia auriculiformis*, *Cocos nucifera* (coconut) etc. were observed. All the floral species are either NE or LC as per IUCN.

103. Possible critical habitats for 6 species are supported in the 50 km area around the distribution line for *Aquilaria malaccensis* (Agarwood) an IUCN CR species, *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species, and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Aquilaria malaccensis* (Agarwood) is a large evergreen tree and is found mainly in the foothills and undulating slopes of evergreen and semi-evergreen forests. The terrain through which the distribution line passes is predominantly plain with the land use predominantly agricultural and rural settlement. There is thus a low likelihood of encountering the species along the alignment. The EPC contractor shall reroute the alignment to avoid the tree species, if chanced upon during ecological walkover during fixing the final alignment. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population is low. The EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is 11.8 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. The likelihood of occurrence along the route due to the presence of agricultural fields is low to medium. The ecological walkover conducted by the EPC contractor during the final alignment shall confirm the absence of the species in the PAI. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Even though the route is about 11.8km from Sepahijala WLS the presence of agricultural fields and settlement between the end point and the WLS boundary reduces the probability of the species straying from the WLS for foraging

and food in this direction, the likelihood of occurrence is therefore low. The EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, and montane forest, including degraded forests. Even though the route is about 11.8km from Sepahijala WLS the presence of agricultural fields and settlement between the end point and the WLS boundary reduces the probability of the species straying from the WLS for foraging and food in this direction, the likelihood of occurrence is therefore low. Its absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT for LT (0.4KV) Line Conversion to ABC Under ESD Sekherkote



104. **Conversion of existing LT Line to ABC under ESD Mandwi:** The 20 ckm conversion of LT line to ABC in West Tripura district and TTAADC area passes through mainly plain and some rolling terrain.

105. There are no IBA and KBA within 10km radius of the line as per report generated from IBAT. IBAT assessment had captured a total of 744 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in neighbouring Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 744 species IBAT has suggested the presence of 64 species that has been listed in the IUCN red data list as critically endangered (10 species including 1 floral, 3 reptilian, 5 avian and 1 mammalian species), endangered (21 species including 7 mammals, 7 aves and 7 reptilian species) and vulnerable (33 species including 4 floral, 6 reptiles, 8 birds and 15 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act.

106. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 18 congregatory species namely *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) & *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are reported by IBAT in 50 km radius. Grasses like *Cynodon dactylon*, *Bambusa spp.*, *Dendrocalamus hamiltonii*, shrubs & herbs like edible ferns / Fiddlehead fern, *Chromolena odorata*, *Mikania micrantha*, *Lantana Camara*, *Cassius quadrangularis* (Hadjor), which is a medicinal plant used by locals for joint pain and broken bone treatment, *hibiscus rosa-sinensis* and along with trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Ficus sp.*, *Hevea brasiliensis* (rubber tree), *Tectona grandis* (teak), *Delonix regia* (gulmohar), *Acacia auriculiformis*, banana etc. were observed near the DL. All the floral species are either NE or LC as per IUCN. Bird species like *Acridotheres tristis* (common myna), doves, *Corvus splendens* (house crow), were observed along the DL. These are all LC or NE species.

110. Possible critical habitats for 6 species are supported in the 50 km area around the distribution line for *Aquilaria malaccensis* (Agarwood) an IUCN CR species, *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Aquilaria malaccensis* (Agarwood) is a large evergreen tree and is found mainly in the foothills and undulating slopes of evergreen and semi-evergreen forests. The terrain through which the distribution line passes is predominantly plain and rolling with the land use predominantly agricultural and rural settlement. There is thus a low likelihood of encountering the species along the alignment, however, a few individuals of the species may be present. The EPC contractor shall reroute the alignment to avoid the tree species, if chanced upon during ecological walkover during fixing the final alignment. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given the distance to Gumti WLS is more than 50km and its decline in population is low. The species was not observed during the site visit and the EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is 26.78 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. It was not observed during the site visit

and even though the habitat could support the presence of this species the likelihood of occurrence along the route is low to medium. The ecological walkover conducted by the EPC contractor during the final alignment shall confirm the absence of the species in the PAI. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Even though the route is about 26.78 km from Sepahijala WLS the likelihood of occurrence is low to medium. The species was not observed during the site visit, EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, and montane forest, including degraded forests. Even though the route is about 26.78km from Sepahijala WLS and 50km from Trishna WLS the likelihood of occurrence is therefore low. Its absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT for Conversion of LT Line to ABC Under ESD Mandwi



107. **Conversion of existing LT to ABC line under ESD Poangbari:** The 20 ckm conversion of LT to ABC line in South Tripura District passes through mostly flat topography across rural settings and along main road.

108. There are no IBA and KBA within 10km radius of the line as per report generated from IBAT. IBAT assessment had captured a total of 762 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in neighbouring Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 762 species IBAT has suggested the presence of 63 species that has been listed in the IUCN red data list as critically endangered (10 species including 1 floral, 5 reptilian, 3 avian and 1 mammalian species), endangered (20 including 7 mammals, 6 aves, 6 reptilian and 1 floral species) and vulnerable (33 species including 2 floral, 8 reptiles, 8 birds and 15 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 17 congregatory species namely *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) & *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are found in the 50 km radius. Grasses like *Cynadon dactylon*, *Bambusa spp.*, *Dendrocalamus hamiltonii*, shrubs and herbs like edible ferns / Fiddlehead fern, *Chromolena odorata*, *Mikania micrantha*, *Lantana Camara* & *Melastoma malabathricum* (Malabar melastoma) along with trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Hevea brasiliensis* (rubber tree), *Artocarpus heterophyllus* (jackfruit), *Tectona grandis* (teak), *Ficus benghalensis* (banyan), *Delonix regia* (gulmohar), *Acacia auriculiformis*, *Cocos nucifera* (coconut) banana etc. were observed. All the floral species are either NE or LC as per IUCN. *Columba livia* (blue rock pigeon), *Acridotheres tristis* (common myna), doves, *Dicrurus macrocercus* (black drongo),

Bubulcus ibis (cattle egret), *Corvus splendens* (house crow) and *Passer domesticus* (house sparrow) were observed. These are all LC or NE species.

109. Possible critical habitats for 5 species are supported in the 50 km area around the distribution line for *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Manis pentadactyla* (Chinese pangolin) also an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given the distance to Gumti WLS and its decline in population is low. The species was not observed during the site visit but the EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Manis pentadactyla* (Chinese pangolin) has been reported in Sepahijala WLS in Tripura which is about 60 km. It is found in a wide range of habitats, including primary and secondary tropical forests, limestone, bamboo, broad-leaf and coniferous forests, grasslands and agricultural fields. The species is solitary, primarily nocturnal (sometimes crepuscular), and largely terrestrial. The species was not observed during the site visit and the likelihood of occurrence is low. The ecological walkover conducted by the EPC contractor during the final alignment shall reconfirm the absence of the species in the PAI. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Since the distribution line is approximately 18.14 km away from the Trishna WLS the likelihood of occurrence is low – medium. The species was not observed during the site visit but the EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, and montane forest, including degraded forests. Since the distribution line is approximately 18.14 km from Trishna WLS and away from forest areas, the likelihood of occurrence is low. The species was not observed during the site visit but absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT for Conversion of LT to ABC Line Under ESD Poangbari



110. **Conversion of existing LT to ABC line under ESD Boxarnagar:** The 25 ckm conversion of existing LT to ABC in Sipahijila District passes through both plain and rolling terrain. The distribution line is predominantly in rural settings with settlements, dense vegetation, brickfields, bamboo and rubber plantations. Section of the distribution line passes through Boxarnagar Forest Range.

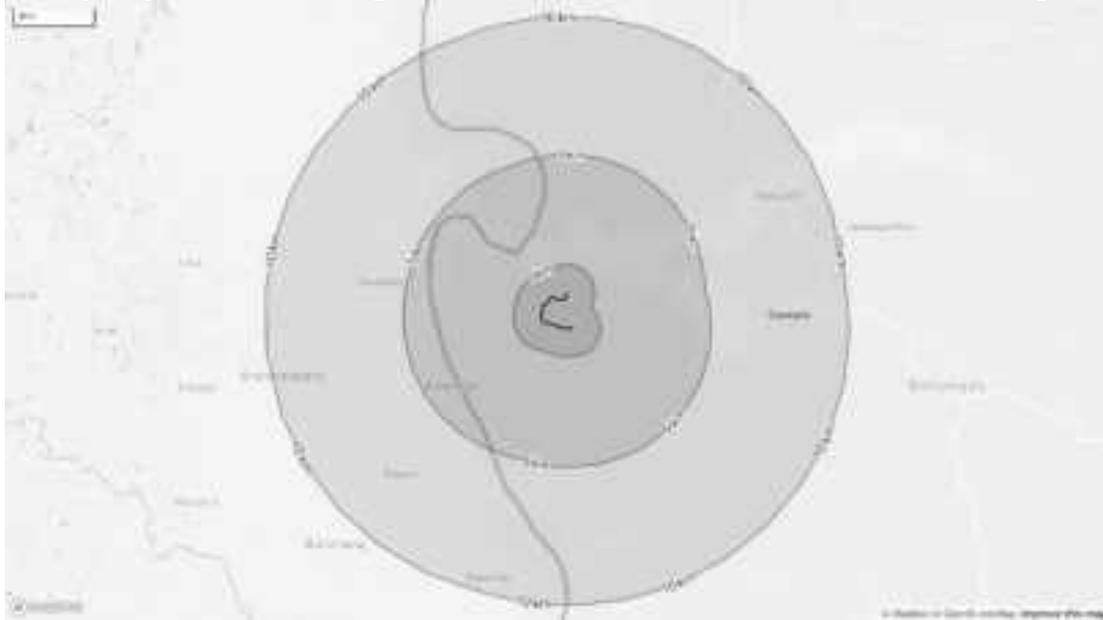
111. The Sepahijala WLS a KBA is approximately 8.57 km from the line. IBAT assessment had captured a total of 738 of floral and faunal species within 50 km radius of the distribution lines. This analysis thus has effectively and erroneously recorded species that may be only found in neighbouring of Bangladesh and thus the data cannot be presumed to be entirely correct, and the species found within the radius may not be implied to be found within the project area of influence. Out of the 738 species IBAT has suggested the presence of 58 species that has been listed in the IUCN red data list as critically endangered (10 species including 1 floral, 6 reptilian and 3 avian species), endangered (18 including 7 mammals, 4 aves, 6 reptilian and 1 floral species) and vulnerable (30 species including 1 floral, 7 reptiles, 8 birds and 14 mammals). Some of the species are also protected and covered under the schedules of the Indian Wildlife Act. *Phylloscopus cantator* (Yellow-vented Warbler) an IUCN LC and a restricted range species is reported as per IBAT to be present within 50km radius of the DL. However, the bird which is a migrant is reported to be native as a non-breeding species in the entire state of Tripura and is also reported to be present in 3 countries. 18 congregatory species namely *Anas acuta* (Northern Pintail), *Anas strepera* / *Mareca strepera* (Gadwall), *Anastomus oscitans* (Asian Openbill), *Anser anser* (Greylag Goose), *Anser indicus* (Bar-headed Goose), *Aythya fuligula* (Tufted Duck), *Dendrocygna bicolor* (Fulvous Whistling-duck), *Dendrocygna javanica* (Lesser Whistling-duck), *Gallinula chloropus* (Common Moorhen), *Larus brunnicephalus* (Brown-headed Gull), *Nettapus coromandelianus* (Cotton Pygmy Goose), *Phalacrocorax carbo* (Great Cormorant), *Porphyrio porphyrio* (Purple Swamphen), *Tadorna ferruginea* (Ruddy Shelduck) *Vanellus cinereus* (Grey-headed Lapwing) and *Sarkidiornis melanotos* (African Comb Duck) all LC species, *Anhinga melanogaster* (Oriental Darter), *Pelecanus philippensis* (Spot-billed Pelican) and *Aythya nyroca* (Ferruginous Duck) all NT species are reported by IBAT in the 50 km radius. Grasses like *Cynodon dactylon*, *Bambusa spp.*, *Dendrocalamus hamiltonii*, shrubs and herbs like edible ferns / Fiddlehead fern, *Chromola odorata*, *Mikania micrantha*, *Lantana Camara*, *Ipomea aquatica*

and *Alocassia* sp. / *Colocassia* sp., along with trees like *Magnifera indica* (mango), *Areca catechu* (areca nut), *Hevea brasiliensis* (rubber tree), *Artocarpus heterophyllus* (jackfruit), *Psidium guajava* (guava), *Tectona grandis* (teak), *Delonix regia* (gulmohar), *Acacia auriculiformis*, *Cocos nucifera* (coconut) banana etc. were observed near the alignment. All the floral species are either NE or LC as per IUCN. *Columba livia* (blue rock pigeon), *Acridotheres tristis* (common myna), *Streptopelia decaocto* (Eurasian collared dove), *Streptopelia orientalis* (oriental turtle dove), *Dicrurus macrocercus* (black drongo), *Dicrurus paradiseus* (greater racket-tailed drongo), *Dicrurus remifer* (lesser racket-tailed drongo), *Bubulcus ibis* (cattle egret), *Centropus sinensis* (greater coucal), *Corvus splendens* (house crow), *Passer domesticus* (house sparrow), *Psilopogon lineatus* (lineated barbet), *Copsychus saularis* (oriental magpie robin), *Pycnonotus cafer* (Red-vented Bulbul), *Dendrocitta vagabunda* (rufous treepie / Indian treepie), *Sturnus contra* Linnaeus (asian pied starling), *Motacilla cinerea* (grey wagtail) were observed. These are all LC or NE species.

112. Possible critical habitats for 4 species are supported in the 50 km area around the distribution line for *Nilssonina nigricans* (Black Softshell Turtle) an IUCN CR species, *Gyps bengalensis* (White-rumped Vulture) an IUCN CR species, *Trachypithecus phayrei* (Phayre's Leaf Monkey) an IUCN EN species and *Macaca leonina* (Northern Pig Tailed Macaque) an IUCN VU species. *Nilssonina nigricans* (Black Softshell Turtle) is reported in medium-sized to very large riverine situations in the wild and several captive populations in temple ponds in North East India. In Tripura the species has been reported in Tripureswari Temple pond in Matabari near Udaipur but not in the wild by ZSI, and thus the likelihood of occurrence of the species along the alignment is very low. However, the EPC contractor shall reconfirm absence through an ecological walkover conducted during finalization of the alignment. *Gyps bengalensis* (White-rumped Vulture) has been reported to be in Gumti WLS and in other parts of Tripura though it is very rare nowadays. It occurs mostly in plains and less frequently in hilly regions where it utilizes light woodland, villages, cities, and open areas. The likelihood of occurrence of the species in the PAI of the alignment given its decline in population is low. The species was not observed during the site visit but the EPC contractor shall reconfirm the presence or absence of the species through an ecological walkover while fixing the final alignment. *Trachypithecus phayrei* (Phayre's Leaf Monkey) has been reported in Trishna WLS, Rowa WLS and Gumti WLS in the state and the area especially around Sepahijala WLS is considered to be a definite critical habitat for this species while population figures in the other protected areas are unknown and thus critical habitat could not be conclusively established. This species occupies primary and secondary high-elevation tropical evergreen forests, semi-evergreen and mixed moist deciduous forests, and Montane Sub-tropical forest and is also found in plantations and in the jhum cultivation (shifting cultivation) areas. The species is predominantly arboreal, diurnal, and folivorous. The species may sometimes move in the plantation areas outside but in the vicinity of the WLS in search of food. Since the distribution line is approximately 8.5 km away from the Sepahijala WLS, the likelihood of occurrence is medium. The species was not observed during the site visit but the EPC contractor shall confirm the presence or absence of the species through an ecological walkover while fixing the final alignment. As per meeting with Boxarnagar Range Forest Officer, the species is primarily restricted to Sepahijala WLS, which is one of the few locations where the species can be regularly spotted. Rarely once or twice in a year they are reported / observed outside in the rubber plantation areas seeking food. They have grown fond of and adapted to rubber as food. Troops are also sometimes reported / sited in the Boxarnagar Social Forest area, which is around 2 km from end point. The latest official siting was at a location approximately 1.58 km away from the end point of DL by the Forest Department on 23rd October 2021. The species though has not been reported since last 30 years in the immediate route and surroundings as per local consultations. *Macaca leonina* (Northern Pig Tailed Macaque) has been recorded in Sepahijala WLS and in Trishna WLS and may stray outside for foraging and feeding. This is a predominantly arboreal animal. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen

forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, and montane forest, including degraded forests. Since the distribution line is approximately 8.5km away from the Sepahijala WLS, the likelihood of occurrence is medium. The species was not observed during the site visit but absence in the PAI shall be confirmed by ecological walkover during finalization of the alignment. The ecological walkover survey on the final alignment by the EPC contractor shall check for signs of these CH species. If the presence of these CH species or any other threatened species are observed during ecological walkover and construction works, EMP measures will be followed and DFOs consulted to ensure construction activities do not threaten the species.

Proximity Map Created Through IBAT for LT Line to ABC Under ESD Boxarnagar Line



Ecology Screening Outputs for Critical Species

Threatened Floral Species Reported by IBAT

Species	Global Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
<i>Aquilaria malaccensis</i> (Agarwood)	CR	It is widespread species in South and South-East Asia, the global population is at threat but not known. In India it is mostly found in the foothills of North-East India and West Bengal. In Tripura Agarwood is mostly confined to Kadamtala Block of North Tripura District, Khowai Subdivision of Khowai District and some pockets of South Tripura and Gomati districts. In non-forest areas total number of trees is estimated at more than 5 million covering about 2000 ha of private plantation, almost 99% of this is concentrated in North Tripura. Northeast India is the cradle of Agarwood aromatics with ancient traditions of Agarwood production. It has been used for over 2000 years for medicinal, aromatic, and religious purposes. Agartala, the state capital of Tripura is believed to have origin of its name from Agarwood. In terms of the likely global population, given the CR status and socioeconomic value, the state population, especially in respect of North Tripura, may meet the thresholds for critical habitat. However, no individuals were recorded at substation or during the site visits. Forest areas will be avoided but the distribution lines may pass through plantations where the Agarwood is commercially cultivated.	Not recorded but possible so to be reconfirmed through route surveys
<i>Anisoptera costata</i>	EN	The species is native to Asia and found in Bangladesh, Myanmar, Thailand, Cambodia, Lao PDR, Viet Nam, peninsular Malaysia, Borneo, Indonesia, and the Philippines. It is not reported in India or Tripura and thus shall not trigger critical habitat.	-
<i>Dipterocarpus costatus</i>	VU	This species is native to southern and southeastern Asia, the global population is not known but, overall, there has been at least a 30% decline in the population over the last three generations due to habitat loss and over-exploitation. It occurs within Bangladesh, Myanmar, India, Thailand, southern Lao PDR, southern Viet Nam, Cambodia, and peninsular Malaysia. The species is considered common within some parts of its range but not within India. Within India the species is found only in the Andaman Islands and in Tripura ⁴ commonly between 600 m and 1,000 m asl. In terms of the likely global population, considering this is a VU species, the state population is unlikely to meet the thresholds for critical habitat. Further, no individuals were recorded from governmental secondary sources (forest	-

⁴ The IUCN Red List of Threatened species. <https://www.iucnredlist.org/species/33010/2830217>

Species	Global Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		department) or at substation or during the site visits. ⁵ Its habitat type is forest and forest areas will be avoided by distribution lines.	
<i>Dipterocarpus turbinatus</i>	VU	This species is native to southern and southeastern Asia, the global population is not known but has experienced between 30-50% population reduction in the last three generations (300 years). In India it grows gregariously and is a common species found in the Andaman Islands and NE India (Tripura, Mizoram, Assam, Manipur, and Meghalaya). The species is reported to be present in Sepahijhala WLS. In terms of likely global population, considering this is a VU species, the state population is unlikely to meet the thresholds for critical habitat. Further, no individuals were recorded at substation or during the site visits. Its habitat type is forest and forest areas will be avoided by distribution lines.	-
<i>Anacyclus pyrethrum</i> (Atlas Daisy)	VU	<i>Anacyclus pyrethrum</i> is a western Mediterranean species with a restricted distribution in North Africa (Morocco and Algeria) and southern Spain. It is a non-native species to India and introduced from Mediterranean region; thus, the species is not considered further in terms of critical habitat screening.	-
<i>Oryza malampuzhaensis</i>	VU	This species is endemic to the Kerala region in India. In the rest of India it is found in plantation. The natural population of the species is highly localized over a small geographical area. The global population is at threat but not known. In terms of likely global population, although the IUCN distribution map includes Tripura, considering this is a VU species endemic to Kerala, the state population is unlikely to meet the thresholds for critical habitat. Further, no individuals were recorded at substation or during the site visits.	-
<i>Globba spathulata</i> (Dancing Girl Flower)	VU	This species is found in India (West Bengal, Mizoram), Bangladesh and Myanmar. 500-1,000 global population reported. However, this species is not recorded or reported in Tripura. Thus, it does not trigger critical habitat.	-
<i>Beilschmiedia assamica</i>	VU	This tree species is known from northeast India, Bangladesh, and Myanmar. There is no information about the population size and trends of this species. The species is recorded in Sikkim and Assam in India. ⁶ However, this species is not recorded or reported in Tripura. Thus, it does not trigger critical habitat.	-
<i>Litsea panamanja</i>	VU	An extant species of Bangladesh, India (West Bengal, Sikkim) and Nepal. There is no global information about the population size	-

⁵ ENVIS Resource Partner on Biodiversity, hosted by Botanical Survey of India.

<http://bsienvi.nic.in/WriteReadData/UserFiles/file/Flora%20of%20Tripura%20State-Angio-Dicot.pdf>

⁶ India Biodiversity portal. <https://indiabiodiversity.org/species/show/253534>

Species	Global Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		and trends of this species. However, this species is not recorded or reported in Tripura. Thus, it does not trigger critical habitat.	
<i>Paris polyphylla</i> (Love Apple)	VU	The species is mainly distributed in the temperate forest across the Himalayas preferring an altitudinal range of 1,800-3,300 meters above sea level and is widespread species in South and South-East Asia. The global population is at threat but not known. In India it is recorded in several states. However, this species is not recorded or reported in Tripura. Thus, it does not trigger critical habitat.	-

CR = Critically Endangered, EN = Endangered, PAI = project area of influence, VU = Vulnerable
Source: ADB TA Consultant

Threatened faunal species reported by IBAT

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
Arthropoda – 2 species			
<i>Liotelphusa quadrata</i>	VU (NE)	Resident of Assam, Meghalaya and Nagaland in India. However, this species is not recorded or reported in Tripura. Thus, it does not trigger critical habitat.	-
<i>Bayadera hyalina</i>	VU (NE)	The species has been recorded in Meghalaya in India and in northwest Thailand. However, this species is not recorded or reported in Tripura. Thus, it does not trigger critical habitat.	-
Fishes – 4 species			
<i>Amblyceps arunchalensis</i>	EN (NE)	This species is known two rivers in the Brahmaputra River drainage in northeastern India. It is at present thought to be restricted to the Dikrong River and the Subansiri River about 25 km. The population size and trend of this species is unknown, as museum holdings of this species are scarce. However, this species is not recorded or reported in Tripura. Thus, it does not trigger critical habitat.	-
<i>Tor putitora</i>	EN (NE)	The species is naturally distributed throughout the rivers (and associated reservoirs) of the South Himalayan drainage (Ganges-Yamuna and Brahmaputra) from Pakistan in the West to Myanmar in the East. Records are also available from several river systems and associated reservoirs in the Mahanadi and the Krishna (because of captive breeding and stocking from hatcheries) located in the south of the Himalayan	-

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		landscape. In addition to exhibiting natural adaptation to changing riverscapes and the presence of thriving populations in reservoirs, multiple successful introductions have also been made to Himalayan lakes. No comprehensive range-wide population studies have been carried out on the species, although there are studies available from many individual river systems and reservoirs that make up the Himalayan landscape, which have observed declines from 25% to 90% in a 10–20-years period. IUCN distribution maps show the species as possibly extant on the edge of its range (it is not currently extant in Tripura as per IUCN). Thus, given only marginal occurrence the species (if indeed present at all) is unlikely meet the thresholds for critical habitat.	
<i>Wallago attu</i>	VU (NE)	This freshwater species is widespread, occurring across South and Southeast Asia including India. This species is widely distributed and hence has a very large population. However, it is overfished, and this has caused a considerable decline in the population in most of the Indian subcontinent. In terms of global population, and considering this is a widespread VU species, the state population is unlikely to meet the thresholds for critical habitat. The species was evidenced in local fish markets during site visits.	-
<i>Bagarius yarrelli</i>	VU (NE)	The species is reported to be widely distributed throughout south and southeast Asia including India. Although there is little information on the population and its status, there are indications that this species is suffering declines in parts of its range. However, the species is widely available in local fish markets and present in the eastern and northeastern part of the Indian Subcontinent. In terms of global population, and considering this is a widespread VU species, the state population is unlikely to meet the thresholds for critical habitat.	-
Amphibian – 1 species			
<i>Bufoides meghalayanus</i> (Khasi Hill Rock Toad)	EN (NE)	This nominal species is known from three sites in the Cherrapunjee area, East Khasi Hills, Meghalaya, India, between 1,084 - 1,192 m asl (Deuti et al. 2012). These three sites are all within 1.5 km of each other, and recent surveys in the region suggest that this could be a genuinely restricted species (Deuti et al. 2012). They are currently understood to occur were estimated to hold no more than 100 adult individuals in 2010 (Deuti et al. 2012). The sites where a suspected undescribed taxon occurs are comprised by Ngengpui Wildlife Sanctuary and Dampa Tiger Reserve in Mizoram and Tura in Garo hills, Meghalaya (Deuti et al. 2012). There is no population status information for these sites. However,	-

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		this species is not recorded or reported in Tripura. Thus, it does not trigger critical habitat.	
Reptiles – 22 species			
<i>Nilssonina nigricans</i> (Black Softshell Turtle)	CR (NE)	The distribution range of this species in the wild is in Brahmaputra River and its tributaries along with isolated subpopulations in several temple ponds in Assam and Tripura of Northeast India. In Tripura it has been recorded by researchers only in Tripureswari Temple pond in Matabari near Udaipur, it is not recorded by ZSI in the wild. It is also recorded from the Meghna River System in Bangladesh, and the Karnaphuli River in Bangladesh. Population of the species is not available both globally and in Tripura. In terms of the likely global population, given the CR status, the state population found in the temple pond, may meet the thresholds for critical habitat.	Not recorded, but reported in Tripureswari Temple pond in Matabari, Udaipur and possible it is also found in other big temple ponds
<i>Indotestudo elongata</i> (Elongated Tortoise)	CR (Schedule IV)	The species is widely distributed across South and Southeast Asia. In India the species is found in Kaleshar Wildlife Sanctuary in the foothills of Himalayas in the Aravali Range and in northern and eastern India including the terrai belt and Chota Nagpur Plateau in eastern India. Both global and national populations are not specified. The species has not been recorded by ZSI to be present in Tripura, though IUCN has mapped its range through north, northwest, and eastern Tripura. Despite having a wide distribution and considerable suitable habitat remaining severe population declines have occurred recently due to human activities. In terms of the likely global population, any marginal occurrence in the state (if present at all) is unlikely to meet the thresholds for critical habitat. No individuals though were recorded at substations or during the site visits. The species inhabits primarily deciduous forest types (Sal, Dry Dipterocarp, Mixed Deciduous forests) with open, broken canopy allowing sufficient light for a moderate to very dense undergrowth of grasses and herbs. Routing of distribution lines through the forest areas which are its habitat has been avoided.	-
<i>Pangshura sylhetensis</i> (Assam Roofed Turtle)	CR (NE)	The species is distributed from foothill areas adjoining the Brahmaputra valley of Bangladesh and India. Global populations are present in Bhutan, India and probably in Myanmar. The species has been stated to be supported in Rudrasagar Lake area. However, Tripura is not shown in the distribution map of the species by IUCN nor has its presence has been reported or recorded in any	-

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		other sources including that by ZSI. ⁷ Thus, it does not trigger critical habitat.	
<i>Batagur dhongoka</i> (Three-striped Roofed Turtle)	CR (NE)	An inland wetland habituating species, it has a range limited to the Ganga lowlands of northern India and Bangladesh. Within India, it has been historically recorded from the states of Assam, Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh, and West Bengal. The species is now restricted to the National Chambal Sanctuary (India) and Ganga Farakka (India). However, this species is not recorded or reported in Tripura. Thus, it does not trigger critical habitat.	-
<i>Manouria emys</i> (Asian Giant Tortoise)	CR (NE)	The species distribution occurs from Bangladesh and northeastern India through mid-elevation hilly areas of Myanmar, and western and southern Thailand through Malaysia and Indonesia. Recent records from India are only from Manipur, Mizoram, and Assam. This species is not being recorded or reported in Tripura. Thus, it does not trigger critical habitat.	-
<i>Cyrtodactylus montanus</i>	CR (NE)	This species has been recorded near Phuldungsei village in the southern Jampui Hills, 20km north in Vangmun, and at two other localities in the Jampui Hills of North Tripura district. It has been collected from collected from rocky roadside cuttings, montane evergreen forest, tree holes and old brick walls. It has a narrow elevational range, from around 600 m asl to the summit of the mountain at 920 m asl. Population is unknown and observations suggest that this species is relatively common in good high elevation forest habitat but uncommon in modified areas within the forest. However, it is endemic to this small area. In terms of likely global population, given the CR status and it being an endemic species, the state population will meet the thresholds for critical habitat. Vangmung SS is found within the IUCN mapped area of occurrence of this species. However, the SS is in modified habitat away from forest areas and the routing of DL through forest areas has been avoided.	Not recorded, but probable in forest areas though reports were from outside footprint of Vangmung Substation, no distribution line works proposed in its mapped area of occurrence

⁷ Rahmani, A.R., Islam, M.Z. and Kasambe, R.M. (2016) Important Bird and Biodiversity Areas in India: Priority Sites for Conservation (Revised and updated). Bombay Natural History Society, Indian Bird Conservation Network, Royal Society for the Protection of Birds and BirdLife International (U.K.). Pp. 1992 + xii

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
			
<i>Cuora amboinensis</i> (Southeast Asian Box Turtle)	EN (NE)	The species is distributed throughout Southeast Asia from north-eastern India and the hills of eastern Bangladesh through mainland Southeast Asia. It occurs throughout the Southeast Asian archipelago, from the Nicobar Islands through Indonesia to the Moluccas and throughout the Philippines. Its habitat is Forest, Wetlands (inland). Global and national population not determined. Substantial populations are reported to have occurred in several protected areas in northeastern India although it is unclear if any are in Tripura. The species has not been recorded by ZSI to be present in Tripura, though IUCN has mapped its range through eastern Tripura. Given the absence of the species in official records and limited probable population/marginal occurrence (if indeed present in the state) this species is unlikely to meet the thresholds for CH.	-
<i>Cuora mouhotii</i> (Keeled Box Turtle)	EN (NE)	<i>Cuora mouhotii</i> occurs in scattered, disjunct occurrences in northeast India, northern Myanmar, southern part of People's Republic of China (PRC), Lao PDR, and Viet Nam. Global population is unspecified while national population is data deficient. It is noted to be apparently common in the north Cachar Hills and other parts of Assam, and Namdapha Tiger Reserve. The species is absent in Tripura as per ZSI and IUCN records though IUCN has mapped its range through eastern Tripura bordering Mizoram where the species is reported. Given the absence of the species in the official records and limited probable population (if indeed present in the state) of this EN species in Tripura, it does not trigger critical habitat.	-
<i>Geoclemys hamiltonii</i> (Spotted Pond Turtle)	EN (NE)	The species inhabits the lowlands of the Indus, Ganga and Brahmaputra River basins of Pakistan, Assam, Bihar, Jammu, Meghalaya, Punjab, Rajasthan, Uttar Pradesh, West Bengal in India, Bangladesh, and Nepal. Global population is unspecified while the national population has not been assessed. It is common in	-

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		several protected locations (e.g., Kaziranga) and in the Brahmaputra floodplains and reported as uncommon or rare at other sites. The species is absent in Tripura as per ZSI and IUCN records and thus does not trigger critical habitat.	
<i>Hardella thurjii</i> (Crowned River Turtle)	EN (NE)	The species inhabits the Ganga-Brahmaputra basin of northern India and Bangladesh, and the Indus basin of Pakistan and northern India. Global population is unspecified while the national population has not been assessed. It is reported that the species has completely disappeared from overexploitation from Gomti basin and thus absent in Tripura. Thus, it does not trigger critical habitat.	-
<i>Melanochelys tricarinata</i> (Tricarinate Hill Turtle)	EN (Schedule I)	The species inhabits the Himalayan foothills of northern and north-eastern India (with an isolated occurrence in southern Bihar / western West Bengal) and southern Nepal while it is doubtful in Bangladesh. The global population is unspecified and national population has not been assessed. This species is not being recorded or reported in Tripura. Thus, it does not trigger critical habitat.	-
<i>Morenia petersi</i> (Indian Eyed Turtle)	EN (NE)	It occurs widely throughout the northern tributaries of the Ganga, the Brahmaputra basin, and their delta region in northern India, Bangladesh, and southern Nepal at elevations of between 10 to 100 m above sea level. Global population is unspecified while the national population has not been assessed. It has suffered widespread declines, with several robust yet localized subpopulations remaining in the Terai region of India and Nepal. The species is reported as likely to occur in Tripura as per ZSI. It is not recorded by IUCN though the geographic distribution map in IUCN shows some fringes of western Tripura near Agartala bordering Bangladesh (where the species is recorded). In terms of likely global population, given its marginal occurrence (if present at all) the state population is unlikely to meet the thresholds for critical habitat	-
<i>Nilssoniana gangetica</i> (Indian Softshell Turtle)	EN (Schedule I)	It occurs throughout the northern plains of the Indian Subcontinent, in the Indus, Ganga, Narmada and Mahanadi basins and most tributaries and intervening drainages of Bangladesh, India, Nepal, Pakistan and Afghanistan and the Brahmaputra basin. The global population is not specified while the national population has not been assessed. The IUCN red list considered the species common throughout its range in India, but possibly in decline. It is fairly widespread and common in North-eastern India and in Bangladesh. But this species is not being recorded or reported in Tripura. Thus, it does not trigger critical habitat.	-

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
<i>Nilssoniahurum</i> (Indian Peacock Softshell Turtle)	EN (Schedule I)	The Indian Peacock Softshell Turtle is widespread across Pakistan, northern India, southern Nepal, and Bangladesh but classified as EN due to a rapid decline due to an illegal trade to Southeast Asia. As per IUCN it is traded in Assam and Tripura, with specimens believed to be sourced from Bangladesh. ⁸ A recent study found there are seven collection points in Bangladesh and two selling hubs in Tripura's capital Agartala. The species has not been recorded in Tripura by ZSI though IUCN covers the state under the geographic distribution map. The global population is not specified, and the national population has not been assessed. In terms of likely global population, given its marginal occurrence (if present at all) the state population is unlikely to meet the thresholds for critical habitat.	-
<i>Varanus flavescens</i> (Yellow Monitor)	EN (Schedule I)	The Yellow Monitor is distributed across Pakistan, Northern India, Nepal, Bhutan, and Bangladesh. In areas where its occurrence coincides with the highest human population densities, habitat loss and degradation are major threats to the species. Global population is not specified, and the national population is not assessed. This species is not recorded to be present in the state as per ZSI, however, the distribution map of the species shows it in the major portion of western and southwestern Tripura. In terms of likely global population, given its marginal occurrence (if present at all) in Tripura the state population is unlikely to meet the thresholds for critical habitat.	-
<i>Pangshuratecta</i> (Indian Roofed Turtle)	VU (NE)	Occurs in the Sub-Himalayan lowlands of the Indus, Sabarmati, Mahi, Narmada, Ganga and Mahanadi River systems of Pakistan, India, Nepal, and Bangladesh. Global population is not specified, and the national population is not assessed. This species is not being recorded or reported in Tripura. Thus, it does not trigger critical habitat.	-
<i>Lissemys punctata</i> (Indian Flapshell Turtle)	VU (Schedule I)	Inhabits essentially the entire Indian subcontinent except the Thar Desert, from the Indus to the Brahmaputra, from the Himalayan foothills of India and Nepal to Bangladesh and extreme western Myanmar. Global population is not specified, and the national population is not assessed. The species is generally considered common or abundant, with mostly stable populations. In terms of likely global population, and considering this is a widespread VU species, the state population is unlikely to meet the thresholds for critical habitat.	-

⁸ The IUCN Red List of Threatened species. <https://www.iucnredlist.org/species/39619/2931203>

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
<i>Ophiophagus Hannah</i> (King Cobra)	VU (Schedule II - Part II)	It is widely distributed in South and Southeast Asia, from Nepal and India across southern People's Republic of China, the Philippines, and east Indonesia. Major population reported in Western Ghat areas of Karnataka and Kerala in India. Reported to be present in Trishna WLS. Global population is not specified, and the national population is not assessed. In terms of likely global population, and considering this is a widespread VU species, the state population is unlikely to meet the thresholds for critical habitat.	-
<i>Elaphe taeniura</i> (Cave Racer)	VU (Schedule IV)	This species occurs from north-eastern India across the People's Republic of China to Japan and Indonesia. Global population is not specified, and the national population is not assessed. This species is infrequently encountered, although it can be abundant in caves. Given the probable absence in Tripura, and considering this is a VU species, it does not trigger presence of critical habitat.	-
<i>Python bivittatus</i> (Burmese Python)	VU (Schedule I)	This species occurs from India, where it has a very disjunct distribution and is known from only two small, isolated areas in the northeast, through Nepal to Indonesia and People's Republic of China. Global population is not specified, and the national population is not assessed. Given the probable absence in Tripura, and considering that this is a VU species, it does not trigger presence of critical habitat.	-
<i>Tropidophorus assamensis</i> (North-Eastern Waterskink)	VU (NE)	This species is known from Assam and Mizoram in India, and from Sylhet and Chittagong Hill Tract in Bangladesh. There are no data on population size and trends for this species. Given the probable absence in Tripura, and considering this is a VU species, it does not trigger presence of critical habitat.	-
<i>Xenochrophis cerasogaster</i> (Painted Keelback)	VU (NE)	It has a narrow range of geographic distribution and is found in India (Bengal, Assam, Khasi Hills, Bihar, Indo-Gangetic plains), Nepal, Pakistan, and Bangladesh. Global population is not specified, and the national population is not assessed. It is not being recorded or reported in Tripura. Thus, it does not trigger critical habitat.	-
Aves – 33 species			
<i>Aythya baeri</i> (Baer's Pochard)	CR (Schedule IV)	The species breeds in Russia southwards to the central and central-eastern People's Republic of China. It winters mainly in central-eastern People's Republic of China. Seemingly, few now winter outside People's Republic of China, the largest flocks since 2012 have been observed in Bangladesh, Myanmar, Thailand and in Assam in 2014/15 with other occasional occurrences of wintering or passage individual birds or small flocks recorded. Thus, its distribution is now highly localized,	No

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		with just a handful of sites used regularly either during the breeding season or winter. In Tripura it has been reported from Gumti WLS and Rudrasagar lake prior to 2012. As per IUCN red list global population is likely less than 1,000 individuals (in the band 250-999 individuals, equating to 167-666 mature individuals, rounded here to 150-700 mature individuals). No estimates are present for national population. 13 individuals were historically reported from Gumti WLS in 2008 and this is 1.3% of the global population. Given that this is more than $\geq 0.5\%$ of the global population and ≥ 5 reproductive units it triggers critical habitat for the state on a precautionary basis. However, as per IUCN, visitors post 2012 (in 10 years) have not been recorded.	
<i>Houbaropsis bengalensis</i> (Bengal Florican)	CR (Schedule I)	The species has two disjunct populations, one in the Indian Subcontinent and the other in South-East Asia (Birdlife International 2001) although modelling work suggests that there are large areas of suitable habitat that could contain larger populations, especially in areas around the Brahmaputra River (Jha et al. 2018). The species is reported to be extinct in neighbouring Bangladesh. Global population estimates are 250-999 while approximately 300 are estimated in India with the major population in Manas NP in Assam. ⁹ Given this scenario, wherein the presence in Tripura is not reported by Birdlife the species is unlikely to meet the thresholds for critical habitat. ¹⁰	-
<i>Calidris pygmaea</i> (Spoon-billed Sandpiper)	CR (Schedule IV)	A migrant species, this species has a naturally limited breeding range in north-eastern Russia and migrates down the western Pacific coast to its main wintering grounds in southern People's Republic of China, Viet Nam, Thailand, Bangladesh, and Myanmar. Wintering birds have also been recorded from India (with a recent sighting in 2018 possibly the first for 14 years), Sri Lanka and peninsular Malaysia. It occurs regularly at only a few sites within this wintering range, with important sites in Bangladesh, Thailand, Myanmar, and People's Republic of China. Global population estimates are 240-620 and no figures for a national population are present. It is not being recorded or reported in Tripura. Thus, it does not trigger critical habitat.	-
<i>Gyps bengalensis</i> (White-rumped Vulture)	CR (Schedule I)	The species occurs in Pakistan, India, Bangladesh, Nepal, Bhutan, Myanmar, Thailand, Lao PDR, Cambodia, and southern Viet Nam. This species has been reported to be in Tripura and in Gumti WLS though	Not recorded but possible rare occurrence

⁹ <https://www.telegraphindia.com/north-east/bengal-florican-takes-wing-for-global-list-migration/cid/1744968>

¹⁰ BirdLife International (2022) Species factsheet: *Houbaropsis bengalensis*. Downloaded from <http://www.birdlife.org>. <http://datazone.birdlife.org/species/factsheet/bengal-florican-houbaropsis-bengalensis>

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		it is very rare nowadays. The global population estimates are 4,000 to 6,000 mature individuals while the national population is not recorded. In terms of likely global population given the CR status, the state population may potentially meet the thresholds for critical habitat, if it is present at all.	
<i>Gyps tenuirostris</i> (Slender-billed Vulture)	CR (Schedule I)	It is found in India north of, and including, the Gangetic plain, west to at least Himachal Pradesh and Haryana, south to southern West Bengal (and possibly northern Orissa), east through the plains of Assam, and through southern Nepal, and north and central Bangladesh. There are reports of 730 to 870 mature individuals globally while nationally data is not assessed. The species was reported in Tripura by Choudhury in 2010. No reports have sighted the species in the state in the recent past and it is probably absent in Tripura. Given its probable absence, the state population is unlikely to meet the thresholds for critical habitat.	-
<i>Sarcogyps calvus</i> (Red-headed Vulture)	CR (Schedule IV)	Occurs in Pakistan, Nepal, India (sparsely distributed and declining, now rare, or absent from some areas, e.g., parts of Gujarat and the north-eastern states, but still fairly common in the west Himalayan foothills and reported in the Western Ghats between 2006 and 2010), Bangladesh, Bhutan, Myanmar, PRC, Thailand, Viet Nam, Cambodia, Malaysia, and Singapore. Was reported to be present in Tripura by ZSI though the IUCN red list now considers it to be absent in entire the Northeast India. Global population estimates are 2,500 to 9,999 mature individuals. Given its probable absence, the state population is unlikely to meet the thresholds for critical habitat.	-
<i>Ardea insignis</i> (White-bellied Heron)	CR (Schedule I)	Distributed from the eastern Himalayan foothills in Bhutan and north-east India to the hills of Bangladesh and Myanmar. In India it is reported from Assam and Namdapaha and is absent in Tripura. It is thus not considered to be a trigger for CH.	-
<i>Emberiza aureola</i> (Yellow-breasted Bunting)	CR (Schedule IV)	It is distributed from Kazakhstan, Korean peninsula, Mongolia, and Russian federation where it breeds and as non-breeding visitor in Southeast and South Asia. It is a winter visitor in India and a grassland species. Global population is unknown while the European population is estimated at 120-600 mature individuals (BirdLife International 2015). The species has not been observed in Tripura in the recent past ¹¹ and thus, not considered a trigger for CH.	-

¹¹ <https://www.inaturalist.org/taxa/9212-Emberiza-aureola>

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
<i>Perdicula manipurensis</i> (Manipur Bush-quail)	EN (Schedule IV)	Distributed from northern West Bengal, Assam, and Manipur in north-eastern India, with unconfirmed historical records from Nagaland and Meghalaya in India and Chittagong, Chittagong Hill Tracts and Sylhet districts, Bangladesh. 1,000-2,499 mature individuals are globally estimated. It is not reported to be present in Tripura and hence not considered a trigger for CH.	-
<i>Asarcornis scutulata</i> (White-winged Duck)	EN (Schedule IV)	Widely distributed from north-eastern India and Bangladesh, through South-East Asia to Java and Sumatra, Indonesia with 250-999 individuals globally. It was reported in the past in Tripura but not reported now and thus it is not considered a trigger for CH.	-
<i>Calidris tenuirostris</i> (Great Knot)	EN (NE)	This species breeds in north-east Siberia, Russia, wintering mainly in Australia, but also throughout the coastline of South-East Asia and on the coasts of India, Bangladesh, Pakistan, and the eastern coast of the Arabian Peninsula, Korean peninsula, and People's Republic of China. The global population has been estimated at 380,000 individuals. It is reported to be migrating through fringes of South Tripura & no census of the same has been recorded. In terms of likely global population, the state population, if indeed present is unlikely to meet the thresholds for supporting critical habitat.	-
<i>Rynchops albicollis</i> (Indian Skimmer)	EN (Schedule IV)	Restricted to India as a breeding bird, with only occasional breeding in western Bangladesh. In India it is not listed as found in Tripura as per data from eBird (2020). Population is estimated at 2,450-2,900 mature individuals. Species is absent in Tripura and hence not considered a trigger for CH.	-
<i>Sterna acuticauda</i> (Black-bellied Tern)	EN (NE)	Distributed from southern People's Republic of China, Pakistan, India (widespread), Nepal, Bangladesh, and South Asia. 6,700-17,000 mature individuals estimated globally. IUCN distribution map does not report the species in Tripura nor is mention of it found in other secondary sources. Thus, it is not considered a trigger for CH.	-
<i>Haliaeetus leucoryphus</i> (Pallas's Fish-eagle)	EN (Schedule I)	The species may breed only in northern India (apparent strongholds in Assam and Uttarakhand), Bangladesh and Myanmar, with very small numbers in Bhutan, dispersing north of the Himalayas to Kazakhstan, Russian federation and Mongolia in its non-breeding season. Globally 1,000 to 2,499 mature individuals estimated. Not reported in Tripura, thus, it is not considered a trigger for CH.	-
<i>Aquila nipalensis</i> (Steppe Eagle)	EN (Schedule I)	This species breeds in Russia, Kazakhstan, Kyrgyz Republic, People's Republic of China, and Mongolia and is a visitor in India and across West Asia and Africa. Global population estimated at 50,000 to 75,000 mature	-

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		individuals. The species is reported to migrate through Tripura and is non breeding as per Birdlife International's distribution map. ¹² No census of the same in Tripura has been recorded and IUCN distribution map does not report the species in Tripura. Thus, it is not considered a trigger for CH.	
<i>Leptoptilos dubius</i> (Greater Adjutant)	EN (Schedule IV)	Spread across Cambodia and India (breeding) and through Bangladesh, Nepal, Thailand, and Viet Nam. In India it is reported from Kamrup district in Assam (650-800 birds) and Bihar in Ganga and Kosi River floodplains (>350 birds). Global population estimates are 800-1,200 mature individuals. Not reported in Tripura, thus, it is not considered a trigger for CH.	-
<i>Laticilla cinerascens</i> (Swamp Grass-babbler)	EN (NE)	Found in the plains of the Brahmaputra River, Assam and western Bihar in north-east India and adjacent northern Bangladesh. It now appears to be very localized or present at very low densities along the Brahmaputra River with global population 250-2499 matured individuals. Not reported in Tripura, thus, it is not considered a trigger for CH.	-
<i>Francolinus gularis</i> (Swamp Francolin)	VU (NE)	Endemic to the Ganges and Brahmaputra River basins, from the Terai of western Nepal to northern India. Reported to be extinct in Tripura as per distribution map of IUCN red list hence not considered as a CH trigger.	-
<i>Aythya ferina</i> (Common Pochard)	VU (Schedule IV)	The species breeds from western Europe through central Asia to south-central Siberia and northern People's Republic of China. It is reported as non-breeding in India. Global population estimated at 760,000-790,000 individuals. Only two individuals were reported in Gumti WLS in 2010. Given the population figures and its VU status the state population is unlikely to trigger CH.	-
<i>Mulleripicus pulverulentus</i> (Great Slaty Woodpecker)	VU (Schedule IV)	Found in South-East Asia, from northern India through the foothills of the Himalayas to southern People's Republic of China, Nepal, Myanmar, Lao PDR, Vietnam, Cambodia, Thailand, Malaysia, Singapore, Indonesia, and the Philippines. The current population has been estimated at 26,000-550,000 individuals. Species not present in Tripura as per Birdlife International's distribution map and other secondary sources. Thus, it is not considered a trigger for CH.	-
<i>Buceros bicornis</i> (Great Hornbill)	VU (Schedule I)	Found in Bangladesh, Bhutan, Cambodia, People's Republic of China, India, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Nepal, Thailand, Viet Nam. Global 13,000 to 27,000 mature	-

¹² BirdLife International (2022) Species factsheet:

Aquila nipalensis. <http://datazone.birdlife.org/species/factsheet/steppe-eagle-aquila-nipalensis>

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		individuals. Not reported in Tripura, thus, it is not considered a trigger for CH.	
<i>Aceros nipalensis</i> (Rufous-necked Hornbill)	VU (Schedule I)	Known from Bhutan, north-east India, Myanmar, PRC, Thailand, Lao PDR, and Viet Nam. Not reported in Tripura and thus not considered a trigger for critical habitat.	-
<i>Rhyticeros undulatus</i> (Wreathed Hornbill)	VU (Schedule I)	The species occurs in South Asia and south-east Asia. In India it is found in north-east India. Distribution maps of IUCN red list do not show this species in Tripura, and it has also not been reported in Tripura by other secondary sources. Thus, it is not considered a trigger for CH.	-
<i>Columba punicea</i> (Pale-capped Pigeon)	VU (Schedule IV)	Distributed in parts of northern India, Bangladesh, Myanmar, Thailand, Lao PDR, Cambodia, and Vietnam (BirdLife International 2001). In India, it is a rare resident in Odisha and northeast India, with most recent records from the Similipal Hills in Odisha. 2,500-9,999 individuals estimated globally and not assessed nationally. Not reported in Tripura and thus not considered a trigger for critical habitat.	-
<i>Gallinago nemoricola</i> (Wood Snipe)	VU (Schedule IV)	Breeds locally in the Himalayas of north-west and north-east India, Nepal, Bhutan and in People's Republic of China. 2,500-9,999 individuals estimated globally but not assessed nationally. The distribution map of IUCN red list does not show this species in Tripura, nor it has been reported from other secondary sources. Thus, it is not considered a trigger for critical habitat.	-
<i>Sterna aurantia</i> (River Tern)	VU (NE)	This species occurs along river systems across a wide range in southern and south-east Asia. In India the species is now more regular in southern India. Globally 20,000-70,000 individuals estimated with 17,776 estimated in India. The species has been reported in Tripura by ZSI but not reported in any IBA. In terms of likely global population given the current VU status the state population is unlikely to meet the thresholds for supporting critical habitat.	-
<i>Clanga clanga</i> (Greater Spotted Eagle)	VU (Schedule I)	The species breeds in European, Caucasus and Central and East Asian countries and potentially in tiny numbers in Pakistan and north-west India (BirdLife International 2001). Passage or wintering birds occur in small numbers over a vast area, including central and eastern Europe, North Africa, East Africa, the Middle East, the Arabian Peninsula, the Indian Subcontinent, south Asia, and South-East Asia. Global population size is 3,900-10,000 mature individuals. The species is not recorded in Tripura by ZSI and not reported in any IBA in Tripura. Thus, it is considered an unlikely trigger for critical habitat.	-

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
<i>Aquila heliaca</i> (Eastern Imperial Eagle)	VU (NE)	This is a fully winter migrant to India and is nonbreeding in India. Globally 2,500 to 9,999 mature individuals are estimated. The species is not reported in the distribution map of IUCN red list as present in Tripura. Thus, it is considered an unlikely trigger for critical habitat.	-
<i>Leptoptilos javanicus</i> (Lesser Adjutant)	VU (Schedule IV)	It has an extensive range across South and South-East Asia. In India (mostly in Assam -2,000 birds, West Bengal, and Bihar - 42 nests but present across much of the country). Globally 5,500-10,000 individuals estimated with approximately 1,200 in India. Reported from Gumti WLS but no census of the same has been recorded. In terms of likely global population given the current VU status the state population is unlikely to meet the thresholds for supporting critical habitat.	-
<i>Turdus feae</i> (Grey-sided Thrush)	VU (Schedule IV)	It breeds in People's Republic of China and recorded in winter from West Bengal, Assam, Meghalaya, Nagaland and Manipur in north-east India, Myanmar, Thailand and Lao PDR. It is not reported in Tripura and thus is not considered to trigger CH.	-
<i>Sitta formosa</i> (Beautiful Nuthatch)	VU (NE)	Distributed over a broad range encompassing Bhutan, north-east India, Myanmar, People's Republic of China, Viet Nam, Lao PDR and Thailand. It is not reported in Tripura and thus is not considered to trigger CH.	-
<i>Pellorneum palustre</i> (Marsh Babbler)	VU (Schedule IV)	Endemic to the Brahmaputra floodplain, its associated tributaries and adjacent hill ranges northeast India and eastern Bangladesh (BirdLife International 2001). It is not reported in Tripura and thus is not considered to trigger CH.	-
<i>Clanga hastata</i> (Indian Spotted Eagle)	VU (NE)	A widespread species that has always been recorded at very low densities in the lowlands of the Indian subcontinent, occurring in Nepal, India, and Myanmar. 2,500-9,999 individuals estimated globally but not assessed nationally. The species has not been either reported by ZSI or in other sources to be present in Tripura. Thus, is not considered to trigger CH.	-
Mammals – 23 species			
<i>Manis pentadactyla</i> (Chinese Pangolin)	CR (Schedule I)	It occurs in the Himalayan foothills of Nepal, southern Bhutan, north and north-eastern India, northeast, Bangladesh, Myanmar, Lao PDR, Viet Nam, Thailand, and People's Republic of China. The Chinese Pangolin is solitary, primarily nocturnal (sometimes crepuscular). There is very little information available on population levels at any level (state, national, or global). In NE India it is reported in Tripura as well as other states. In Tripura it has been recorded in Sepahijala WLS. Given the unknown global population, and that this is a Schedule I and a CR species, the state is considered to support possible CH for the species. Chinese	Not recorded but possible; absence will need to be confirmed during route surveys of DL in rural areas

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		pangolin may make use of modified as well as natural habitat.	
<i>Trachypithecus phayrei</i> (Phayre's Leaf Monkey)	EN (Schedule I)	Found across North-East India, Bangladesh, and Myanmar but global population is not recorded. In India and Bangladesh populations are small and highly fragmented – estimated 1,200 individuals in India and 376 in Bangladesh. There is no population information for Myanmar. The home range of the species can be up to 100 ha, depending on troop size, with little overlap between the troops. If food resources are limited larger groups will increase the size of their home range in search of food. Recorded in Sepahijala WLS (1,853 ha), 132 individuals. This is 8.7% of the known population (one troop of 8-22 would be >0.5% of the known population, they are comprised of 1 male, 3-6 adult females, plus sub-adults, juveniles, and infants) thus Sepahijala WLS would be considered a definite critical habitat for this species. The species is also recorded in Trishna WLS, Rowa WLS and Gumti WLS (22 individuals in 2013-14 census) though population figures in the other 2 PA are unknown). Thus, areas around these WLS, are considered to support Critical Habitat for Phayre's Leaf Monkey. However, the species was not recorded during surveys of substations and sample DL conducted during site visits.	Not recorded but reported by District Forest Officers as being present and possible occurrence outside of WLS; absence will need to be confirmed during route surveys of DL in rural areas especially plantation within about 10km of WLS
<i>Hoolock hoolock</i> (Western Hoolock Gibbon)	EN (Schedule I)	This species is found in eastern Bangladesh, northeastern India (including Tripura), and northwestern Myanmar (west of the Chindwin River). This species occurs in several of India's northeastern states, but populations there tend to be isolated and is considered rare throughout its range (Choudhury, 2001). The total population in northeastern India is now estimated to be over 12,000, of which about 2,000 occur in the state of Assam, most of the remainder of this population is outside Tripura. In Tripura it is reported to be present in Gumti WLS (8 individuals reported by the Wildlife Department through census in 2013-14) and Trishna WLS (independent researchers in 2005 noted 97 individuals in Tripura with 22 individuals in Trishna WLS, 58 in North Tripura and 17 in Gumti WLS, while another group of in 2014 researchers reported 39 groups of average 3.1 individuals per group in 2014). ^{13,14} 600 individuals would represent 0.5% of the Northeast Indian population. Given that the known population in the state	-

¹³ Pallab Deb, Prabhat Kumar Rai and Parimal C. Bhattacharjee. A review on the distribution of Western Hoolock Gibbon (*Hoolock hoolock*) in Northeast India. *Journal of Research in Biology* (2014) 4(3): 1301-1310

¹⁴ Sanjay Molur, Sally Walker, Anwarul Islam, Phil Miller, C. Srinivasulu, P.O. Nameer, B.A. Daniel and Latha Ravikumar (Editors) (2005). Conservation of Western Hoolock Gibbon (*Hoolock hoolock hoolock*) in India and Bangladesh. Zoo Outreach Organisation / CBSG-SouthAsia, Coimbatore, India, 132 pp.

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		is significantly less than 0.5% of the total Northeast Indian population, it does not trigger CH. The species was not recorded during surveys of substations and sample DL conducted during site visits.	
<i>Cuon alpinus</i> (Dhole)	EN (Schedule II part I) ¹⁵	Distributed throughout South, Central and East Asia. In India it is in the Western Ghats and central Indian forests and Eastern Ghats, Terai region in northern India, Sikkim, Ladakh and in north-eastern states (where the population is low due to a decreasing prey base and retaliatory killings). Global population estimate are 949-2,215 individuals while national population is not assessed. The species is reported from Trishna WLS and Gumti WLS, however, independent researchers have recently reported absence of the species in the state. On this basis the species shall not trigger CH. ¹⁶	-
<i>Elephas maximus</i> (Asian Elephant)	EN (Schedule I)	Asian Elephants formerly ranged from West Asia along the Iranian coast into the Indian subcontinent, eastwards into South-east Asia including Sumatra, Java, and Borneo, and into People's Republic of China at least as far as the Yangtze-Kiang. In India, the species occurs in the central and southern Western Ghats, North-east India, eastern India, and northern India and in some parts of southern peninsular India. Global population is estimated at 48,323–51,680 individuals in the wild. The number of individuals in India as per the last census is between 27785-31368 with the largest population recorded in South India and in Assam while in Tripura it is 59 in two populations (in Khowai and Gomti districts). Given the Tripura state population is <0.5% of the global population it does not trigger critical habitat.	-
<i>Nycticebus bengalensis</i> (Bengal Slow Loris)	EN (Schedule I)	This species occurs in Bangladesh, Cambodia, People's Republic of China, north-eastern India (including Tripura), Lao PDR, Myanmar, Thailand, and Viet Nam. This is an arboreal, nocturnal species that inhabits tropical evergreen rainforest, semi-evergreen forest, and mixed deciduous forest. No population estimates have been provided both nationally and globally. In India, the encounter rates vary from 0.1 to 0.77/km. In Tripura it has been recorded in Sepahijala, Trishna and Gumti WLS. Given that this is a Schedule I and an EN species, the state, notably areas around these WLS, are considered to support possible CH for the species. No distribution components are proposed within the vicinity of the WLS except Rajnagar Substation which is 633m away from the ESZ Trishna	No

¹⁵ Schedule II Part I species are protected by the act but are not threatened or endangered

¹⁶ Singh, P., Srivathsa, A., & Macdonald, D. (2020). Conservation status of the dhole *Cuon alpinus* in north-east India, with a focus on Damps Tiger Reserve, Mizoram. *Oryx*, 54(6), 873-877. doi:10.1017/S0030605319000255

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		WLS. However, the species prefers forested areas that are avoided.	
<i>Axis porcinus</i> (Hog Deer)	EN (Schedule III)	The species historically occurred from Pakistan, throughout northern and north-eastern India (including the Himalayan foothill zone), Southeast Asia and southern People's Republic of China, but it is now reduced to isolated subpopulations within this range. In India it is found mainly in the Terai grasslands along the Himalayan foothills and the floodplains of the Rivers Ganges and Brahmaputra, with major population in Assam and northern part of West Bengal in NE India. The presence of this species in Manipur and southern Assam (close to Manipur, Mizoram, and Tripura) is based on records and its current status there is unknown. All groups in these areas were estimated to be very small and should not be assumed to persist. Given this scenario it is highly unlikely to be present in Tripura and hence not considered as a CH trigger.	-
<i>Trachypithecus pileatus</i> (Blond-bellied Langur / Capped Langur)	VU (Schedule I)	Four subspecies found across India, Bangladesh, Bhutan, and Myanmar with a possible population in People's Republic of China, but global population is not recorded. It is most common in North-East India, in Assam population of 18,600 was recorded. Recorded in Sepahijala WLS, 59 individuals. This species is also recorded to be present in Gumti WLS (12 individuals recorded in 2013-14 census). It is reported by IUCN to be vulnerable, but there is also an indication from species experts that it is already endangered. ¹⁷ Given that the population is less than 0.5% of the national population, it does not trigger CH. No members of the species were reported in the vicinity of the substations by TSECL, or the sample distribution lines that were visited. But reported by District Forest Officers and potentially present in the rubber plantations near the substations and the DL.	-
<i>Macaca leonina</i> (Northern Pig Tailed Macaque)	VU (Schedule II part I)	Found from North-East India across Southeast Asia, but global population is not recorded. In India, the population is <1,500 individuals, the only other population estimate is <1,700 from People's Republic of China. Recorded in Sepahijala WLS, 42 individuals (2.8% of the North-East Indian population, it will be less of the global population) and in Trishna WLS (no population figures are available). As the species was noted by District Forest Officers and the WLS in Tripura have important concentrations of a globally vulnerable	Not recorded but reported by District Forest Officers and possible occurrence outside of WLS; absence will need to be confirmed during route surveys of DL in rural areas especially plantation

¹⁷ Per personal correspondence between J. Pilgrim and C. Taylor it appears that the species should be EN and the sub criteria used should be A2acd+3cd.

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		species, the state, especially the WLS areas, are considered to support possible CH for the species. However, the species was not encountered during site visits to substations and sample distribution lines.	within about 10km of WLS
Clouded Leopard (<i>Neophelis nebulosa</i>)	VU (Schedule I)	Found across South and Southeast Asia, with a global population of 3,700-5,580. Population density estimates vary from 0.3-5.14 individuals per 100 km ² . The Clouded Leopard NP has been declared in 5.08 km ² within the core area of Sepahijala WLS in January 2008. The last census in 2013-14 reported 5 individuals in the national park. The Sepahijala Zoological Park within the Sepahijala WLS runs a breeding program for the species and 10 individuals were reported at the breeding center in on 31 st March 2019. The species is also reported to be in Trishna WLS but population figures are not available. Although the WLS support this globally vulnerable species, as numbers are limited, the state population is unlikely to trigger critical habitat.	-
<i>Helarctos malayanus</i> (Sun Bear)	VU (Schedule I)	Presently they are found in Bangladesh and north-eastern India (West Garo Hills, Meghalaya) northwards to Myanmar and have been extirpated from most of its earlier range. It is not reported in Tripura and hence not considered a trigger for CH.	-
<i>Lutrogale perspicillata</i> (Smooth coated Otter)	VU (Schedule II part I)	This species is distributed throughout South Asia and Southeast Asia. The species habitat is large perennial rivers and lakes and seasonally flooded swamps. Due to its elusive and mostly nocturnal behavior, reliable estimates of the population are not available. It has not been recorded in Tripura by ZSI or in any protected area records. Thus, it is not considered to trigger critical habitat.	-
<i>Macaca arctoides</i> (Stump-tailed Macaque)	VU (Schedule II part I)	Historically found from North-East India (including Tripura) across Southeast Asia and People's Republic of China, but global population is not recorded. The species is reported to be extirpated in Tripura as per the distribution map of IUCN red list. Hence it is not considered to trigger critical habitat.	-
<i>Panthera pardus</i> (Leopard)	VU (Schedule I)	Found across the Caucasus, West, central, South, Southeast and East Asia besides in Africa. In India it is widespread across the country occurring both inside and outside Protected Areas. Reported in Gumti WLS. Global population not assessed but 12,852 individuals recorded as per National Tiger Conservation Authority in India. ¹⁸ The same source has reported 141 individuals in the Northeast Hills and Brahmaputra Flood Plains but has not assessed the population in Tripura Given the	-

¹⁸ Jhala, Y.V., Qureshi, Q., Yadav, S.P. 2021. Status of leopards, co-predators, and megaherbivores in India, 2018. National Tiger Conservation Authority, Government of India, New Delhi, and Wildlife Institute of India, Dehradun.

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
		national population figures and its distribution, as well as its vulnerable status, the species population in the state is unlikely to meet the threshold for CH.	
<i>Prionailurus viverrinus</i> (Fishing Cat)	VU (Schedule I)	It is widely distributed in South and Southeast Asia. The species is not reported in Tripura by ZSI, and the distribution map of IUCN does not include Tripura. Hence it is not considered to trigger critical habitat.	-
<i>Ursus thibetanus</i> (Asiatic Black Bear)	VU (Schedule II part I)	Found across Central Asia, South Asia, and Southeast Asia. Approximately 28,000 exist in People's Republic of China, 12,000-19,000 in Japan, 5,000-7,000 in India and 5,000-7,000 in Russia. The species have not been reported in Tripura by ZSI or in other records of the protected areas in the state. Although Forest Officers have indicated human-wildlife conflict with Himalayan sub-species it is not considered to trigger critical habitat.	-
<i>Arctictis binturong</i> (Binturong)	VU (Schedule I)	Found across South and Southeast Asia. Global and national population are not assessed. In North-east India it is known from all the states, including Tripura but is mostly restricted to protected areas, being widespread in several of them. Sepahijala Zoological Park within the Sepahijala WLS runs a breeding program for the species and 2 individuals were reported at the breeding center on 31st March 2019. Although the WLS support this globally vulnerable species, as numbers are limited, the state population is unlikely to trigger critical habitat.	-
<i>Rusa unicolor</i> (Sambar)	VU (Schedule III)	The species is distributed in SE Asia and South Asia including India and Bangladesh. Global and national population data is unassessed. In India, although it occurs widely and in many habitat types, and large populations occur in 208 well-secured protected areas especially in South and Central India, its distribution outside protected areas is now highly scattered. In Tripura it is reported to be present in Gumti WLS (though no individuals were reported in the last census carried out by the Wildlife Department in 2013-14) and it is also historically reported in North Tripura district by ZSI. Given the distribution and small population size within the state it is not considered to trigger CH.	-
<i>Aonyx cinereus</i> (Asian Small-clawed Otter)	VU (Schedule I)	The species has a large distribution range, extending from India in South Asia eastwards through Southeast Asia. It is not reported in Tripura thus it is not considered to trigger critical habitat.	-
<i>Arctonyx collaris</i> (Greater Hog Badger)	VU (Schedule I)	It occurs from South Asia to Southeast Asia. It is found in Bangladesh and North-east India (mainly in Manas NP in Assam). But the species is not reported in Tripura and hence is not considered to trigger CH.	-
<i>Capricornis sumatraensis</i>	VU (Schedule I)	The species occurs across eleven countries, including the People's Republic of China, Southeast Asia, and Himalayan range. Global and national population not	-

Species	Global (National) Red List Status	Discussion	Recorded in PAI (500 m from substation and 50 m from distribution line) if critical habitat species
(Mainland Serow)		assessed. In India it is mainly reported from northern India. It has been reported by forest department in Gumti WLS. Given its VU status the state population is unlikely to trigger CH.	

CR = Critically Endangered, EN = Endangered, NE = not evaluated, PAI = project area of influence, VU = vulnerable
Source: ADB TA Consultant

**APPENDIX 7: DATA FROM WILDLIFE OFFICIALS
FROM PRINCIPAL CHIEF CONSERVATOR OF FOREST, AGARTALA, GOT**



Location where wild elephant population exists & data on incident of Man-animal conflict

1. There is no specific elephant corridor identified in the state. However there are two locations where wild elephant population exists, namely Haramura Deotamura R.F. (Gandari area) in Gornati District and Atharamura hill range in Khowai District. There are few locations in the above mentioned area where Elephant movement has been reported frequently. The details of the areas are as follows:

District	Sub-division	Place of sighting	GPS reading
Khowai	Teliamura	Krishnapur	1. 23°52.6'N 91°38.52'E
			2. 23°52.19'N 91°39.50'E
			3. 23°51.38'N 91°38.57'E
4. 23°52.12'N 91°38.47'E			
		Fulbani School	1. 23°51.38'N 91°38.52'E
		Krishnapur/Fulbani School	1. 23°52.6'N 91°38.52'E
Khowai	Khowai	Holong Mwtai	1. 23°58'49.80"N 91°37'44.11"E
			2. 23°58'49.10"N 91°39'35.43"E
Gornati	Amarpur	Mokrai Bari Area	1. 23 500965N 91 617402E

2. Incidents of Man animal conflict in Tripura in last 2 years.

Sl. No	Name of the person	Age	Gender	Date	Village Name	Division	Activity of the person before death	Inside/Outside the forest	Details of animal Male/ Female
				dd/mm/yyyy			Agricultural activity/Attending school/involved in farmery/wildlife works/illegal entry into forest for poaching/illegal cutting of trees/enrichment		
2.	Chitramohan Debbarma (Death case)	70	Male	08.05.2019	Purba Giribatali	SDFO, Teliamura	Agricultural activity	Outside Forest	Male
3.	Purusdayal Jamsaita (Death case)	65	Male	11.05.2019	Wahilong Para	SDFO, Teliamura	Rubber Plantation activity	Outside Forest	Male
4.	Md.Mafiz Mish (Injured case)	38	Male	03.10.2019	Sepahijala	W.I.W, Sepahijala	Wildlife works	Inside forest	Male
5.	Abhije Dhar (Injured case)	33	Male	02.06.2020	Krishnapur	SDFO, Teliamura	On road journey	Outside Forest	Male

2. Cases of electrocution of animals in last 5 years.

Sl. No	Year	Age	Gender	Date dd/mm/ YYYY	Village Name	Division	Reasons for the death Of elephant	Place of occurrence (inside/ Outside the forest) and nature of incident
1.	2016-17					NIL		
2.	2017-18					NIL		
3.	2018-19					NIL		
4.	2019-20					NIL		
5.	2020-21					NIL		

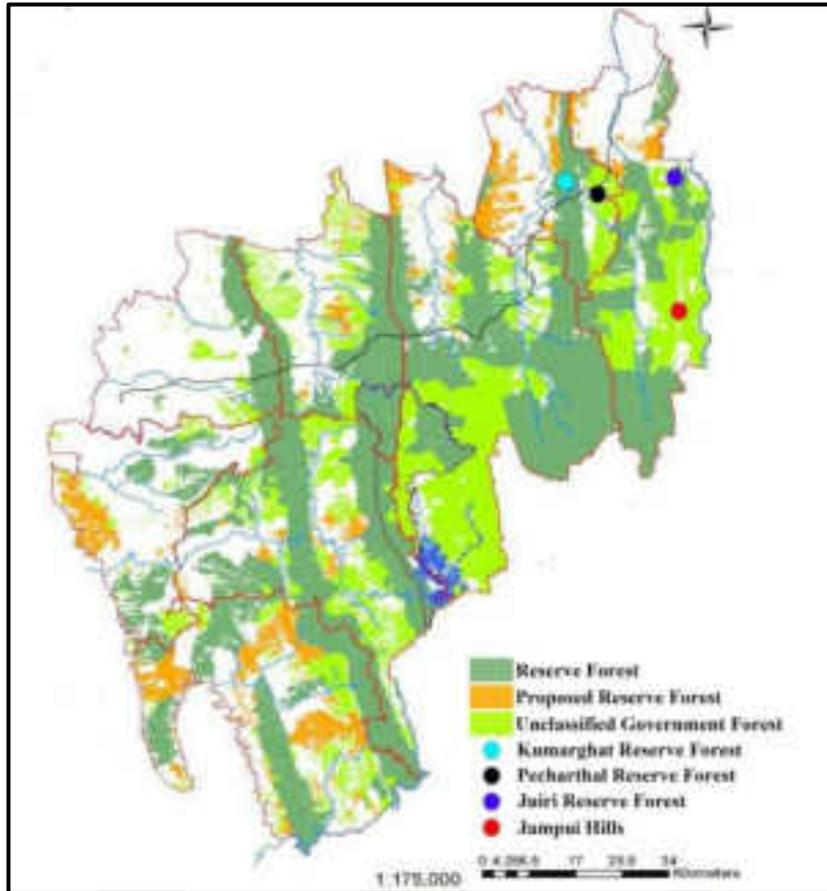
4. Map showing Elephant Distribution & Wildlife Sanctuaries & National Parks of Tripura is enclosed.

MAP OF TRIPURA SHOWING WILDLIFE REPORTING



Source: TSECL

MAP SHOWING GOT DECLARED FOREST AREAS IN TRIPURA



Source: [Twelve new additions in the orchid flora of Tripura, north-east India \(pensoft.net\)](http://pensoft.net)

List of Declared Reserve Forests (RF) in Tripura by GoT

S.No.	Name	Location
1	Atharmura Kalajhari RF	Khowai SD
2	Baramura Deotamura RF	Khowai, Sadar, Udaipur, Amarpur, Belonia and Sabroom SD
3	Betaga Ludhua RF	Sabroom SD
4	Champamura RF	Sadar and Khowai SD
5	Charilam RF	Sadar SD
6	Chandrapur RF	Udaipur and Belonia SD
7	Chakmaghat RF	Khowai SD
8	Chandraipara RF	Kamalpur and Kailasahar SD
9	Central Catchment RF	Kailashahar and Dharmanagar SD
10	Choraibari RF	Dharmanagar SD
11	Deo RF	Kailashahar and Dharmanagar SD
12	Damchhara RF	Dharmanagar SD
13	Garjee RF	Udaipur and Belonia SD
14	Hatipara RF	Sadar SD
15	Harishnagar RF	Sadar SD
16	Jagannath Dighi RF	Belonia SD
17	Juri RF	Dharmanagar SD
18	Karchakhola RF	Sonamura SD
19	Kachigang RF	Udaipur SD
20	Kashari RF	Belonia SD
21	Kulai RF	Kamalpur SD
22	Khowai Catchment RF	Khowai SD
23	Longtarai RF	Kamalpur and Kailasahar SD
24	Muhuripur RF	Belonia SD
25	Pathalia RF	Sadar SD
26	Pathalia Fuel RF	Sadar SD
27	Radhakishorepur RF	Udaipur SD
28	Ramchandraghat RF	Khowai SD
29	South Sonamura RF	Sonamura SD
30	Samru Halai RF	Kailasahar SD
31	Salema RF	Kamalpur SD
32	Tulakona RF	Sadar SD
33	Tulatali Bari RF	Sonamura and Belonia SD
34	Tekka Tulsi RF	Belonia and Sabroom SD
35	Teliamura RF	Khowai SD
36	Ujan Machmara RF	Dharmanagar SD
37	Unakoti RF	Kailashahar and Dharmanagar SD
38	Unakoti Extension RF	Kailashahar SD
39	Ultachara RF	Kailashahar SD

40	Manu Chailengta (MC) RF	Kailashahar and Dharmanagar SD
41	Kulia Extension RF	Khowai SD

SD: Sub-Division

Source: <https://forest.tripura.gov.in/forest-rf-prf?id=UKY=>

List of Declared Proposed Reserve Forest (PRF) in Tripura by GoT

S.No.	Name	Location
1	<u>Saydachhara PRF</u>	Kailashahar SD
2	<u>Chancap PRF</u>	Kamalpur SD
3	<u>Chhaygharia PRF</u>	Belonia SD
4	<u>Durlavpur PRF</u>	Sonamura SD
5	<u>Gandhigram PRF</u>	Sadar SD
6	<u>Kamalagar PRF</u>	Khowai SD
7	<u>Khedabari PRF</u>	Sonamura SD
8	<u>Taksapara PRF</u>	Sonamura SD
9	<u>Telkajla PRF</u>	Sonamura SD
10	<u>Trishna Extension PRF</u>	Belonia SD
11	<u>Tulakona Extension PRF</u>	Sadar SD
12	<u>Indurail PRF</u>	Dharmanagar SD
13	<u>Amlighat PRF</u>	Sabroom SD
14	<u>Tabaria PRF</u>	Belonia SD
15	<u>Melaghar PRF</u>	Sonamura SD
16	<u>Manubazar PRF</u>	Sabroom SD
17	<u>Krishnapur PRF</u>	Belonia SD
18	<u>Jalafa PRF</u>	Sabroom SD
19	<u>Taranagr PRF</u>	Sadar SD
20	<u>Abhanga PRF</u>	Kamalpur SD
21	<u>Ambassa PRF</u>	Kamalpur SD
22	<u>Bampur PRF</u>	Amarpur SD
23	<u>Baliashcherra PRF</u>	Kamalpur SD
24	<u>Chandrapur Extension PRF</u>	Udaipur SD
25	<u>Debbari PRF</u>	Amarpur SD
26	<u>Garjeechara PRF</u>	Udaipur SD
27	<u>Sichharachara PRF</u>	Belonia SD
28	<u>Hirapur PRF</u>	Udaipur SD
29	<u>Laxmipati PRF</u>	Udaipur SD
30	<u>Pipariakhola PRF</u>	Belonia SD
31	<u>Purba Charakbai PRF</u>	Belonia SD
32	<u>Purba Laxmichara PRF</u>	Khowai SD
33	<u>Purna Singicharra PRF</u>	Khowai SD
34	<u>R.K.Pur Extesnion PRF</u>	Udaipur SD
35	<u>Radhakishore Ganj PRF</u>	Belonia SD
36	<u>Rajkang PRF</u>	Amarpur SD
37	<u>Rani PRF</u>	Udaipur SD
38	<u>Kalaganrai PRF</u>	Belonia SD
39	<u>Kalapania PRF</u>	Sabroom SD
40	<u>Motai PRF</u>	Belonia SD

<u>41</u>	<u>North Sonamura PRF</u>	<u>Sonamura SD</u>
<u>42</u>	<u>Pramodnagar PRF</u>	<u>Khowai SD</u>
<u>43</u>	<u>Santinagar PRF</u>	<u>Khowai SD</u>
<u>44</u>	<u>Trishna PRF</u>	<u>Belonia and Sonamura SD</u>
<u>45</u>	<u>Tuichandrai PRF</u>	<u>Khowai SD</u>

SD: Sub-Division

Source: <https://forest.tripura.gov.in/forest-rf-prf?id=UFJG>

APPENDIX 8: ENVIRONMENTAL SAMPLING PHOTOGRAPHS

AIR: (SOURCE: MITCON 2021)



AQ.1 – Digbarbagh – in courtyard of the substation (~1.5 m AGL, and 20 m from nearest road)
 (24°23'11.36"N / 92°10'27.98"E)



AQ.2 – Charipara – terrace of the under-construction substation (~10 AGL, and 25 m from nearest road)
 (23°47'53.71"N / 91°15'6.90"E)



AQ.3 – Adharaha Colony, Agartala – terrace of the substation (~25 m AGL, and 30 m from nearest road)
 (23°48'52.68"N / 91°18'47.50"E)



AQ.4 – Stadium, Agartala – terrace of the substation (~15 m AGL, and 10 m from nearest road)
 (23°48'31.37"N / 91°16'32.10"E)



AQ.5 – Collegatilla, Agartala – backyard of the substation (~1.5 m AGL, and 7-8 m from approach road)
 (23°49'46.26"N / 91°18'5.41"E)





AQ.6 – NSRCC, Agartala – in premises of the substation (~1.5 m AGL, at 7 m from main road)
 (23°49'38.13"N / 91°16'44.24"E)



AQ.7 – Tilibeszer – in the empty plot where substation is yet to be constructed (~1.5 m AGL, and 5 m from main road)
 (24°21'5.45"N / 92°0'2.20"E)



AQ.9 – Killa – in premises of the substation, on unused water storage tank (~3 m AGL, and 5 m from main road)
 (23°38'41.56"N / 91°30'44.35"E)



**AQ.10 – Mandal – terrace of the substation (15 m AGL, and 35 m from nearest road)
(23°51'19.27"N / 91°28'30.00"E)**



**AQ.11 – Melaghar – terrace of the substation (20 m AGL, and 5 m from main road)
(23°30'3.00"N / 91°28'37.28"E)**



**AQ.12 – Manu – terrace of the substation (10 m AGL, and 15 m from main village road)
(23°59'54.36"N / 91°59'26.77"E)**



**AQ.13 – Chhawmanu – terrace of the substation (20 m AGL, and 15 m from village road)
(23°50'42.07"N / 91°59'27.59"E)**



**AQ.14 – Kadamtala – terrace of the substation (10 m AGL, and 30 m from main village road)
(24°27'28.80"N / 92°12'25.53"E)**



**AQ.15 – Rungrung – premises of the substation (~1.5 m AGL, and 5 m from village road)
(24°17'35.06"N / 92°58'48.55"E)**

Source: MITCON 2021

NOISE:



NO.1 – Digalbagh
(24°23'11.32"N / 92°10'28.88"E)



NO.2 - Charpara
(23°47'53.88"N / 91°15'7.49"E)



NO.3 - Adharsha Colony, Agartala
(23°48'51.54"N / 91°16'47.78"E)



NO.4 - Stadium, Agartala
(23°48'31.09"N / 91°16'31.76"E)



NO.5 - Collegetilla, Agartala
(23°49'45.86"N / 91°18'5.15"E)



NO.6 - MSRCC, Agartala
(23°49'38.70"N / 91°16'44.36"E)



NO.7 - Tillabazar
(24°21'6.23"N / 92°0'1.81"E)



NO.9 - Killa
(23°36'41.41"N / 91°30'44.61"E)



(SOURCE: MITCON 2021)

SURFACE WATER:



SW.1 – Digolbagh
(24°23'12.33"N / 92°10'29.14"E)



SW.2 – Chertpara
(23°47'57.26"N / 91°15'7.18"E)



SW.3 – Adharshe Colony, Agartala
(23°48'53.99"N / 91°18'44.71"E)



SW.7 – Tilebezar
(24°21'5.24"N / 92°0'3.03"E)



SW.8 – Jolalbert
(23°13'8.91"N / 91°36'57.74"E)



SW.13 – Chhewmanu
(23°50'40.87"N / 91°59'26.14"E)



SW.14 – Kadamtale
(24°27'28.27"N / 92°12'21.96"E)

Source: MITCON 202)

GROUND WATER



GW.2 – Charipara
(23°47'55.30"N / 91°15'6.86"E)



GW.3 – Adharsha Colony, Agartala
(23°48'52.03"N / 91°18'43.80"E)



GW.4 – Stadium, Agartala
(23°48'31.49"N / 91°16'31.99"E)



GW.6 – NSRCC, Agartala
(23°49'37.56"N / 91°16'45.38"E)



GW.7 – Tillebazar
(24°21'7.20"N / 92°0'1.03"E)



GW.8 – Joleibari
(23°13'8.50"N / 91°36'57.30"E)



GW.9 – Killa (open well)
(23°36'40.70"N / 91°30'42.72"E)



GW.11 – Melaghar
(23°30'6.01"N / 91°20'40.30"E)



GW.12 – Manu
(23°59'55.28"N / 91°59'25.48"E)



GW.14 – Kadamtala
(24°27'28.12"N / 92°12'29.56"E)

Source: MITCON, 2021

APPENDIX 9: AIR QUALITY DATA

PM2.5

Date	Sample No.	Location	Period	Time (mins.)	Initial Flow rate	Final Flow rate	Difference in flow	Average flow	Total air passed	Initial weight (g)	Final weight (g)	Difference (g)	PM _{2.5} µg/m ³
29/08/2021	AQ.1	Digalbagh (24°23'11.36"N / 92°10'27.98"E)	24 hrs	1440	16.67	15.7	0.97	0.485	698.4	0.08687	0.099125	0.012255	17.55
26/08/2021	AQ.2	Charipara (23°47'53.71"N / 91°15'6.90"E)	24 hrs	1440	16.67	15.7	0.97	0.485	698.4	0.08687	0.098125	0.011255	16.12
25/08/2021	AQ.3	Adharsha Colony, Agartala (23°48'52.68"N / 91°18'47.50"E)	24 hrs	1440	16.67	15.8	0.87	0.435	626.4	0.08733	0.09983	0.0125	19.96
25/08/2021	AQ.4	Stadium, Agartala (23°48'31.37"N / 91°16'32.10"E)	24 hrs	1440	16.67	15.9	0.77	0.385	554.4	0.08684	0.097235	0.010395	18.75
24/08/2021	AQ.5	Collegetilla, Agartala (23°49'46.26"N / 91°18'5.41"E)	24 hrs	1440	16.67	15.9	0.77	0.385	554.4	0.08876	0.099654	0.010894	19.65
24/08/2021	AQ.6	NSRCC, Agartala (23°49'38.13"N / 91°16'44.24"E)	24 hrs	1440	16.67	15.6	1.07	0.535	770.4	0.08723	0.10562	0.01839	23.87
31/08/2021	AQ.7	Tillabazar (24°21'6.45"N / 92° 0'2.20"E)	24 hrs	1440	16.67	15.7	0.97	0.485	698.4	0.08836	0.09954	0.01118	16.01
23/08/2021	AQ.9	Killa (23°36'41.56"N / 91°30'44.35"E)	24 hrs	1440	16.67	15.6	1.07	0.535	770.4	0.08869	0.10184	0.01315	17.07
26/08/2021	AQ.10	Mandai (23°51'19.27"N / 91°28'30.00"E)	24 hrs	1440	16.67	15.8	0.87	0.435	626.4	0.08876	0.099587	0.010827	17.28

22/08/2021	AQ.11	Melaghar (23°30'3.00"N / 91°20'37.28"E)	24 hrs	1440	16.67	15.7	0.97	0.485	698.4	0.0894	0.1008	0.0114	16.32
27/08/2021	AQ.12	Manu (23°59'54.36"N / 91°59'26.77"E)	24 hrs	1440	16.67	15.8	0.87	0.435	626.4	0.08732	0.098514	0.011194	17.87
27/08/2021	AQ.13	Chhawmanu (23°50'42.07"N / 91°59'27.59"E)	24 hrs	1440	16.67	15.7	0.97	0.485	698.4	0.08843	0.099526	0.011096	15.89
29/08/2021	AQ.14	Kadamtala (24°27'28.80"N / 92°12'25.53"E)	24 hrs	1440	16.67	15.6	1.07	0.535	770.4	0.08811	0.10085	0.01274	16.54
31/08/2021	AQ.15	Rangrung (24°17'35.06"N / 91°58'48.55"E)	24 hrs	1440	16.67	15.7	0.97	0.485	698.4	0.08812	0.09903	0.01091	15.62

Source: MITCON BASELINE 2021

PM10

Date	Sample No.	Location	Period	Time (min)	Initial Flow rate	Final Flow rate	Difference in flow	Average flow	Total air passed	Initial weight (g)	Final weight (g)	Difference (g)	PM ₁₀ µg/m ³
29/08/2021	AQ.1	Digalbagh (24°23'11.36"N / 92°10'27.98"E)	24 hrs	1440	1.2	1	0.2	1.1	1584	2.6789	2.7558	0.0769	48.5
26/08/2021	AQ.2	Charipara (23°47'53.71"N / 91°15'6.90"E)	24 hrs	1440	1.2	1.05	0.15	1.125	1620	2.6849	2.7636	0.0787	48.6
25/08/2021	AQ.3	Adharsha Colony, Agartala (23°48'52.68"N / 91°18'47.50"E)	24 hrs	1440	1.2	1	0.2	1.1	1584	2.6875	2.7705	0.083	52.4
25/08/2021	AQ.4	Stadium, Agartala (23°48'31.37"N / 91°16'32.10"E)	24 hrs	1440	1.2	1	0.2	1.1	1584	2.7058	2.7904	0.0846	53.4
24/08/2021	AQ.5	Collegetilla, Agartala (23°49'46.26"N / 91°18'5.41"E)	24 hrs	1440	1.2	1.05	0.15	1.125	1620	2.7381	2.8193	0.0812	50.1

24/08/2021	AQ.6	NSRCC, Agartala (23°49'38.13"N / 91°16'44.24"E)	24 hrs	1440	1.2	1	0.2	1.1	1584	2.6968	2.7862	0.0894	56.4
31/08/2021	AQ.7	Tillabazar (24°21'6.45"N / 92° 0'2.20"E)	24 hrs	1440	1.2	1.05	0.15	1.125	1620	2.7896	2.8705	0.0809	49.9
23/08/2021	AQ.9	Killa (23°36'41.56"N / 91°30'44.35"E)	24 hrs	1440	1.2	1	0.2	1.1	1584	2.7984	2.8718	0.0734	46.3
26/08/2021	AQ.10	Mandai (23°51'19.27"N / 91°28'30.00"E)	24 hrs	1440	1.2	1	0.2	1.1	1584	2.6719	2.7454	0.0735	46.4
22/08/2021	AQ.11	Melaghar (23°30'3.00"N / 91°20'37.28"E)	24 hrs	1440	1.2	1	0.2	1.1	1584	2.7212	2.7936	0.0724	45.7
27/08/2021	AQ.12	Manu (23°59'54.36"N / 91°59'26.77"E)	24 hrs	1440	1.2	1.05	0.15	1.125	1620	2.7023	2.7796	0.0773	47.7
27/08/2021	AQ.13	Chhawmanu (23°50'42.07"N / 91°59'27.59"E)	24 hrs	1440	1.2	1	0.2	1.1	1584	2.7193	2.7885	0.0692	43.7
29/08/2021	AQ.14	Kadamtala (24°27'28.80"N / 92°12'25.53"E)	24 hrs	1440	1.2	1	0.2	1.1	1584	2.7079	2.7811	0.0732	46.2
31/08/2021	AQ.15	Rangrung (24°17'35.06"N / 91°58'48.55"E)	24 hrs	1440	1.2	1	0.2	1.1	1584	2.6948	2.7655	0.0707	44.6

Source: MITCON BASELINE 2021

SO₂

Date	Sample No.	Location	Period	Time (mins)	Initial flow rate	Final flow rate	Difference in flow	Avg flow	Volume of air sampled	Barometric pressure	Temperature of air	Corrected volume of air	Abs	Calibration factor	Conversion factor	Dilution factor	Concentration in µg/m ³
29/08/2021	AQ.1	Digalbagh (24°23'11.36"N / 92°10'27.98"E)	24 hrs	1440	16.67	16.4	0.27	0.135	194.4	742	25	189.7957895	0.008	53.48	1000	3.5	7.89
26/08/2021	AQ.2	Charipara (23°47'53.71"N / 91°15'6.90"E)	24 hrs	1440	16.67	16.3	0.37	0.185	266.4	742	25	260.0905263	0.012	53.48	1000	3.5	8.64
25/08/2021	AQ.3	Adharsha Colony, Agartala (23°48'52.68"N / 91°18'47.50"E)	24 hrs	1440	16.67	16.4	0.27	0.135	194.4	742	25	189.7957895	0.014	53.48	1000	3.5	13.81
25/08/2021	AQ.4	Stadium, Agartala (23°48'31.37"N / 91°16'32.10"E)	24 hrs	1440	16.67	16.3	0.37	0.185	266.4	742	25	260.0905263	0.014	53.48	1000	3.5	10.08
24/08/2021	AQ.5	Collegetilla, Agartala (23°49'46.26"N / 91°18'5.41"E)	24 hrs	1440	16.67	16.4	0.27	0.135	194.4	742	25	189.7957895	0.012	53.48	1000	3.5	11.83
24/08/2021	AQ.6	NSRCC, Agartala (23°49'38.13"N / 91°16'44.24"E)	24 hrs	1440	16.67	16.4	0.27	0.135	194.4	742	25	189.7957895	0.019	53.48	1000	3.5	18.74
31/08/2021	AQ.7	Tillabazar (24°21'6.45"N / 92° 0'2.20"E)	24 hrs	1440	16.67	16.3	0.37	0.185	266.4	742	25	260.0905263	0.014	51.81	1000	3.5	9.76
23/08/2021	AQ.9	Killa (23°36'41.56"N / 91°30'44.35"E)	24 hrs	1440	16.67	16.4	0.27	0.135	194.4	742	25	189.7957895	0.01	51.81	1000	3.5	9.55
26/08/2021	AQ.10	Mandai (23°51'19.27"N / 91°28'30.00"E)	24 hrs	1440	16.67	16.5	0.17	0.085	122.4	742	25	119.5010526	0.006	51.81	1000	3.5	9.10

22/08/ 2021	AQ.11	Melaghar (23°30'3.00"N / 91°20'37.28"E)	24 hrs	1440	16.67	16.4	0.27	0.135	194.4	742	25	189.7957895	0.01 1	51.81	1000	3.5	10.51
27/08/ 2021	AQ.12	Manu (23°59'54.36"N / 91°59'26.77"E)	24 hrs	1440	16.67	16.3	0.37	0.185	266.4	742	25	260.0905263	0.01 2	51.81	1000	3.5	8.37
27/08/ 2021	AQ.13	Chhawmanu (23°50'42.07"N / 91°59'27.59"E)	24 hrs	1440	16.67	16.3	0.37	0.185	266.4	742	25	260.0905263	0.01 1	51.81	1000	3.5	7.67
29/08/ 2021	AQ.14	Kadamtala (24°27'28.80"N / 92°12'25.53"E)	24 hrs	1440	16.67	16.3	0.37	0.185	266.4	742	25	260.0905263	0.01 3	51.81	1000	3.5	9.06
31/08/ 2021	AQ.15	Rangrung (24°17'35.06"N / 91°58'48.55"E)	24 hrs	1440	16.67	16.2	0.47	0.235	338.4	742	25	330.3852632	0.01 8	51.81	1000	3.5	9.88

Source: MITCON BASELINE 2021

NOx

Period	Time (mins.)	Initial flow rate	Final flow rate	Difference in flow	Average flow	Volume of air sampled in m ³	Abs	Calibration factor	Dilution factor	Final volume of sampling solution	Sampling efficiency	Volume taken for analysis	NOx value in µg/m ³
24 hrs	1440	16.67	15.7	0.97	0.485	0.6984	0.085	36.76	1	27	0.82	10	14.73
24 hrs	1440	16.67	15.7	0.97	0.485	0.6984	0.088	36.76	1	24	0.82	10	13.56
24 hrs	1440	16.67	15.5	1.17	0.585	0.8424	0.085	36.76	1	24	0.82	10	10.86
24 hrs	1440	16.67	15.7	0.97	0.485	0.6984	0.085	36.76	1	25	0.82	10	13.64
24 hrs	1440	16.67	15.5	1.17	0.585	0.8424	0.104	36.76	1	25	0.82	10	13.84
24 hrs	1440	16.67	15.6	1.07	0.535	0.7704	0.082	36.76	1	26	0.82	10	12.41
24 hrs	1440	16.67	15.7	0.97	0.485	0.6984	0.098	36.76	1	25	0.82	10	15.73

24 hrs	1440	16.67	15.4	1.27	0.635	0.9144	0.083	36.76	1	25	0.82	10	10.17
24 hrs	1440	16.67	15.8	0.87	0.435	0.6264	0.104	36.76	1	28	0.82	10	20.84
24 hrs	1440	16.67	15.6	1.07	0.535	0.7704	0.077	36.76	1	25	0.82	10	11.20
24 hrs	1440	16.67	15.6	1.07	0.535	0.7704	0.09	36.76	1	24	0.82	10	12.57
24 hrs	1440	16.67	15.6	1.07	0.535	0.7704	0.095	36.76	1	24	0.82	10	13.27
24 hrs	1440	16.67	15.7	0.97	0.485	0.6984	0.115	36.76	1	26	0.82	10	19.19
24 hrs	1440	16.67	15.5	1.17	0.585	0.8424	0.088	36.76	1	26	0.82	10	12.18

Source: MITCON BASELINE 2021

EQUIPMENT CALIBRATION CERTIFICATE: AIR QUALITY
 Source: MITCON



CALIBRATION CERTIFICATE

ULR-CC2018212000201790

Calibrated For MITCON Consultancy and Engineering Services Ltd. Environment Management & Engineering Division, Agriculture College Campus, Next to DIC office, Shringi Nagar, Pune 411 005, Maharashtra (India)	Page No. 1 of 3 Certificate No. :- MIT/507/13716/01 Received Date :-09/01/2021 Service Req. No. :-L21/0901/01 Calibration Date :-09/01/2021 Next Due On :-08/01/2022 Date of issue :-28/01/2021					
Calibration Carried Out :- In Lab Condition When Received :- OK						
DESCRIPTION AND IDENTIFICATION OF ITEM						
Name :- Ambient Fine Dust Sampler Make :- Pufftech Instrument Range :- As per observation sheet	Sr. No. :- 7410 ID Code No. :- EME-LAB-106 Model :- PISM-ADK2.5p/01p					
Environmental Condition :- Ambient Temp. :- 27.8 °C	Humidity :- 33 % RH					
EQUIPMENTS USED FOR CALIBRATION						
Sr. No.	Name	Certified By	Certificate No./Sr. No	Validity		
1	Ultrasonic Flow Meter	Nagwan Instruments & Electronics (P) Ltd.	2020-21/ CFC / ME/ME294/1	20/10/2022		
2	4 wire RTD with Indicator	Auriborn Calibration Pvt. Ltd. (CC-2301)	ACPL/THL/0816/01/2020	11/11/2023		
3	Digital Vacuum Gauge	Vijay Instrumentation Services	VIS/20-21/7-395	18/08/2021		
4	Digital Time Calibrator	C & I Calibrations Pvt. Ltd.	C&I/CAL/06-12/058	09/12/2021		
Calibration Procedure No. :- AKCPL/PW/51 Calibration Results :- ATTACHED ANNEXURE Remarks :- 1) Calibration traceable to National Standards 2) Results are related only to the item Calibrated. 3) This Certificate shall not be reproduced except in full without the prior Permission in writing. 4) Flow meter not cover under NABL Scope Format No. :- AKCPL/P/G1						
Calibrated By :  Dhanraj Kulkarni (Technical Assistant)					Authorized By :  Vijay Kale (Technical Manager)	



Auto-Instrument Calibration Laboratory Pvt. Ltd.



Poosana Apartment, Off. No. 2, Sr. No. 438, J.M. Road, Modern College Chowk, Shivajinagar, Pune - 411 005
 Email : sales@aicplabs.com / aicpl@aicplabs.com / Ph : 020-25261011 / 25263034 / www.aicplabs.com

Date of Calibration	Next Due Date of Calibration	Calibration Certificate No.	Page No.
09/01/2021	08/02/2022	M21/567/13756/01	2 of 3

ANNEXURE

OBSERVATION TABLE

1. Parameter: Time

Name: Timer
 Range: 0 to 999 Min

Make: ---
 Least Count : 1 Min

Sr. No.	Range	Master Equipment Reading	UDC Reading	% Error	Expanded Uncertainty at 95.45% CL with k=2
1	0 to 999 Min	5.00	5	0.00	± 0.20 sec
2		10.00	10	0.00	
3		15.00	15	0.00	
4		20.00	20	0.00	
5		30.00	30	0.00	

2. Parameter: Temperature

Name: Temperature
 Range: 0 to 50 °C

Make: Politech
 Least Count : 1°C

Sr. No.	Calibration Point In °C	Master Reading In °C	UDC Reading In °C	Deviation In °C	Expanded Uncertainty at 95.45% CL with k=2
1	10	9.9	10	0.10	± 0.8°C
2	20	19.8	20	0.20	± 0.8°C
3	30	29.7	30	0.30	± 0.8°C
4	40	39.7	40	0.30	± 0.8°C
5	50	49.5	50	0.50	± 0.8°C

3. Parameter: Vacuum

Name: Vacuum
 Range: 0 to 760 mmHg

Make: Politech
 Least Count : 1 mmHg

Sr. No.	Range	Master Equipment Reading	UDC Reading	% Error	Expanded Uncertainty at 95.45% with k=2
1	0 to 760 mmHg	-99.91	-100	-0.09	± 1.30 %
2		-199.83	-200	-0.15	± 1.30 %
3		-298.75	-300	-1.25	± 1.30 %
4		-498.63	-500	-1.37	± 1.30 %
5		-598.22	-600	-1.78	± 1.30 %

Calibrated By : 
 Oshkar Kale
 (Technical Assistant)



Authorized By : 
 Vijay Kale
 (Technical Manager)

Date of Calibration: 09/01/2021	Next Due Date of Calibration: 09/01/2022	Calibration Certificate No.: 8611195/0171691	Page No.: 3 of 3
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4. Parameter: Flow

Name: Glass Rotameter
 Range: 0 to 3 LPM
 Sr No: FT3318
 Least Count: 0.1 LPM

Sr. No.	Range	Master Equipment Reading	IPC Reading	% Error	Expected Uncertainty at 95.45% with k=2
1	0 to 3 LPM	0.00	0.0	-0.00	± 0.02 %
2		1.00	1.0	-0.00	± 0.02 %
3		2.00	2.0	-0.00	± 0.02 %
4		2.50	2.5	-0.00	± 0.02 %
5		3.00	3.0	-0.00	± 0.02 %

5. Parameter: Flow

Name: Flow
 Range: 10 to 100 LPM
 Meter Puleksh
 Least Count: 1 LPM

Sr. No.	Range	Master Equipment Reading	IPC Reading	% Error	Expected Uncertainty at 95.45% with k=2
1	10 to 100 LPM	0.00	0	0.00	± 0.01 %
2		10.00	10	0.00	± 0.01 %
3		20.00	20	0.00	± 0.01 %
4		30.00	30	0.00	± 0.01 %
5		40.00	40	0.00	± 0.01 %

CIK: List under Calibration

Calibrated By: 
 Debbaraj
 (Calibration Assistant)



Authorized By: 
 Vijay Kish
 (Technical Manager)

CALIBRATION CERTIFICATE

Customer For MITCON Consultancy and Engineering Services Ltd. Environmental Management & Engineering Division, Agricultural College Campus, Near to IIC Office, Madhav Nagar, Phase - Four 441 005, Maharashtra (India)		Page No. 1 of 2 Certificate No. - ACI170017031004 Issue Date - 09/03/2021 Service Req. No. - 4214990160 Calibration Date - 19/03/2021 Issue Date Of - 09/03/2021		
Calibration Control Qp - In Lab Condition When Received - IIS				
DESCRIPTION AND IDENTIFICATION OF ITEM				
Name	: Artificial Feed Feed Sampler	Id. No.	: 7230	
Make	: Pollock Instrument	ID Code No.	: ENERLAB-407	
Range	: As per instruction sheet	Model	: PEM ADC2 3x10g	
Environmental Condition - Ambient Temp. : 23.3 °C		Humidity : 51 %RH		
EQUIPMENT USED FOR CALIBRATION				
Sr. No.	Name	Cal. Ref. No.	Certificate No./Sr. No.	Validty
1	Electronic Flow Meter	Progress Instrument & Electronics (P) Ltd.	2020-21/CHC-463M2001	30/03/2022
2	4 wire RTD with Indicators	Artificial Instrument Calibration Pvt. Ltd. (AIIC-2011)	ACPL/1916/09/01/2008	31/01/2021
3	Digital Vacuum Gauge	Vijay Instrumentation Services	VI020-21/7-201	14/03/2021
4	Digital Force Calibrator	C & T Calibration Pvt. Ltd.	CEI01/AC/25/12/01E	30/03/2021
Calibration Procedure No. : - AIICUL/001/19 Calibration Method : ATTACHED ANNEXURE				
Remarks : 1) Calibration Issued as Per Instruction Sheet 2) Results are related only to the Item Calibrated. 3) This Certificate shall not be reproduced except in full without our prior Permission in writing. 4) Please contact our sales under NAAM Scope.				
Form No. : AIICUL/01/19				
Calibrated By :  (Technical Assistant)		Authorized By :  (Authorized Person)		

Source: MITCON 2021

Date of Calibration: 09/01/2021	Next Due Date of Calibration: 09/01/2022	Calibration Certificate No.: AICILAB/000184	Page No.: 2 of 2
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ANNEXURE

OBSERVATION TABLE

1. Parameter: Time

Name: Timer
 Range: 0 to 999.999 s
 Make: ---
 Least Count: 1.000 s

No. No.	Range	Master Equipment Reading	15°C Reading	% Error	Expanded Uncertainty at 95.45% with k=2
1	0 to 999.999 s	0.00	0	0.00	± 0.20 ms
2		10.00	10	0.00	
3		10.00	10	0.00	
4		10.00	10	0.00	
5		10.00	10	0.00	

2. Parameter: Temperature

Name: Temperature
 Range: 0 to 20 °C
 Make: Pallack
 Least Count: 1°C

No. No.	Calibration Point in °C	Master Reading in °C	15°C Reading in °C	Deviation in °C	Expanded Uncertainty at 95.45% CI, with k=2
1	10	9.9	10	-0.10	± 0.20°C
2	20	19.9	20	-0.10	± 0.20°C
3	20	19.7	20	-0.30	± 0.20°C
4	20	19.5	20	-0.50	± 0.20°C
5	20	19.3	20	-0.70	± 0.20°C

3. Parameter: Voltage

Name: Voltage
 Range: 0 to 200 mVdc
 Make: Pallack
 Least Count: 1 mVdc

No. No.	Range	Master Equipment Reading	15°C Reading	% Error	Expanded Uncertainty at 95.45% with k=2
1	0 to 200 mVdc	00.07	000	-0.10	± 1.20 %
2		00.70	000	-0.20	± 1.20 %
3		00.66	000	-0.34	± 1.20 %
4		00.87	000	-1.13	± 1.20 %
5		00.71	000	-1.29	± 1.20 %

Calibrated By:  (Technical Assistant)

Authorized By: 

Date of Calibration 09/01/2021	Next Due Date of Calibration 09/01/2022	Calibration Certificate No. AICI/547/001/84	Page No. 2 of 3
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ANNEXURE

OBSERVATION TABLE

1. Parameter: Time

Name: **Timer** Make: **---**
 Range: **0 to 999.99s** Least Count: **1.00s**

No. No.	Range	Master Equipment Reading	EVG Reading	% Error	Expanded Uncertainty at 95.45% with k=2
1	0 to 999.99s	0.00	0	0.00	± 0.28 ms
2		10.00	10	0.00	
3		10.00	10	0.00	
4		20.00	20	0.00	
5		30.00	30	0.00	

2. Parameter: Temperature

Name: **Temperature** Make: **Pollock**
 Range: **0 to 25 °C** Least Count: **1 °C**

No. No.	Calibration Point in °C	Master Reading in °C	EVG Reading in °C	Deviation in °C	Expanded Uncertainty at 95.45% CI, with k=2
1	10	9.8	10	0.20	± 0.21 °C
2	20	19.5	20	0.50	± 0.21 °C
3	20	20.7	20	-0.70	± 0.21 °C
4	20	24.7	20	-4.70	± 0.21 °C
5	20	19.7	20	0.30	± 0.21 °C

3. Parameter: Voltage

Name: **Voltage** Make: **Pollock**
 Range: **0 to 200 mVdc** Least Count: **1 mVdc**

No. No.	Range	Master Equipment Reading	EVG Reading	% Error	Expanded Uncertainty at 95.45% with k=2
1	0 to 200 mVdc	-00.07	-000	-0.10	± 1.23 %
2		-000.71	-000	-0.71	± 1.23 %
3		-000.66	-000	-0.66	± 1.23 %
4		-000.87	-000	-0.87	± 1.23 %
5		-000.21	-000	-0.21	± 1.23 %

Calibrated By:  (Technical Assistant)
 Authorized By: 

APPENDIX 10: NOISE QUALITY DATA

Day / Night	Time (in hrs.)		22/08/2021 1 (Sunday)	23/08/2021 1 (Monday)	24/08/2021 (Tuesday)	25/08/2021 (Wednesday)	26/08/2021 (Thursday)	27/08/2021 (Friday)	29/08/2021 (Sunday)	31/08/2021 (Tuesday)						
			NQ.11 <u>Melaghar</u> (23°30'2.85"N / 91°20'37.12"E)	NQ.9 <u>Killa</u> (23°36'41.41"N / 91°30'44.61"E)	NQ.5 <u>Collegetilla, Agartala</u>	NQ.6 <u>NSRCC, Agartala</u> (23°49'38.70"N / 91°16'44.36"E)	NQ.3 <u>Adarsha Colony, Agartala</u> (23°48'51.54"N / 91°18'47.78"E)	NQ.4 <u>Stadium, Agartala</u> (23°48'31.09"N / 91°16'31.76"E)	NQ.2 <u>Charipara</u> (23°47'53.88"N / 91°15'7.49"E)	NQ.10 <u>Mandai</u> (23°51'18.49"N / 91°28'29.87"E)	NQ.12 <u>Manu</u> (23°59'54.54"N / 91°59'27.15"E)	NQ.13 <u>Chhawmanu</u> (23°59'42.59"N / 91°59'27.30"E)	NQ.1 <u>Digalbagh</u> (24°23'11.32"N / 92°10'28.88"E)	NQ.14 <u>Kadamtala</u> (24°27'29.06"N / 92°12'26.61"E)	NQ.7 <u>Tillabazar</u> (24°21'6.23"N / 92°01'81"E)	NQ.15 <u>Rangrung</u> (24°17'35.14"N / 91°58'48.70"E)
Day Time	06:00	06:30	41.6	40.2	42.4	43.9	42.1	42.7	41.3	40.6	39.9	39.6	41.1	38.6	38.9	40.3
	06:30	07:00	42.1	40.9	43.1	44.2	41.9	43.2	42.2	41.1	40.1	39.9	41.8	39.0	39.4	41.2
	07:00	07:30	42.6	41.3	43.6	44.8	42.4	43.9	41.9	41.8	40.6	40.5	42.3	39.5	40.1	41.6
	07:30	08:00	43.5	42.1	44.2	45.6	43.3	44.5	42.1	42.2	41.2	41.1	42.7	40.4	41.5	42.3
	08:00	08:30	44.1	42.5	44.9	46.3	43.8	44.8	42.8	42.9	41.7	41.3	43.2	40.8	41.7	42.9
	08:30	09:00	44.9	43.8	45.2	46.9	44.1	45.2	43.5	43.2	42.9	42.4	43.9	41.2	42.5	43.4
	09:00	09:30	45.6	43.6	45.6	47.5	44.6	46.1	44.2	43.4	43.5	42.9	44.5	41.8	43.3	44.6
	09:30	10:00	46.1	44.6	46.8	48.1	45.4	46.9	44.7	44.7	44.1	43.6	45.2	41.4	44.2	45.1
	10:00	10:30	46.5	45.2	47.5	47.9	46.2	47.6	45.8	44.1	44.8	44.1	45.3	42.3	44.8	45.7
	10:30	11:00	46.8	45.9	48.2	48.6	47.6	47.5	45.3	45.3	45.6	43.9	46.1	43.6	45.6	46.2
	11:00	11:30	47.8	46.3	48.9	49.2	47.1	48.4	46.6	45.9	46.3	44.7	46.8	44.2	46.7	46.5
	11:30	12:00	48.6	46.1	48.7	49.7	48.5	48.7	47.1	46.2	46.7	45.3	47.2	45.1	45.8	46.1
	12:00	12:30	48.2	46.8	49.3	50.6	49.2	49.1	47.4	46.6	48.1	46.1	47.6	44.8	46.1	47.0
	12:30	13:00	49.7	47.1	49.9	51.4	50.2	49.6	48.2	47.3	47.4	46.6	48.3	45.3	46.9	47.6
13:00	13:30	49.2	47.4	49.2	52.1	50.7	49.5	48.6	47.6	48.6	47.3	47.9	46.2	47.2	48.1	

	13:30	14:00	48.7	47.7	48.9	51.9	51.3	50.2	48.9	48.2	49.2	46.8	48.1	45.6	47.6	47.8
	14:00	14:30	48.1	48.0	49.6	52.7	52.1	50.8	49.3	48.7	50.3	45.2	48.7	46.3	46.2	47.5
	14:30	15:00	49.5	48.3	50.1	53.1	51.8	51.7	50.4	49.9	49.8	45.9	47.4	46.8	46.8	48.2
	15:00	15:30	50.2	48.6	50.6	52.4	52.4	52.4	50.6	49.6	49.6	46.7	48.2	47.1	47.4	48.8
	15:30	16:00	50.9	49.4	51.4	53.5	53.3	52.8	51.3	50.1	50.4	47.2	48.9	47.3	46.7	48.4
	16:00	16:30	51.4	49.9	52.3	54.2	53.8	53.6	51.9	50.9	50.9	47.8	49.1	47.8	47.3	49.2
	16:30	17:00	51.6	50.2	51.9	54.7	54.3	53.4	51.6	51.6	51.7	47.1	49.8	47.5	47.9	49.6
	17:00	17:30	52.1	50.8	52.8	55.6	55.2	55.1	52.4	51.4	52.3	48.2	50.3	48.2	48.7	50.1
	17:30	18:00	53.6	51.4	53.4	55.4	54.9	54.7	53.2	53.4	52.9	49.3	51.4	48.7	48.2	50.7
	18:00	18:30	52.9	51.8	54.1	56.8	55.4	55.4	52.9	52.1	54.1	49.6	51.9	48.4	46.1	50.4
	18:30	19:00	53.4	50.2	53.8	56.2	55.3	54.9	53.8	51.7	54.7	50.2	50.7	47.9	46.7	48.8
	19:00	19:30	52.6	49.6	54.4	55.6	53.6	53.2	53.4	51.4	53.5	49.8	49.8	48.5	45.4	47.5
	19:30	20:00	50.8	48.7	53.7	54.9	52.8	53.1	52.6	51.2	52.1	50.1	48.6	47.6	44.3	45.9
	20:00	20:30	50.4	47.5	52.6	53.7	52.4	52.7	52.1	50.6	51.8	49.2	48.9	46.7	43.6	44.7
	20:30	21:00	49.8	45.9	50.9	52.1	51.9	51.4	51.2	49.3	50.2	48.7	47.4	45.3	42.8	43.6
	21:00	21:30	49.6	46.5	49.3	51.8	52.5	50.7	49.5	48.5	49.8	46.9	46.2	44.2	42.1	42.5
	21:30	22:00	48.3	45.2	48.1	50.2	50.9	49.8	48.2	47.3	48.3	45.5	46.7	43.4	41.6	41.2
Night Time	22:00	22:30	47.9	44.8	47.7	49.6	49.4	49.1	47.3	46.3	46.1	44.2	45.6	42.8	40.9	40.9
	22:30	23:00	47.4	44.3	46.9	49.2	48.1	48.5	46.5	45.6	44.5	43.7	44.7	41.1	41.2	39.7
	23:00	23:30	46.3	42.8	45.6	48.1	47.7	47.6	46.1	44.7	43.6	43.3	43.9	40.2	40.1	38.8
	23:30	00:00	45.8	42.5	44.2	47.3	47.2	46.3	45.6	43.2	43.2	42.1	43.3	39.4	39.7	37.6
	00:00	00:30	45.3	41.9	43.8	45.2	46.5	46.8	44.9	42.3	42.5	41.6	42.5	38.2	39.1	36.9
	00:30	01:00	44.9	41.7	43.3	44.7	45.7	46.1	43.4	41.7	41.3	40.3	41.1	37.8	38.3	36.1
	01:00	01:30	44.1	41.5	42.9	43.5	43.4	45.8	42.6	41.2	40.5	39.7	40.6	37.2	37.8	36.5
	01:30	02:00	43.3	41.3	42.4	43.6	42.7	45.2	42.1	40.7	38.8	38.6	40.2	36.6	37.6	36.7
	02:00	02:30	42.6	40.5	41.9	43.2	42.4	45.6	41.3	40.2	38.3	38.4	39.4	36.5	37.4	37.5
	02:30	03:00	42.4	39.7	41.6	42.6	42.5	44.9	40.8	39.9	38.9	38.1	39.1	36.7	37.9	37.2
	03:00	03:30	42.1	40.2	41.1	42.8	42.9	43.6	40.9	39.6	39.1	37.8	39.3	36.9	38.2	37.8
03:30	04:00	41.8	40.8	41.6	43.3	43.2	42.6	40.4	40.1	39.6	37.2	39.6	37.6	39.1	37.7	

	04:00	04:30	42.1	40.7	42.3	43.5	43.7	42.5	39.8	40.4	39.4	37.6	40.1	37.8	39.6	38.5
	04:30	05:00	42.5	41.3	42.9	43.6	43.5	42.7	40.6	40.9	39.8	38.4	40.6	38.1	39.9	38.8
	05:00	05:30	42.9	41.1	43.2	43.9	43.6	43.1	41.1	41.1	40.2	38.9	41.1	38.5	40.5	39.4
	05:30	06:00	43.2	40.9	43.7	43.5	43.8	43.4	41.6	41.2	40.6	39.4	41.5	38.9	40.8	39.8
Day Time	L_{eq}		48.8	47.0	49.6	51.5	50.3	50.3	48.8	47.9	48.5	46.1	47.3	45.0	45.1	46.3
	L₉₀		43.6	42.1	44.3	45.7	43.4	44.5	42.3	42.3	41.3	41.1	42.8	40.4	41.5	41.7
	L₅₀		49.0	47.0	49.3	51.9	51.1	50.0	48.8	47.9	48.9	46.4	47.5	45.3	45.7	46.4
	L₁₀		52.6	50.2	53.7	55.6	54.8	54.6	52.9	51.6	52.8	49.6	50.3	48.2	47.6	49.6
	L_{max}		53.6	51.8	54.4	56.8	55.4	55.4	53.8	53.4	54.7	50.2	51.9	48.7	48.7	50.7
	L_{min}		41.6	40.2	42.4	43.9	41.9	42.7	41.3	40.6	39.9	39.6	41.1	38.6	38.9	40.3
Night Time	L_{eq}		44.3	41.8	43.7	45.3	45.1	45.5	43.2	42.1	41.4	40.3	41.7	38.6	39.4	38.2
	L₉₀		42.1	40.4	41.6	43.0	42.6	42.7	40.5	40.0	38.9	37.7	39.4	36.7	37.7	36.6
	L₅₀		43.3	41.3	43.1	43.6	43.7	45.4	41.9	41.2	40.4	39.2	40.9	38.0	39.4	37.8
	L₁₀		46.9	43.6	46.3	48.7	47.9	48.1	46.3	45.2	44.1	43.5	44.3	40.7	40.9	39.8
	L_{max}		47.9	44.8	47.7	49.6	49.4	49.1	47.3	46.3	46.1	44.2	45.6	42.8	41.2	40.9
	L_{min}		41.8	39.7	41.1	42.6	42.4	42.5	39.8	39.6	38.3	37.2	39.1	36.5	37.4	36.1

Source: MITCON 2021

CALIBRATION CERTIFICATE OF SOUND LEVEL METERS
SOURCE: MITCON



LATA ENVIROTECH SERVICES - CENTRE FOR CALIBRATION LABORATORY
 (A Division of Lata Envirotech Services)

K-087 UPDGC Industrial Area, Site 8, Karna, Greater Noida, (Sector South Nagar-201310 (G.P.))
 Email: lesco287@gmail.com, lescofah@gmail.com, Call No. 9821735177, 9821735176, 9302849339
 Website: www.lescofah.com



CALIBRATION CERTIFICATE

ULR No.	CC225321000001069F	Calibration Field - Mechanical	Page 1 of 1
Certificate No.	LES-CCL/MECH/SLM/303		
Calibration Date	11.03.2021	Suggested Date of Next Calibration	10.03.2022
Customer Name :- Address :-	M/s Mitcon Consultancy & Engineering Services Ltd. Agriculture College Campus, Environment Division, Near ETDC, Shivrajnagar, Pune - 411006		
Reference :- S.R.F. No. :-	2020/1181	Date :-	10.03.2021
		Date of Issue :-	11.03.2021

01. Details of (DUC)

Name	Sound Level Meter	Environmental Condition of During Calibration	
Make / Model	Lutron T SL - 4033 (B)	Temperature (°C)	25 ± 3
S.No. / ID No.	0889973 / EM (LAB/02)	Relative Humidity (%)	40 - 75
Range	30 - 150 dB	Barometric Pressure (mmHg)	745.10

02. Standard Equipment used for calibration

Standard Equipment Name	Range	Traceability
Sound Level Calibrator	94 dB, 114 dB	L164109 CENI MORGAN
Certificate No.	Calibration Date	Valid Up to
CC000068020-21	08.11.2020	N/A

03. Calibration Procedure :- LES-CCL/W31/MECH/03

04. Calibration Results :
 DUC has been calibrated for following Parameters (S) ranges (R)

S.No.	Displayed Value on DUC (dB)	Reference Value (dB)	Error (SRdp)	Expanded Uncertainty at 95 % of Confidence level (k = 2)
1	93.0	94.0	-0.85	± 0.31 dB
2	113.9	114.2	-0.35	± 0.31 dB

Remark: The reading of DUC represent the Average of two reading measurements

Uncertainty Contributing Factors :- 1. Repeatability based on five measurement 2. Uncertainty of master instrument 3. Resolution of DUC

The expanded Uncertainty in calibration at a coverage factor k = 2, for degrees of freedom ∞ and confidence level is 95 % for Normal distribution.

Notes :-

1. Reference used are directly traceable to national standard through calibration chain of calibration.
2. Results reported are valid at the time of and under the stated conditions of measurement.
3. This Certificate valid only to the particular item calibrated.
4. This certificate shall not be reproduced, except in full without the written permission of LES-CO, Karna, Greater Noida (G.P.).



Authorized By



DR. ANANT KUMAR
 Chief Executive Officer

Source: MITCON 2021


LATA ENVIROTECH SERVICES - CENTRE FOR CALIBRATION LABORATORY
 [A Division of Lata Envirotech Services]

K-307 UPDCC Industrial Area, Site-5, Kanes, Greater Noida, Gautam Buddha Nagar (G.P.)
 E-mail: lesccl01@gmail.com, lesccl02@gmail.com, Call No. 9821225177, 9821728476, 9305046238
 Website : www.lesclab.com



CALIBRATION CERTIFICATE

ULR No.	CC225321000001070F	Calibration Field -	Page 1 of 1
Certificate No.	LES-CCL/MECH/SLM/304	Mechanical	
Calibration Date	11.03.2021	Suggested Date of Next Calibration	10.03.2022
Customer Name :- Address :-	M/s Mission Consultancy & Engineering Services Ltd. Agriculture College Campus, Environment Division, Near ETDC, Shivajinagar, Pune - 411005		
Reference :- S.R.F. No. -	2020/1151	Date :-	10.03.2021
		Date of Issue :-	11.03.2021

01. Details of (DUC)

Name	Sound Level Meter	Environmental Condition of During Calibration	
Make / Model	Lutron / SL - A033/50	Temperature (°C)	25 ± 3
SI No. / ID No.	QC70515 / EME/LAB/301	Relative Humidity (%)	45 - 75
Range	30 - 139 dB	Barometric Pressure (mmHg)	745.10

02. Standard Equipment used for calibration

Standard Equipment Name	Range	Traceability
Sound Level Calibrator	94 dB, 114 dB	1164106
		ICEM, MOUSA
Certificate No.	Calibration Date	Valid Up to
CC/CC/083525/31	08.11.2020	NA

03. Calibration Procedure :- LES-CCL/W01/MECH03

04. Calibration Results :
 DUC has been calibrated for following Parameter (S) ranges (S)

S.No.	Displayed Value on DUC (dB)	Reference Value (dB)	Error (%Rdg)	Expanded Uncertainty at 95 % of Confidence level (k = 2)
1	93.9	94.0	-0.7%	± 0.51 dB
2	113.8	114.3	-0.4%	± 0.51 dB

Remark: The reading of DUC represent the Average, of five reading measurements.
 Uncertainty Contributing Factor = 1. Repeatability based on five measurement 2. Uncertainty of master instruments
 3. Resolution of DUC
 The evaluated Expanded Uncertainty in calibration at a coverage factor k = 2, for degrees of freedom = ∞ and confidence level is 95 % for Normal distribution.

Notes :-

- Reference used are directly traceable to national standard through unbroken chain of calibration.
- Results reported are valid at the time of and under the stated conditions of measurement.
- This Certificate refers only to the particular item, calibrated.
- This certificate shall not be reproduced, except in full without the written permission of LES-CCL, Kanes, Greater Noida (G.P.)

	Authorized By
 DR. SHANKAR SINGH (Dist. Executive Officer)	

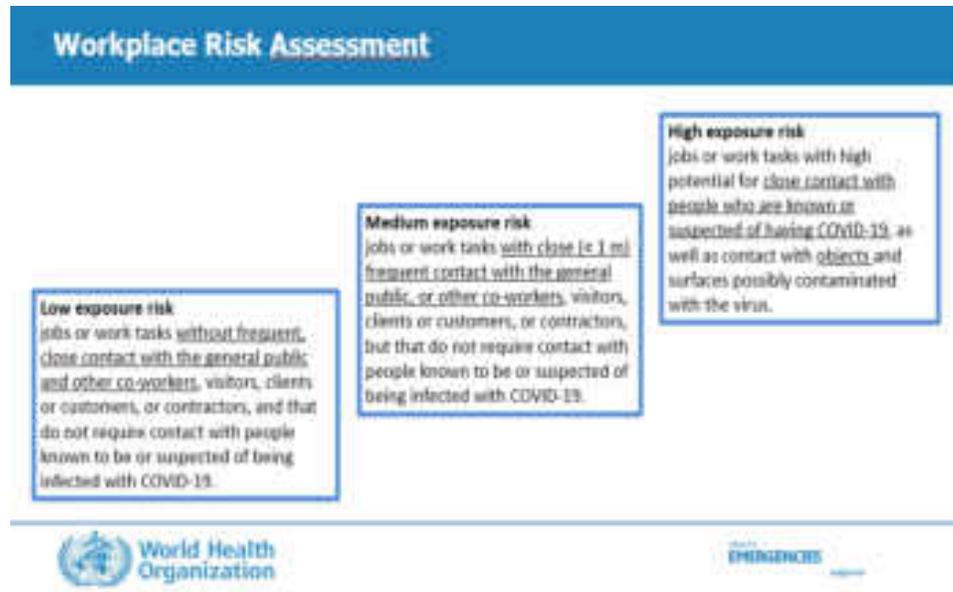


Source: MITCON 2021

APPENDIX 11: COVID-19 GUIDELINES

A. Risk of Exposure

1. The World Health Organization (WHO) notes that COVID-19 is transmitted primarily through respiratory droplets or contact with contaminated surfaces such that the risk of occupational exposure depends on the probability of coming into (i) close, less than 1m, or frequent contact with people who may be infected; and (ii) contact with contaminated surfaces. The nature of pre-construction consultations and survey work and construction works required for the project mean that the WHO occupational exposure risk will be at least a medium risk.



Source: WHO 2021

2. The following factors will increase the risk of community and/or workers exposure if COVID-19 is circulating in either the local community where workers live/travel from or where the location where the project will be implemented:

- Underlying health conditions; asthma, chronic kidney or lung disease, diabetes, liver disease, serious heart conditions, serious obesity, etc.
- Local health care capacity for testing, in-patient and intensive care facilities limited and remote from health care facilities
- Poor sanitation and welfare facilities on-site, in the worker accommodations and for local communities
- Transient nature of worker camps – for the distribution lines, potential contact with the local communities is possible
- Construction workers likely to be coming from outside the local community and/or country

B. India Latest Status (September/October 2021)

Media Bulletin on COVID-19, Dated: 29.09.2021 Evening

World Health Organization (WHO) has declared the Novel Corona Virus, COVID-19 as Pandemic. Globally, as of 29.09.2021 there have been **23,20,75,351** Confirmed cases and including **47,52,988** deaths. (Source-<https://covid19.who.int/> at 05:30 pm)

Till date in India, the **Confirmed Cases** are **3,37,16,451** (+18,870), **Recovered** **3,29,86,180** (+28,178) including **4,47,751** (+378) deaths. The situation of Confirmed COVID-19 cases in North Eastern states: -Assam (**6,01,421**) Manipur (**1,30,216**), Meghalaya (**80,992**), Mizoram (**91,919**), Arunachal Pradesh (**54,444**) Nagaland (**31,195**), Sikkim (**31,355**). (Source: Aarogya Setu App at 05:30 pm)

The detailed status of surveillance activity for COVID-19 (as on 29th September, 2021 evening) is given below:

Sample tested (RTPCR)	4,17,381	Patient recovered	82,991
Sample tested (RAT)	14,80,916	Total no of patients under treatment /Active case	338
Total Sample tested	18,98,297	No of Death	810
Sample positive (RTPCR)	13,088	COVID-19 positivity rate	4.43%
Sample positive (RAT)	71,017	Recovery rate	98.78%
Total Sample positive	84,105	Fatality rate	0.96%
Sample Negative	18,14,192	Tests per million	4,74,859

In order to contain the spread of the virus, Tripura Government has strengthened the surveillance and control measures against the disease.

The detailed status of surveillance activity for COVID-19 as on 29th Sept, 2021 (from yesterday evening to today evening) is given below:

Sample tested (RTPCR)	398
Sample tested (RAT)	3,832
Total Sample tested	4,230
Sample positive (RTPCR)	9
Sample positive (RAT)	11
Total Sample positive	20
Positivity rate	0.47%
Patient recovered	21
No of Death	01

• Out of 20 positive patients the distribution is as mentioned below:

West Tripura	12	South Tripura	00
Sipahijala	00	Dhaka	00
Khurai	00	Unakoti	02
Gumai	03	North Tripura	03

Source: MOHFW, Gol

3. Tripura Status: as of 1 October 2021, 81308 people are so far affected in Tripura by Covid-19. 78,929 out of 81,308 have recovered. Sadly, 778 patients have died due to coronavirus in Tripura. 1,538 patients are still in hospital and recovering. 3 people are so far affected in Sipahijala, Tripura by Covid-19 and none have yet recovered and are still in hospital. But so far, no patients have died due to coronavirus in Sipahijala, Tripura.

4. Gol has issued various guidelines to be followed which are available at:

- <https://ncdc.gov.in/index1.php?lang=1&level=1&sublinkid=703&lid=550>
- <https://www.mohfw.gov.in/>

Tripura specific guidance available at:

- <https://covid19.tripura.gov.in/>.

C. COVID-19 Preparedness

5. To demonstrate how the project will address the above risks, COVID-19 will be included as part of the construction health and safety management plan. This plan will need to include details of the current risk, day to day measures to be taken on-site, trainings, roles and responsibilities, an emergency procedure to follow in the event anyone develops symptoms including flow chart and contact details for local health facilities, screening checklists, etc. It will need to demonstrate how government requirements will be followed by TSECL and their EPC contractors.

6. In addition to any government requirements applicable at the time (as above section) the following measures should be considered:

- (i) During pre-construction activities social distancing of at least 1m will be maintained by all those working in the field, to reduce the risk of exposure as far as possible.
- (ii) Check and follow the national and state government advice for the local community where planning to undertake consultations, surveys, and/or construction works. If face to face meeting is not allowed virtual consultations and phone call survey with officials and community will be undertaken. Virtual meeting and phone call will be conducted to facilitate the grievance resolution with community.
- (iii) Confirm the local health authority and liaise with them in advance to identify the status of COVID-19 in the local community and any advice to be followed.
- (iv) Develop an emergency procedure to follow in the event anyone in the field develops symptoms including flow chart and contact details of local health facilities; this is to cover self-monitoring of symptoms, isolation, testing and quarantine, and transfer and admittance to hospital as a situation requires.
- (v) Provide awareness raising activities for those being deployed to the field to cover hand hygiene, symptoms, risk, and procedures to follow if symptoms occur – keep records of all trainings.
- (vi) Ensure those going in the field are provided with accommodation that allows social distancing of at least 1m, is regularly cleaned, and with adequate sanitation and welfare facilities to enable them to undertake hand washing etc.
- (vii) Ensure temperature and medical checks are undertaken before deploying anyone to the field, especially for anyone travelling from outside the local community and/or state.
- (viii) Provide those going in the field with adequate supplies of PPE including soap, hand sanitizer, paper tissues, masks, thermometer to check own temperature etc.
- (ix) For consultations consider if rather than one large public meeting a series of smaller focus groups or face-to-face consultations could serve the same purpose without compromising the requirement to undertake meaningful consultations.
- (x) Clean and disinfect the venue including objects and surfaces before and after any event.
- (xi) Consider the use of outdoor venues to maximize ventilation, space chairs at least 1m apart and ensure there are no bottlenecks to avoid close contact.
- (xii) If health authorities advise COVID-19 is circulating in the local community then advise participants in advance that if they have any symptoms or feel unwell, they should not attend.
- (xiii) On arrival at the public meeting check the temperature of participants and require them to self-declare free of COVID-19 symptoms and not in recent contact with anyone who has had symptoms before being allowed into the venue.

- (xiv) Those that cannot attend should be given the option of a telephone consultation or similar if they have an interest or concern about the project, to avoid them feeling obliged to attend for their voice to be heard.
- (xv) Provide awareness raising posters and have a hand wash station at the entry equipped with clean water, soap, and hand sanitizer for participants to use.
- (xvi) Pre-order enough PPE, including soap, paper towels, paper tissues, hand sanitizer, and surgical masks for all participants to use; if not nationally mandated, at minimum, masks must be worn by all participants that cannot maintain social distancing or are elderly or otherwise medically vulnerable.
- (xvii) If using microphones, ensure that they are wiped down with alcohol at least 70% concentration before passing it on.
- (xviii) If food and drink is provided, try to provide pre-ordered individual packed food to avoid cross-contamination
- (xix) Identify an area where someone feeling unwell or has symptoms can be safely isolated, in case of serious case have a vehicle on call in which patient can be safely transferred to a local health facility with a driver who has full PPE and is trained to deal with potential cases and deep clean the vehicle afterwards.
- (xx) Emergency procedure to include for participants reporting symptoms and contacting other participants if anyone tests positive later, for contact tracing purposes ensure that all participants including support workers such as caterers or cleaners provide their contact details: telephone, address etc.
- (xxi) Disposal of hygiene related waste in garbage bins with sealed lids lined with plastic bags, for onwards disposal in accordance with national regulations
- (xxii) During construction activities social distancing of at least 1m will be maintained by construction workers to members of the local communities in which they are undertaking work with awareness raising posters and notices so that local community members understand social distancing with them must be maintained. However, it may not be possible to maintain social distancing of 1m with other construction workers given tasks to be undertaken. If the tasks cannot be reconfigured to enable this, additional measures must be taken to reduce the risk of transmission between them:
- (xxiii) Daily temperature reading and self-certification check to be undertaken by the construction workers before leaving accommodation to confirm fit for work and having no COVID-19 symptoms.
- (xxiv) Posters and signages to be displayed on-site and at accommodation with daily toolbox talk to provide COVID-19 reminders on hygiene, emergency procedures, etc.
- (xxv) Enhanced cleaning and disinfection (using sodium hypochlorite (bleach) of surface at concentration 0.1% or alcohol at least 70% concentration for surfaces which can be damaged by sodium hypochlorite) of objects and surfaces that are regularly touched on-site and in construction worker accommodation including materials and equipment, shared rooms, surfaces, floors, toilets, and, washing facilities etc.
- (xxvi) Minimizing face-to-face and skin-to-skin contact by construction workers, orientate tasks so working side by side or facing away from each other rather than face on, and always assign construction workers to the same small working gang and the same accommodation, to limit social interaction between them
- (xxvii) Enhanced hand hygiene - regular hand washing with soap and water or alcohol-based hand sanitizer, including before entering and on leaving accommodation, on arriving and leaving site, and before putting on and after taking off any PPE
- (xxviii) Provide appropriate PPE and training on its proper use – masks, gloves, eye protection as applicable

- (xxix) Provide medical insurance for all construction workers and sick leave to avoid them turning up for work when symptomatic due to no work-no pay situation

D. Further Sources of Information

- ADB <https://www.adb.org/publications/safety-well-being-workers-communities-covid-19>
- India <https://www.mohfw.gov.in/>
- WHO Advice for the Public <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>
- WHO Technical Guidance <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance>
- WHO Guidance for Schools, Workplace and Institutions <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/guidance-for-schools-workplaces-institutions>

APPENDIX 12: CONSULTATION RECORDS

CONSULTATION DETAILS IN NON-TTAADC VILLAGES (DISTRIBUTION COMPONENTS)

Sl. No	01
Village	Chawmanu
Have you heard about the Project or Do you have any information about the project	Some are aware of the project little bit, and some do not have any idea of the project. But none having full idea of the project.
What is your opinion about this Project	Project is good for our society and nearby villages as well as for the State.
Do you support this Project	Yes, we will support this project as the project will bring development for our area and for the State.
Are all houses electrified and if yes then what is average hours of electricity per day for domestic consumption	Yes, all houses are electrified, average hours of electricity per day for domestic consumption is 15-18 hours
Number of Household population of the village tribal composition	-
What is the composition of people in the village Name of the Tribe Name of the Subtribe What is the common language What is the official language Are their non-tribal households if yes name and percentage What is the general occupation	Bengali and Tribal are living in this area and tribes are 30% General occupation are agriculture, labour, service etc Tripuri, Chakama, Devburma and Riang Common language are Tripuri, Chakama, Bangala, Riang Bengali Yes There are non-tribal household approximate H12
Are there industrial units on the village and surrounding and if yes please mention the name	No
What are the general economic activities in the area	Agriculture, daily labour, business, and service are the economic activities in the area
What are the major crops and how many crops you cultivate in a year	Major crop is Paddy, cultivated 1 crop in a year
Do you face any problem regarding current electric supply as far as home connection is concerned	Yes, they have issues with current electric supply, as the supply is not regular and there are power cuts very often and its worse during rainy season due to rain and storm.

Do you think that the project is necessary	Yes, project is necessary as the proposed project can help improve the power supply with developed and sustainable electricity supply even during rainy season.
What are your main concerns/issues about the project	The height of the electric pole should be more because its generally touch the trees, tree cutting should be avoided to protect environment etc. Safety also important.
Can you suggest how best to address your concerns/issues	The height of the electric pole should be more than the existing poles and tree cutting should be avoided.
The project is about rehabilitation of new substation without land acquisition and replacement of 33kv and 11kv distribution lines. While the project will not acquire any land some of the lines may pass through the agriculture field do you have any objection? If yes, then describe	Implementation of project should be done to avoid any loss of crops or acquisition of land. Where people are cultivation in forest and government land in some instances. In case of damage to such property, people should be cash compensation and some livelihood opportunity should be created for the affected people or the area.
Do you expect any kind of compensation If there is loss of land or crops or trees (which is minimal)? In general, no such compensation is paid in Tripura for distribution project because it is for providing better electricity to the people, please suggest your views.	We are expecting cash compensation in case of damage of crops during construction. Livelihood generating activities should be taken care by the Government for our areas as we are very poor people.
If you need compensation, what kind of compensation will you be expecting (cash or kind) in case of land acquisition	we are expecting cash compensation in case of land acquisition of common areas used by the villagers (cultivation in forest and government land) as well as Livelihood for income generation for both men and women.
Specifically what concerns/issues do you have on the implementation of the project with respect to the following Community health and safety Land Agricultural production Cultural Heritage Displacement Loss of income and business Other (Specify)	Community health and safety. Work should be implemented with proper safety norms. Trees should not be cut, crops should not be damaged, common areas used by the community should be avoided. Modern technology should be used at the time of execution of the project.
What positive impacts and/or benefits do you think the project will have	People will get regular electricity supply due to the project which will help their children to get more time to study, will help existing small and medium scale industries to run smoothly, can expand, new opportunities, some business opportunity may come up, irrigation

	system will improve etc. Power cut may not occur during rainy season etc.
What negative impacts do you think the project will have	No negative impact but may be environmental issues like tree cutting, noise and water pollution during construction stage.
Any criteria you would like to be considered for project design, construction, and operation stage?	Safety during construction and operation. High poles, new wires, boundary walls for the sub stations, connecting roads, streetlight near the structure, should not be in residential area for safety of humans and animals.
How long have you been living in this area	More than 100 years
Are there any local NGO or CBOs, if yes then mention the name and nature of work they do	No
Would you support and participate during the implementation of project	Yes, we will support and participate if asked by the Government or required any point of time. This should be implemented faster.
Any other suggestions if any	Old systems should be completely replaced, and good and quality materials should be used.

Sl. No	02
Village	Khas Rang Para Mandwi
Have you heard about the Project or Do you have any information about the project	Kind of fifty: fifty. Some are aware of the project little bit, and some do not have any idea of the project. But none having full idea of the project.
What is your opinion about this Project	Project is good for our society and nearby villages
Do you support this Project	Yes, we will support this project
Are all houses electrified and if yes then what is average hours of electricity per day for domestic consumption	No all house is not electrified, average 15-18 hours power supply
Number of Household population of the village tribal composition	Approximate 85-90 Household Population of the village is approximate 600 Tribal composition only, Devburma, 100%

<p>What is the composition of people in the village</p> <p>Name of the Tribe</p> <p>Name of the Subtribe</p> <p>What is the common language</p> <p>What is the official language</p> <p>Are their non-tribal households if yes name and percentage</p> <p>What is the general occupation</p>	<p>Tribal people are living in this village</p> <p>Devburma</p> <p>Common language is Kokborok and Bengali</p> <p>Bengali is official language</p> <p>No there is not any non-tribal household except 1 Muslim house</p> <p>General occupation is agriculture, labour, service and business</p>
<p>Are there industrial units on the village and surrounding and if yes please mention the name</p>	<p>No</p>
<p>What are the general economic activities in the area</p>	<p>Agriculture, labour, business, and service are economic activities in the area</p>
<p>What are the major crops and how many crops you cultivate in a year</p>	<p>Major crop is Paddy, cultivated 1 crop in a year</p>
<p>Do you face any problem regarding current electric supply as far as home connection is concerned</p>	<p>Power cuts, irregular supply etc.</p>
<p>Do you think that the project is necessary</p>	<p>Yes, project is necessary</p>
<p>What are your main concerns/issues about the project</p>	<p>Issue is about old electric pole and wire which are generally broken down</p>
<p>Can you suggest how best to address your concerns/issues</p>	<p>Change all old pole and wire due to which problem occurs. Safety measures to protect humans and animals from the accident.</p>
<p>The project is about rehabilitation of new substation without land acquisition and replacement of 33kv and 11kv distribution lines. While the project will not acquire any land some of the lines may pass through the agriculture field do you have any objection? if yes, then describe</p>	<p>Implementation of project should be done in off season, so they do not have to face loss of crops due to project and if project done during season than they should give compensation to the loss of crops</p>
<p>Do you expect any kind of compensation If there is loss of land or crops or trees (which is minimal)? In general, no such compensation is paid in Tripura for distribution project because it is for providing better electricity to the people, please suggest your views.</p>	<p>We are expecting cash compensation in case of damage of crops during construction. If government will not pay compensation, then implementation of project should be done in off season</p>
<p>If you need compensation, what kind of compensation will you be expecting (cash or kind) in case of land acquisition</p>	<p>We are expecting cash compensation in case of land acquisition</p>

Specifically what concerns/issues do you have on the implementation of the project with respect to the following Community health and safety Land Agricultural production Cultural Heritage Displacement Loss of income and business Other (Specify)	Both safety and agricultural production.
What positive impacts and/or benefits do you think the project will have	People will get regular electricity supply due to the project
What negative impacts do you think the project will have	No negative impact
Any criteria you would like to be considered for project design, construction, and operation stage?	Safety during construction and operation.
How long have you been living in this area	More than 200 years
Are there any local NGO or CBOs, if yes then mention the name and nature of work they do	No
Would you support and participate during the implementation of project	Yes, we will support
Any other suggestions if any	The work process implementation should be faster. Safety measures should be taken seriously, Villagers should be informed from time to time on the progress.

SI. No	03
Village	College Tilla
Have you heard about the Project or Do you have any information about the project	Yes, some of us have heard about the project, it will be a good project for the area.
What is your opinion about this Project	Project is good for our area after implemented it will help good power supply.
Do you support this Project	Yes, we will support this project whole heartedly.

Are all houses electrified and if yes then what is average hours of electricity per day for domestic consumption	Yes, all houses are electrified, average hours of electricity per day for domestic consumption is 15 to 18 hours
Number of Household population of the village tribal composition	Approximate 1000-1200 Household Population of the area is around 8000 Chakama, Tripuri, Devburma is living here
What is the composition of people in the village Name of the Tribe Name of the Subtribe What is the common language What is the official language Are their non-tribal households if yes name and percentage What is the general occupation	Bengali, Tripuri and Chakma people living in this area Bengali, Kokbarok and English are common language Bengali and English are official language General occupation are service, business, labour
Are there industrial units on the village and surrounding and if yes please mention the name	Yes, agro-based, wood based, rubber, plastic and petrol based industrial units in this area, they are mostly small and medium scale industries. This project will help such industries to expand, and new industry might come here to set up.
What are the general economic activities in the area	General economic activities are service, labour and business, agriculture, forest products, carpentry, small household products for markets etc.
What are the major crops and how many crops you cultivate in a year	Major crop is Paddy, cultivated 1 crop in a year
Do you face any problem regarding current electric supply as far as home connection is concerned	Power supply, power cuts during rainy season and storm etc.
Do you think that the project is necessary	Yes, project is necessary because in rainy season electric poles are broken down due to storm
What are your main concerns/issues about the project	The main issue is about the implementation of project timing because it is college and university area
Can you suggest how best to address your concerns/issues	Work may be done on night to avoid power cutting during daytime.

The project is about rehabilitation of new substation without land acquisition and replacement of 33kv and 11kv distribution lines. While the project will not acquire any land some of the lines may pass through the agriculture field do you have any objection? if yes, then describe	Implementation of project should be done in off season, so they do not have to face loss of crops due to project and if project done during season than they should give compensation to the loss of crops
Do you expect any kind of compensation If there is loss of land or crops or trees (which is minimal)? In general, no such compensation is paid in Tripura for distribution project because it is for providing better electricity to the people, please suggest your views.	Cash compensation.
If you need compensation, what kind of compensation will you be expecting (cash or kind) in case of land acquisition	Cash Compensation.
Specifically what concerns/issues do you have on the implementation of the project with respect to the following Community health and safety Land Agricultural production Cultural Heritage Displacement Loss of income and business Other (Specify)	-
What positive impacts and/or benefits do you think the project will have	Power cut may not be happened during rainy season
What negative impacts do you think the project will have	No negative impact
Any criteria you would like to be considered for project design, construction, and operation stage?	Safety during construction and operation.
How long have you been living in this area	More than 50 years
Are there any local NGO or CBOs, if yes then mention the name and nature of work they do	Do not know
Would you support and participate during the implementation of project	Yes, people will support and participate during the implementation of project
Any other suggestions if any	The work process implements at night-time because in daytime this area is crowded with students

Sl. No	04
Village	Ram Thakar Para
Have you heard about the Project or Do you have any information about the project	Yes, we heard about the project
What is your opinion about this Project	Implementation of this project is very important for this village as well as nearby village
Do you support this Project	Yes, we will support this project
Are all houses electrified and if yes then what is average hours of electricity per day for domestic consumption	Yes, all houses are electrified, average hours of electricity per day for domestic consumption is 15-18 hours
Number of Household population of the village tribal composition	Approximate 350 Household Population of the village is approximate 950-1000 "Mokh" Tribal are living in this village
What is the composition of people in the village Name of the Tribe Name of the Subtribe What is the common language What is the official language Are their non-tribal households if yes name and percentage What is the general occupation	It has 85% Bengali and 15% tribal in this village Name of tribe is Mokh Common and official language is Bangla Yes there is nontribal household approximate 85% General occupation is Agriculture, Business and Service
Are there industrial units on the village and surrounding and if yes please mention the name	Ice cream, Rice mill, LED bulb industrial units on the village and surrounding area
What are the general economic activities in the area	General economic activities are Agriculture, Service, Labour, and Business
What are the major crops and how many crops you cultivate in a year	Major crop is Paddy, cultivated 1 crop in a year
Do you face any problem regarding current electric supply as far as home connection is concerned	Yes, we are facing lots of problem regarding current electric supply as far as home connection is concerned
Do you think that the project is necessary	Yes, project is necessary

What are your main concerns/issues about the project	Main issue is load shedding and in rainy season wires broken down due to Strom
Can you suggest how best to address your concerns/issues	If possible, make it underground or cover the wire
The project is about rehabilitation of new substation without land acquisition and replacement of 33kv and 11kv distribution lines. While the project will not acquire any land some of the lines may pass through the agriculture field do you have any objection? if yes, then describe	Implementation of project should be done in off season, so they do not have to face loss of crops due to project and if project done during season than they should give compensation to the loss of crops
Do you expect any kind of compensation If there is loss of land or crops or trees (which is minimal)? In general, no such compensation is paid in Tripura for distribution project because it is for providing better electricity to the people, please suggest your views.	No, we do not expect any kind of compensation because no crops will damage in this area
If you need compensation, what kind of compensation will you be expecting (cash or kind) in case of land acquisition	We are expecting cash compensation in case of land acquisition
Specifically what concerns/issues do you have on the implementation of the project with respect to the following Community health and safety Land Agricultural production Cultural Heritage Displacement Loss of income and business Other (Specify)	Community health and safety. Work should be implemented with proper safety norms.
What positive impacts and/or benefits do you think the project will have	Due to implementation of project power cut may decrease
What negative impacts do you think the project will have	Some trees may be cut due to this project which will harm our environment
Any criteria you would like to be considered for project design, construction and operation stage?	If possible, make it underground because there is lots of plantation in our area, which might get damaged due to poles and wires
How long have you been living in this area	More than 150 years

Are there any local NGO or CBOs, if yes then mention the name and nature of work they do	Yes, there is NGO or CBO name "TRML" block base is working they provide small loan to women
Would you support and participate during the implementation of project	Yes, people will support and participate during the implementation of project
Any other suggestions if any	Poor tribals who can't pay the electricity bills should be provided free supply.

SI. No	05
Village	Kailasahar
Have you heard about the Project or Do you have any information about the project	Few people heard about the project.
What is your opinion about this Project	People believe that it will improve the power supply in the area
Do you support this Project	Yes, we will support this project
Are all houses electrified and if yes then what is average hours of electricity per day for domestic consumption	Yes, all houses are electrified, average house of electricity per day for domestic consumption is 18-20 hours
Number of Household population of the village tribal composition	2000-2500 Household Population is around 1 lac 30%- Riang, Debburma, Dalang, Khasia, Jamatiya
What is the composition of people in the village Name of the Tribe Name of the Subtribe What is the common language What is the official language Are their non-tribal households if yes name and percentage What is the general occupation	40% Muslim Common language- Kokburok, Bengali, Hindi, English General Occupation is Agriculture, Labour, Business and service
Are there industrial units on the village and surrounding and if yes please mention the name	No

What are the general economic activities in the area	Agriculture, labour, business and service are economic activities in the area
What are the major crops and how many crops you cultivate in a year	Major crop is Paddy, cultivated 1 crop in a year
Do you face any problem regarding current electric supply as far as home connection is concerned	Yes, having problem during rainy season, too much power cut during that time
Do you think that the project is necessary	Yes, project is necessary due to this power cut will improve during summer and rainy season
What are your main concerns/issues about the project	No issue
Can you suggest how best to address your concerns/issues	Change all old pole and wire due to which problem occurs.
The project is about rehabilitation of new substation without land acquisition and replacement of 33kv and 11kv distribution lines. While the project will not acquire any land some of the lines may pass through the agriculture field do you have any objection? if yes, then describe	Implementation of project should be done in off season, so they do not have to face loss of crops due to project and if project done during season than they should give compensation to the loss of crops
Do you expect any kind of compensation If there is loss of land or crops or trees (which is minimal)? In general, no such compensation is paid in Tripura for distribution project because it is for providing better electricity to the people, please suggest your views.	We are expecting cash compensation in case of damage of crops during construction. If government will not pay compensation, then implementation of project should be done in off season
If you need compensation, what kind of compensation will you be expecting (cash or kind) in case of land acquisition	We are expecting cash compensation in case of land acquisition
Specifically what concerns/issues do you have on the implementation of the project with respect to the following Community health and safety Land Agricultural production Cultural Heritage Displacement Loss of income and business Other (Specify)	Both safety and agricultural production.
What positive impacts and/or benefits do you think the project will have	Students will be able to study properly and able to concentrate more, if there is no power cut during summer, rainy season and in nights, drinking water facility will be available to all without power cut
What negative impacts do you think the project will have	No negative impact

Any criteria you would like to be considered for project design, construction, and operation stage?	Approach road with streetlight to meet emergencies, proper fencing for safety and security for humans and animals.
How long have you been living in this area	More than 150 years
Are there any local NGO or CBOs, if yes then mention the name and nature of work they do	Yes, there is NGO like Pushpraaj Club- work for public welfare, during corona pandemic they provide ambulance assistance to needful Reliance Club- Provide medical help to the needful
Would you support and participate during the implementation of project	Yes, people will support and participate during the implementation of project
Any other suggestions if any	Implementation of project should be done without damaging of crops

Sl. No	06
Village	Rangrung
Have you heard about the Project or Do you have any information about the project	Few people heard about the project.
What is your opinion about this Project	In favour of the project, people believe it will improve the capacity of the substation and power supply in the village
Do you support this Project	Yes, we will support this project
Are all houses electrified and if yes then what is average hours of electricity per day for domestic consumption	98% houses are electrified and average hours of electricity per day for domestic consumption is 18-20 hours
Number of Household population of the village tribal composition	700-800 Household 2000-2500 Population
What is the composition of people in the village Name of the Tribe Name of the Subtribe What is the common language What is the official language Are their non-tribal households if yes name and percentage What is the general occupation	Name of tribe Munda, Soutal, Urang Common language is Bengali Official language is Bengali
Are there industrial units on the village and surrounding and if yes please mention the name	It is a Tea Estate area and maximum people work in this estate
What are the general economic activities in the area	It is a Tea Estate area and maximum people work in this estate

What are the major crops and how many crops you cultivate in a year	Major crop is Paddy, cultivated 1 crop in a year
Do you face any problem regarding current electric supply as far as home connection is concerned	They are having issue with the bill but having no issue with the current electric supply as far as home connection is concerned
Do you think that the project is necessary	Yes, it will upgrade the substation and it will decrease the chances of accident with kids and animal near the substation
What are your main concerns/issues about the project	No issue
Can you suggest how best to address your concerns/issues	-
The project is about rehabilitation of new substation without land acquisition and replacement of 33kv and 11kv distribution lines. While the project will not acquire any land some of the lines may pass through the agriculture field do you have any objection? if yes, then describe	Implementation of project should be done in off season, so they do not have to face loss of crops due to project and if project done during season than they should give compensation to the loss of crops
Do you expect any kind of compensation If there is loss of land or crops or trees (which is minimal)? In general, no such compensation is paid in Tripura for distribution project because it is for providing better electricity to the people, please suggest your views.	We are expecting cash compensation in case of damage of crops during construction. If government will not pay compensation, then implementation of project should be done in off season
If you need compensation, what kind of compensation will you be expecting (cash or kind) in case of land acquisition	We are expecting cash compensation in case of land acquisition
Specifically what concerns/issues do you have on the implementation of the project with respect to the following Community health and safety Land Agricultural production Cultural Heritage Displacement Loss of income and business Other (Specify)	Both safety and agricultural production.
What positive impacts and/or benefits do you think the project will have	Due to implementation of project power cut may decrease
What negative impacts do you think the project will have	No negative impact

Any criteria you would like to be considered for project design, construction, and operation stage?	Project should be implemented during off season, that will not impact the crops
How long have you been living in this area	More than 150 years
Are there any local NGO or CBOs, if yes then mention the name and nature of work they do	No
Would you support and participate during the implementation of project	Yes, people will support and participate during the implementation of project
Any other suggestions if any	At present substation has no boundary wall due to which animals get near to the transformer and got killed, if boundary wall will be built around the substation than these misshaping will not occur in future

Sl. No	07
Village	East Chandigarh
Have you heard about the Project or Do you have any information about the project	Yes, we heard about the project
What is your opinion about this Project	In favour of the project, people believe it will improve the capacity of the substation and power supply in the village
Do you support this Project	Yes, we will support this project
Are all houses electrified and if yes then what is average hours of electricity per day for domestic consumption	98% houses are electrified and average hours of electricity per day for domestic consumption is 18-20 hours
Number of Household population of the village tribal composition	Approximate 15000 Household Approximate 40000 Population
What is the composition of people in the village Name of the Tribe Name of the Subtribe What is the common language What is the official language Are their non-tribal households if yes name and percentage What is the general occupation	Name of tribe Tripuri, Murasing, Notaia, Debburma Common language Kokburok, Bengali Official language Bengali
Are there industrial units on the village and surrounding and if yes please mention the name	Mineral water, tiles and handicraft industrial units on the village and surrounding area

What are the general economic activities in the area	Agriculture, labour, business, and service are economic activities in the area
What are the major crops and how many crops you cultivate in a year	Major crop is Paddy, cultivated 1 crop in a year
Do you face any problem regarding current electric supply as far as home connection is concerned	No
Do you think that the project is necessary	Yes, project is necessary due to this power cut will improve during summer and rainy season
What are your main concerns/issues about the project	No issue
Can you suggest how best to address your concerns/issues	Change all old pole and wire due to which problem occurs.
The project is about rehabilitation of new substation without land acquisition and replacement of 33kv and 11kv distribution lines. While the project will not acquire any land some of the lines may pass through the agriculture field do you have any objection? if yes, then describe	Implementation of project should be done in off season, so they do not have to face loss of crops due to project and if project done during season than they should give compensation to the loss of crops
Do you expect any kind of compensation If there is loss of land or crops or trees (which is minimal)? In general, no such compensation is paid in Tripura for distribution project because it is for providing better electricity to the people, please suggest your views.	We are expecting cash compensation in case of damage of crops during construction. If government will not pay compensation, then implementation of project should be done in off season
If you need compensation, what kind of compensation will you be expecting (cash or kind) in case of land acquisition	We are expecting cash compensation in case of land acquisition
Specifically what concerns/issues do you have on the implementation of the project with respect to the following Community health and safety Land Agricultural production Cultural Heritage Displacement Loss of income and business Other (Specify)	Both safety and agricultural production.
What positive impacts and/or benefits do you think the project will have	Power cut may not be happened during rainy season

What negative impacts do you think the project will have	No negative impact
Any criteria you would like to be considered for project design, construction, and operation stage?	Project should be implemented during off season, that will not impact the crops
How long have you been living in this area	More than 200 years
Are there any local NGO or CBOs, if yes then mention the name and nature of work they do	No
Would you support and participate during the implementation of project	Yes, people will support and participate during the implementation of project
Any other suggestions if any	Implementation of project should be done without damaging of crops

SI. No	08
Village	Rajnagar
Have you heard about the Project or Do you have any information about the project	Yes, we heard about the project
What is your opinion about this Project	In favour of the project, people believe it will improve the capacity of the substation and power supply in the village
Do you support this Project	Yes, we will support this project
Are all houses electrified and if yes then what is average hours of electricity per day for domestic consumption	95% houses are electrified and average hours of electricity per day for domestic consumption is 18-20 hours
Number of Household population of the village tribal composition	
What is the composition of people in the village Name of the Tribe Name of the Subtribe What is the common language What is the official language Are their non-tribal households if yes name and percentage What is the general occupation	Composition - 20% General, 80% OBC Name of tribe Mog, Reiang, Tripuri, Munda, Debburma Common language- Bengali Official language- Bengali
Are there industrial units on the village and surrounding and if yes please mention the name	Rice mill, Ice cream, Brick factory and small welding units on the village and surrounding area

What are the general economic activities in the area	Agriculture, labour, business and service are economic activities in the area
What are the major crops and how many crops you cultivate in a year	Major crop is Paddy, and it is cultivated during rainy season only
Do you face any problem regarding current electric supply as far as home connection is concerned	No
Do you think that the project is necessary	Yes, project is necessary due to this power cut will improve during summer and rainy season
What are your main concerns/issues about the project	No issue
Can you suggest how best to address your concerns/issues	Change all old pole and wire due to which problem occurs.
The project is about rehabilitation of new substation without land acquisition and replacement of 33kv and 11kv distribution lines. While the project will not acquire any land some of the lines may pass through the agriculture field do you have any objection? if yes, then describe	Implementation of project should be done in off season, so they do not have to face loss of crops due to project and if project done during season than they should give compensation to the loss of crops
Do you expect any kind of compensation If there is loss of land or crops or trees (which is minimal)? In general, no such compensation is paid in Tripura for distribution project because it is for providing better electricity to the people, please suggest your views.	We are expecting cash compensation in case of damage of crops during construction. If government will not pay compensation, then implementation of project should be done in off season
If you need compensation, what kind of compensation will you be expecting (cash or kind) in case of land acquisition	we are expecting cash compensation in case of land acquisition
Specifically what concerns/issues do you have on the implementation of the project with respect to the following Community health and safety Land Agricultural production Cultural Heritage Displacement Loss of income and business Other (Specify)	Both safety and agricultural production.
What positive impacts and/or benefits do you think the project will have	It will improve the day to day domestic and business activities

What negative impacts do you think the project will have	No negative impact
Any criteria you would like to be considered for project design, construction and operation stage?	Project should be implemented during off season, that will not impact the crops
How long have you been living in this area	Since 1960
Are there any local NGO or CBOs, if yes then mention the name and nature of work they do	SHG working Jai baba Lok Nath
Would you support and participate during the implementation of project	Yes, people will support and participate during the implementation of project
Any other suggestions if any	Implementation of project should be done without damaging of crops

Source: ADB TA Consultant

PARTICIPANTS DETAILS – Non TTAADC Areas

SI.No	Name	Age	Sex	Education	Occupation
Name of Village- Chaumanu					
1	Subhankar Chakama	45	M	Secondary	Service
2	Renu Da Tripura	34	M	Secondary	Service
3	TustaRam Reang	40	M	Metric	Service
4	Chandra Kishor Tripura	35	M	Graduate	Service
Name of Village- Khasrang para Mandwi					
1	Sanjib Debburam	36	M		Service
2	Vikash Debburma	42	M		Labour
3	Dilip Debburama	35	M		Labour
4	Samir Debburama	40	M		Operator
5	Samir Debburama	35	M		Labour
Name of Village- College Tilla					
1	Biswajeet Saha	41	M	Metric	Service
2	Nirmal Chandra Deb	54	M	Secondary	Service
3	Bishu Debburma	47	M	Metric	Service
4	Gopal Dhanuk	35	M	Secondary	Service

Sl.No	Name	Age	Sex	Education	Occupation
5	Hiralal Munda	53	M	Secondary	Service
6	Sanju Rupini	34	M	Secondary	Service
Name of Village-Ram Thakur Para Jolaibari					
1	Rajib Pal	34	M	Higher Secondary	Driver
2	Subrata Biswas	38	M	Graduate	Teacher
3	Dipak Kantisarkar	57	M	Metric	Contractor
4	Minti Mamo	48	F	Middle	Housewife
5	Gita Nama	59	F	Middle	Housewife
6	Sita Pal	64	F	Secondary	Housewife
Name of Village-Kailasahar					
1	Utpal Choudhary	48	M	BA	Contractor
2	Sriniwas Pal	46	M	Metric	Business
3	Jayeshwar Malakar	51	M	Metric	Labour
4	Rajat Kalidas	42	M	Secondary	Business
5	Makan Debburma	56	M	Middle	Labour
6	Tonu Babu Singh	61	M	Middle	Labour
Name of Village-Rangrung					
1	Sudarshan Sonar	32	M	Middle	Shop
2	Rajesh Ravidas	30	M	Middle	Shop
3	Vimal Ravidas	28	M	Middle	Shop
4	Bisan Ram	29	M	Middle	Labour
5	Prem	45	M	Middle	Labour
6	Dipanshu Singha	31	M	BCA	Technical Job
Name of Village- East Chandigarh					
1	Kishor Devburma	41	M	Middle	Shop
2	Sapan Debnath	18	M	Middle	Shop
3	Dipankar Debnath	32	M	Metric	Shop
Name of Village- Rajnagar					
1	Subash Singh	35	M	Middle	Electrician
2	Sapan Burman	39	M	Metric	Electrician

Sl.No	Name	Age	Sex	Education	Occupation
3	Parikhet Malik	64	M	Primary	Labour
Name of Village - Ashabari, ESD Boxarnagar					
1	Rajib Debbarma	34	M	Secondary	Village Council Chairman
2	Rangin Das	80	F	Metric	Housewife
3	Dipa Das	29	F	Metric	Housewife
4	Sumita Das	31	F	Metric	Housewife
5	Anil Ch Das	42	M	Metric	Farmer
Name of town/area - Kheyerpur					
1	Manu Dey	37	M	Graduate	Shop
2	Sekher Ghosh	51	M	Secondary	Shop
3	B. Ghosh	31	F	Graduate	Housewife
4	G.Ghosh	71	F	Metric	Housewife
5	Archana Dey	31	F	Graduate	Housewife
6	Sima Dey	21	F	Secondary	Housewife
7	Deep Das	38	M	Metric	Shop
8	Jatin Das	46	M	Secondary	Shop
Name of Town/Area – Dashimighat/Golchakkar					
1	Nepu Pal	56	M	Metric	Shop
2	Rajaram Choudhury	50	M	Metric	Shop
3	Sukumari Pal	31	F	Secondary	Shop/housewife
4	Suman Pal	35	M	Secondary	Shop
Name of town/area: Motinagar, Sekherkote					
1	Rippon Mian	44	M	Metric	Shop
2	Qurban Mian	38	M	Metric	Shop
3	Litton Bhula	46	M	Secondary	Carpenter
4	Toliram Ranjan	51	M	Metric	Shop
5	Dulal Mian	45	M	Metric	Rice Mill
6	Tazu Mian	50	M	Metric	Rice Mill
7	Ganjum Mian	46	M	Metric	Shop
8	Abdul Haque	50	M	Secondary	Shop

Sl.No	Name	Age	Sex	Education	Occupation
Name of town/area: Gokulnagar					
1	Mrinal Sen	55	M	Secondary	Shop
2	Swapna Sen	49	F	Secondary	Housewife
3	Manish Sen	43	M	Graduate	Shop
4	Pushparani Barik	52	F	Metric	Housewife
5	Kamallal Barik	60	M	Secondary	Service
6	Prantosh Roy	45	M	Graduate	Unemployed
7	Akhil Dey	29	M	Graduate	Unemployed
8	Shayam Sil	31	M	Secondary	Carpenter
9	Sorojit Sen	34	M	Secondary	Unemployed
10	Mukesh Mian	67	M	Secondary	Car repair
11	Aniruddha Bhowmik	34	M	Metric	Shop
12	Liton Bhowmik	42	M	Graduate	Factory worker
13	Apu Saha	27	M	Secondary	Driver
14	Sushanta Sarkar	44	M	Metric	Shop
15	Sunil Chnadra Debbnath	36	M	Secondary	Shop
16	Himangshu Sil	40	M	Secondary	TSR Staff
17	Bisha Nolfar	43	M	Secondary	TSR Staff
18	Uttam Debnath	34	M	Graduate	Shop

Source: ADB TA Consultant

CONSULTATION DETAILS IN TTAADC VILLAGES (DISTRIBUTION COMPONENTS)

Sl. No	1
Village	Manu
Have you heard about the Project or Do you have any information about the project	Few people of our locality having little information that a new Sub-Station with new transformer will be installed here.
What is your opinion about this Project	We believe that after the upgradation of substation power supply will be improved and load shedding will decrease. That will improve the day-to-day life of local people
Do you support this Project	Yes, most of the people in the village will support the project
Please tell details of various ethnic people Name of the Scheduled Tribe Name of the Subtribe What is the common language What is the official language Are their non-tribal households if yes name and percentage What is the general occupation	Name of tribe- Debburma, Reang, Tripura, Chakma, Marak, Kolai, Rupini, Jamatia, Darlong Common language- Bangali, Reang, Tripuri, Chakma, Marak garo, Kolai, Rupini, Jamatia, Kuki/ Mizo Offical language- Bengali
What is the general economic activities in the area	General Economic activities are agriculture, daily labour and service
What are the major crops and how many crops you cultivate in a year	Major crop is Paddy and cultivated twice in a year
Do people use the state and forest land for their use and if yes then what kind of use	Yes, people use forest land for firewood and other non-timber products.
DO you depend on the forest for your basic livelihood and other needs	Yes, some villagers depend for their livelihood by selling firewood's and other non-timber products.
Do you have access to forest	Yes
What are your main concerns/issues about the project regarding electricity	This will improve regular power supply, stop load shedding, stop power cuts etc.
Can you suggest how best to address your concerns/issues	Capacity of the transformers should be increased for better power supply. Electric poles heigh should be increased. Locals should get some work in this project.
Would you volunteer and provide consent to the project	Yes, we volunteer to provide consent to the project and will support the project. It is good for the locality.

Do you expect any kind of compensation If there is loss to crops which is temporary	Yes, we are expecting cash compensation if there is loss to crops, damage to any other assets, commonly used areas etc. Also, if livelihood opportunity can be supported, it will be blessings for poor tribals like us.
If you need compensation, what kind of compensation will you be expecting (cash or kind) in case of land restrictions	Cash compensation for both loss of crops and land. That will be better for us. For future, livelihood support required from the implementing agencies.
Specifically what concerns/issues do you have on the implementation of the project with respect to the following Community health and safety Land Agricultural production Cultural Heritage Displacement Loss of income and business Other (Specify)	Might affect our agricultural activities during the implementation of the project. Safety for animals and children, Protect our commonly used area, Loss of trees maybe,
What positive impacts and/or benefits do you think the project will have	Regular power supply will help improve whatever irrigation facility we have; it will help children who are student to give more time to study. Will encourage to set up small businesses.
What negative impacts do you think the project will have	We do not see any such negative impact, but there might be tree cutting which is not good for us.
Any criteria you would like to be considered for project design	Safety of human and animal should be taken into consideration while designing to minimize accidents. Tree cutting should be avoided.
How long have you been living in this area	More than 150 years
Are there any local NGO or CBOs, if yes then mention the name and nature of work they do	NGO- Longthorai Foundation, Pragydhulai, do help in during natural calamity
Access to the forest land and the use of the forest land(if any)	Yes, having access to forest land for wood and animal fodder, firewood collection, agricultural activities etc.
Shortage of water for human consumption, irrigation and how extensive are they?	Yes, there is a shortage of drinking water in our locality, few handpump and tube well available in the field. Moderate
Have you been consulted before	No, it is the first-time consultation held with the village people regarding upgradation of substation

Is the consultation useful	Yes, people believe that these consultations help to understand what electric department is doing for the improvement of village people day to day life
Would you support the project	Yes, people do support the project
Other suggestions if any	Upgradation of substation should be done on immediate basis which will improve the power supply

Sl. No	02
Village	Takarjala
Have you heard about the Project or Do you have any information about the project	Yes, we have heard about this project
What is your opinion about this Project	People believe that after the installation of the new structure of the substation, power supply will be better which might help decrease load shedding. That will be great help for the local people.
Do you support this Project	Yes, we will support the project
Please tell details of various ethnic people Name of the Scheduled Tribe Name of the Subtribe What is the common language What is the official language Are their non-tribal households if yes name and percentage What is the general occupation	Debburma 100% Common language- Bengali Official language- Bengali
What are the general economic activities in the area	General Economic activities are Agriculture, daily labour, and service
What are the major crops and how many crops you cultivate in a year	Major crop is Paddy and cultivated once in a year
Do people use the state and forest land for their use and if yes then what kind of use	Yes, people use forest land for firewood and other non-timber products.
DO you depend on the forest for your basic livelihood and other needs	Yes, some villagers depend for their livelihood by selling firewood and other non-timber products.
Do you have access to forest	Yes
What are your main concerns/issues about the project regarding electricity	This will improve regular power supply

Can you suggest how best to address your concerns/issues	Capacity of the transformers should be increased for better power supply.
Would you volunteer and provide consent to the project	Yes, we volunteer to provide consent to the project
Do you expect any kind of compensation If there is loss to crops which is temporary	Yes, we are expecting cash compensation if there is loss to crops
If you need compensation, what kind of compensation will you be expecting (cash or kind) in case of land restrictions	Cash compensation for both loss of crops and land. That will be better for us.
Specifically what concerns/issues do you have on the implementation of the project with respect to the following Community health and safety Land Agricultural production Cultural Heritage Displacement Loss of income and business Other (Specify)	Might affect our agricultural activities during the implementation of the project.
What positive impacts and/or benefits do you think the project will have	Regular power supply will help improve whatever irrigation facility we have, it will help children who are student to give more time to study, will help small businessman also.
What negative impacts do you think the project will have	It might affect free movement of our domestic animals.
Any criteria you would like to be considered for project design	Safety of human and animal should be taken into consideration while designing to minimize accidents.
How long have you been living in this area	More than 300 years
Are there any local NGO or CBOs, if yes then mention the name and nature of work they do	NGO- Radiant Club do social work SHGs- Help in piggery, goat rearing, fishing and trading
Access to the forest land and the use of the forest land (if any)	Yes, having access to forest land for wood and animal fodder
Shortage of water for human consumption, irrigation and how extensive are they?	Yes, shortage of water for drinking and irrigation. Moderate
Have you been consulted before	No

Is the consultation useful	Yes, this is useful and at the same time regular information and development should be shared on the proposed project to educate them.
Would you support the project	Yes, people do support the project
Other suggestions if any	Upgradation of substation should be done on immediate basis which will improve the power supply

Sl. No	03
Village	Damcherra
Have you heard about the Project or Do you have any information about the project	Yes, we have heard about this project
What is your opinion about this Project	If project will be implemented, will be blessings for us and it will help our area.
Do you support this Project	Yes, we will support the project
Please tell details of various ethnic people Name of the Scheduled Tribe Name of the Subtribe What is the common language What is the official language Are their non-tribal households if yes name and percentage What is the general occupation	30% non-tribal households Name of tribe- Reang, Mag, Rupini, Halam, Dalang, Debburama, Marak Official language- Bangala
What are the general economic activities in the area	General economic activities are agriculture, daily labour, service, and business
What are the major crops and how many crops you cultivate in a year	Major crop is Paddy and cultivated twice in a year
Do people use the state and forest land for their use and if yes then what kind of use	Yes, people use forest land for firewood, other non-timber products and cultivation in some area as well.
DO you depend on the forest for your basic livelihood and other needs	Yes, some villagers depend for their livelihood by selling firewood's and other non-timber products.
Do you have access to forest	Yes

What are your main concerns/issues about the project regarding electricity	This will improve regular power supply
Can you suggest how best to address your concerns/issues	Proper care should be taken in hilly areas to put strong poles to avoid mishaps.
Would you volunteer and provide consent to the project	Yes, we volunteer to provide consent to the project
Do you expect any kind of compensation If there is loss to crops which is temporary	Yes, we are expecting cash compensation if there is loss to crops
If you need compensation, what kind of compensation will you be expecting (cash or kind) in case of land restrictions	Cash compensation for both loss of crops and land. That will be better for us.
Specifically what concerns/issues do you have on the implementation of the project with respect to the following Community health and safety Land Agricultural production Cultural Heritage Displacement Loss of income and business Other (Specify)	Might affect our agricultural activities during the implementation of the project.
What positive impacts and/or benefits do you think the project will have	Regular power supply will help improve whatever irrigation facility we have; it will help children who are student to give more time to study.
What negative impacts do you think the project will have	Some of us may lose our agricultural land and residential land.
Any criteria you would like to be considered for project design	Tower or pole height should be more
How long have you been living in this area	More than 100 years
Are there any local NGO or CBOs, if yes then mention the name and nature of work they do	Yes, CBOs is available in this area and SHGs group for ladies
Access to the forest land and the use of the forest land (if any)	Yes, having access to forest land for wood and animal fodder
Shortage of water for human consumption, irrigation and how extensive are they?	Yes, shortage of water for human consumption. Moderate

Have you been consulted before	No
Is the consultation useful	Yes
Would you support the project	Yes, people do support the project
Other suggestions if any	There is waterlogged in the substation area due to which people face problem to submit bill in the rainy season

Source: ADB TA Consultant

LIST OF PARTICIPANTS

	Name	Age	Sex	Education	Occupation
Name of Village- Manu					
1	Prashant Nandi	35	M	Metric	Shop
2	Dhruv Burva	25	M	Metric	Business
3	Sapana Rai	47	F	Middle	Service
4	Jeven Majumdar	45	M	Metric	Contractor
5	Alok Paul	32	M	Graduate	Job
6	Ansh Majumdar	37	M	Middle	Driver
Name of Village- Takarjala					
1	Sukhdev Debburma	40	M	Metric	Agriculture
2	Sambhuram Debburma	45	M	Metric	Agriculture
3	Bishnu Kumar Debburma	51	M	Metric	Service
Name of Village- Damcherra					
1	Sukhamani Singh	44	M	Secondary	Business
2	Vimal Sinha	37	M	Middle	Driver
3	R k Shil	40	M	Metric	Service
4	Yasin Ali	30	M	Madarsa	Labour
5	Satyajit Sinha	50	M	Metric	Driver
6	Gourmohan Sinha	63	M	Middle	Chairman
7	Asgar Ali	65	M	Illiterate	Labour
8	Shyamal Sinha	56	M	Secondary	Business
9	Devendro Sinha	54	M	Metric	Labour
10	Prabhat Sinha	49	M	Metric	Contractor
11	Dipankar Nath	32	M	ITI	Service
12	Porenjoy Reang	35	M	Metric	Government job
Name of Village: Baludhumpara					
1	Chikanmala Debbarma	32	F	Metric	Shop
2	Pradip Debbarma	30	M	Metric	Shop
3	Swapan Debbarma	32	M	Metric	Unemployed
4	Sunil Debbarma	37	M	Metric	Shop
5	Uparai Debbbarma	19	F	Metric	Housewife
6	Golapi Debbbarma	21	F	Metric	Housewife
7	Manu Debbbarma	42	F	Secondary	Housewife
8	Rinku Debbbarma	28	F	Metric	Housewife
Name of Village: Sakimura					
1	Sudhinu Debbbarma	72	M	Metric	Unemployed/retired
2	Subichandra Debbbarma	45	M	Metric	Farmer
3	Subodh Debbbarma	28	M	metric	Bamboo crafts supply
4	Budhuni Debbbarma	31	F	Metric	Housewife
5	Dhanchari Debbbarma	37	F	Metric	Housewife

	Name	Age	Sex	Education	Occupation
6	Phulwari Debbbarma	40	F	Metric	Housewife
7	Suklarani Debbbarma	40	F	Metric	Housewife
8	Nagendar Debbbarma	27	M	Metric	Shop
Name of village: Chittamura					
1	Sanjib Dutta	66	M	Secondary	Shop
2	Prakash Kr Dutta	40	M	Graduate	Shop
3	Manoj Singh	35	M	Metric	Migrant worker in Brick field
Name of Village: Damchara/Ananda Nagar					
1	Swapan Debbbarma	32	M		Unemployed
2	Mita Merak	47	F		Shop
3	Rati Debbbarma	59	M		Farmer
4	Pulmani Debbbarma	43	F		Housewife
Name of Village: Asharampur/Ramharipara, Dayarampara					
1	Suklaxmi Debbbarma	30	F	Secondary	Anganwari/health worker
2	Biroza Debbbarma	59	F	Metric	Farmer
3	Rupom Debbbarma	30	F	Secondary	TSR staff
4	Suribda Debbbarma	29	F	Secondary	TSR staff
5	Sanjib Debbbarma	44	M	Metric	Farmer
6	Parija Debbbarma	32	F	Metric	Housewife
Name of Village: Poangbari					
1	Mukunda Debbbarma	70	M	Metric	Farmer
2	Bapi Dey Sarkar	45	M	Metric	Shop
3	Dhananjoy Tripura	28	M	Secondary	Unemployed
4	Pintu Debbbarma	37	M	Secondary	Unemployed
5	Tanmoy Ghosh	39	M	Secondary	Shop
6	Dolon Dutta	28	M	Metric	Unemployed
7	Tapas Dey	45	M	Metric	Factory worker
8	Anjana Debbbarma	39	F	Metric	Housewife

Source: ADB TA Consultant

Consultation Photolog Non-Tribal Villages



Source: ADB TA Consultant



Source: ADB TA Consultant



Jolaibari SS
Source: ADB TA Consultant

Consultation Photolog-Tribal Villages



Source: ADB TA consultant

Sample filled in consultation form

Teguna Power Integration Project
Consultation Form for Local Communities

PERSONAL DETAILS

- Date: 16/05/2011
- Name of the Respondent: Rikunant Solva
- Phone Number of Respondent: 9862740397
- Municipality / Rural Municipality of Respondent's Residence: Lallega Tillya
- Residence close to SS or DL component: SS
- Age of Respondent:
Under 18 16-55 Over 55
- Gender of Respondent:
Female Male Others
- Main Livelihood (Occupation): Service
- Secondary Livelihoods: Less Agriculture
- Ethnic Group:
- Caste: B.C.
- Religion: Hindu
- Main Language: Bhojpur
- Other Languages: -
- Number of family members living under the same roof (as a single household):
Male: 3, Female: 2

13. Do you or any of your family members fall into any of the following vulnerable groups?

Potentially Vulnerable Group	Remarks (numbers and relationship)
Female Headed Household	<input checked="" type="checkbox"/>
Below Poverty Line	<input checked="" type="checkbox"/>
Indigenous Peoples	<input checked="" type="checkbox"/>
Children	<input checked="" type="checkbox"/> 1
Elderly	<input checked="" type="checkbox"/> 1
Illiterate	<input checked="" type="checkbox"/>
Persons with Disabilities	<input checked="" type="checkbox"/>

14. How is Your and Your Family Members Underlying Health?
Very Poor Poor Good Very Good
Elaborate on Health Conditions/Diseases Currently Suffered or Suffered in the last year, if any

15. Awareness of the Project Prior to this Consultation:
Not At All Aware Slightly Aware Very Aware

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LAND USE, LIVELIHOODS, AND SENSITIVE COMMUNITY RECEPTORS

16. Where is your Residence and/or land located in relation to the following project locations:

	Residence	Land/Cropland/Shop/Office, etc.	Remarks
In the vicinity of the Distribution line ROWs (within 50m)			
In the vicinity of the SE (within 50m)			
None of the above (Please specify)			

17. Are you Concerned about Land Use being Adversely Impacted By The Project?

Yes No Don't Know

If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider Mitigating Impacts, noting that compensation will be paid for land acquisition and resettlement.

18. Accidental property damage during construction works of DL (SE) – houses, shops, school, other infrastructures

Yes No Don't Know

If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider to Mitigate Impacts.

19. Are you aware of any sensitive community receptors that may be directly or indirectly adversely impacted by the project, please identify their location on map provided wherever possible

Receptor		Remarks Potential Impact/Suggested Mitigation
Agricultural land	<input checked="" type="checkbox"/>	
Forest/Wildlife	<input type="checkbox"/>	
School	<input checked="" type="checkbox"/>	
Clinic, Health Center, or Hospital	<input type="checkbox"/>	
Religious Building	<input checked="" type="checkbox"/>	
Irrigation channel	<input checked="" type="checkbox"/>	
Groundwater well	<input checked="" type="checkbox"/>	
Road	<input checked="" type="checkbox"/>	
Other <i>College</i>	<input checked="" type="checkbox"/>	<i>2. or 100m</i>

¹ Under Land Use Consider Damage to Crops, Structures, Trees etc. but also Landscape/Visual Impacts.

BIODIVERSITY

20. Are you aware of any legally protected areas or other sensitive ecological habitat that may be directly or indirectly adversely impacted by the project. please identify their location on map provided whenever possible

Legally Protected Area or Sensitive Ecological Habitat/KBA/IBA/Wildlife Movement/Active area	Location	Remarks Potential Impact/ Suggested Mitigation

21. Is any biodiversity* supported by the local area of social, economic, or cultural importance to your local community (e.g. fisheries, forests) used for personal consumption (heating, cooking, food, medicinal, religious) or commercial purposes?
 Yes No Don't Know
 If yes, please elaborate:

22. With reference to the IBCO guide provided, are you aware of any of these threatened, endemic or migratory species being present in the surrounding area?
 Yes No Don't Know
 If yes, please elaborate on species, season, and other factors including locations.

Species	Season Observed	When sites/heard about	Siting area	Any conflicts/ observations

23. Are you aware of any wildlife impacts associated with existing operation of the SS and DL, e.g. elephant, bird or bat electrocution or collision?
 Yes No Don't Know
 If yes, please elaborate:

24. Are you Concerned about Wild Animals and Plants being Adversely Impacted by The Project?
 Yes No Don't Know
 If yes, Identify Habitats or Species of Concern and Suggest Measures the Project Can Consider Mitigating Impacts:

* Wild animals or wild (not cultivated) plants including trees/timber within the surrounding area

Habitat or Species	Remarks Potential Impact/Suggested Mitigation
Mango, Subul	

PHYSICAL CULTURAL RESOURCES

25. Are you Concerned about Physical Cultural Resources being Adversely Impacted By The Project?

Yes No Don't Know

26. Are you aware of any Physical Cultural Resources of either national or local importance (e.g. temples, shrines, religious forests, sacred groves or trees, cremation places etc.) that may be directly or indirectly adversely impacted by the Project; please identify their location on map provided whenever possible?

Name of Physical Cultural Resource	Location	Remarks Potential Impact/ Suggested Mitigation
Not any		

HUMAN ENVIRONMENT

27. Are you aware of any of the following having occurred in the local area?

Earthquakes Landslides Storms
 Flooding Drought None Don't Know

28. Do You Believe that TSECL has Met National Regulations for the operation of its existing SS and DL lines? If No, please elaborate and provide suggestions for improvement?

yes

29. Are you aware of any incidents/human fatalities having occurred due to operation of TSECL's existing SS and DL lines? If yes, please elaborate?

NO

30. Are you aware that, if not well managed, there may be community safety risks associated with operation of the SS and DL?

Yes No Don't Know

Please elaborate on Concerns sent, if no, suggest any Measures the Project Can Consider Increasing Awareness.

31. Are you Concerned about the Overall Community Health and Safety Impacts of the Project?

Yes No Don't Know

If yes, elaborate on Concerns and Suggest any Measures the Project Can Consider Mitigating Impacts.

32. How would you qualify

The existing noise level in the area?

Very Quiet Quiet Noisy Very Noisy

The existing air quality (dust levels) in the area?
 Very Dirty Dirty Clean Very Clean
 The availability of water resources for drinking, washing etc:
 Very Poor Poor Good Very Good
 The existing surface water quality in the area?
 Very Polluted Polluted Clean Very Clean
 The existing ground water quality in the area?
 Very Polluted Polluted Clean Very Clean
 Solid and hazardous waste management in the area is?
 Very Poor Poor Good Very Good
 The existing road traffic in the area?
 Very Busy Busy Quiet Very Quiet

33. What are the main sources of existing pollution in the local area?
 None Lack of Sanitation Agriculture
 Discarded Waste Traffic Other (please state)
 Don't Know

34. Do you think the project SS/OL will temporarily or permanently during operation?
 Increase existing noise levels in the area?
 Yes: Intolerable Yes: Tolerable No Don't Know
 Decrease existing air quality (dust) in the area?
 Yes: Intolerable Yes: Tolerable No Don't Know
 Increase pressure on availability water resources for drinking, washing etc.
 Yes: Intolerable Yes: Tolerable No Don't Know
 Decrease existing surface water quality in the area?
 Yes: Intolerable Yes: Tolerable No Don't Know
 Decrease existing ground water quality in the area?
 Yes: Intolerable Yes: Tolerable No Don't Know
 Increase solid and hazardous waste in the area?
 Yes: Intolerable Yes: Tolerable No Don't Know
 Increase existing road traffic in the area?
 Yes: Intolerable Yes: Tolerable No Don't Know

If yes to any of the above, elaborate on Potential Impacts and Detail Measures the Project Can Consider to Mitigate These Impacts

35. Do you and your family have

Socioeconomic Condition		Remarks
Access to electricity from national grid	<input checked="" type="checkbox"/>	
Access to electricity from an off-grid system (solar panel, etc.)	<input type="checkbox"/>	
Access to drinking water from home tap	<input checked="" type="checkbox"/>	
Access to drinking water from public well	<input checked="" type="checkbox"/>	
Access to drinking water from waterbody	<input checked="" type="checkbox"/>	
Access to clean sanitation facilities (toilet)	<input checked="" type="checkbox"/>	
Connection to sewerage system	<input checked="" type="checkbox"/>	
Access to health care close to home	<input checked="" type="checkbox"/>	
Access to public transportation system close to home (e.g. bus route)	<input type="checkbox"/>	None, but, 2km, 5km, 10km

Socioeconomic Condition		Remarks
Access to private transportation system (motorbike, car, etc.)	<input checked="" type="checkbox"/>	
Access to municipal waste collection	<input checked="" type="checkbox"/>	

36. How Do You Believe Socioeconomic Conditions Will Be/Is being Impacted By The Project?
 Positively Negatively Don't know
 Elaborate on Potential Socioeconomic Impacts and Detail Measures the Project Can Consider to Mitigate Any Negative Impacts.

GENERAL

37. Further Suggestions to Project on Environment, Health and Safety Impacts to be Considered Further and Measures that Could be Incorporated to Mitigate Them
These Electric Charges & Light Expenses may be Low

Name and Signature of Interviewee	<i>Sony Choudhary (Jama)</i>
Name and Signature of Interviewers	<i>Richard T. Schi</i>
Date	
Place	<i>Agf</i>

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Source: ADB TA Consultant

APPENDIX 13: GRM RECORDS

Grievance Lodging Form

Grievance Form: TSECL DISTRIBUTION LINE UPGRADATION COMPONENT, TSECL, Govt. of Tripura			
Grievance registration number:			
Contact details (may be submitted anonymously)	Name (s):		
	Address:		
	Telephone/Mobile:		
	Email:		
How would you prefer to be contacted (check one)	By mail/post: <input type="checkbox"/>	By phone/SMS: <input type="checkbox"/>	By email <input type="checkbox"/>
Preferred language	<input type="checkbox"/> Hindi/Bengali	<input type="checkbox"/> English	<input type="checkbox"/> Other Please state: _____
Provide details of your grievance. Please describe the problem, type, who it happened to, when and where it happened, how many times, etc. Describe in as much detail as possible.			
What is your suggested resolution for the grievance if you have one? Is there something you would like TSECL or another party/person to do to solve the problem?			
How have you submitted this form to the project?	Website <input type="checkbox"/>	Email <input type="checkbox"/>	By hand <input type="checkbox"/>
	In person <input type="checkbox"/>	By telephone <input type="checkbox"/>	Other (specify) <input type="checkbox"/>
Who filled out this form (If not the person named above)?	Name and contact details:		
Signature			
Name of TSECL's PIU official assigned responsibility			
Resolved on site or referred to GRC1?	<input type="checkbox"/> Resolved	<input type="checkbox"/> Referred	If referred, date:
Resolved referred to GRC2?	<input type="checkbox"/> Resolved	<input type="checkbox"/> Referred	If referred, date:
Resolved referred to GRC3?	<input type="checkbox"/> Resolved	<input type="checkbox"/> Referred	If referred, date:
Completion			
Final resolution (briefly describe)			
	Short description	Accepted? (Y/N)	Acknowledgement signature
1 st proposed solution			
2 nd proposed solution			
3 rd proposed solution			

Source: ADB TA Consultant

Template for GRM Register Record

Registration number	Type (Env/ Soc/ H&S etc.)	Date of complaint	Details of complainant (name, address, email, contact number). If confidentiality is requested, highlight here.	Mode/ Entry point of complaint (person/ entity)	Description of complaint	Date and content of communication to complainant (date complaint acknowledged by level 1/2/3, feedback sent, etc.)	Date of meetings held and outcome (attach minutes of meetings)	Timeline agreed upon for resolution and action plan	Status (outstanding, overdue, solution agreed upon, solution under implementation, resolved)	Other remarks

Source: ADB TA Consultant

TSECL Emergency Helpline Numbers

Electrical Circle	Tel No.
Electrical Circle No.I, Udaipur	03821-222340
Electrical Circle No.II, Agartala	0381-2224351
Electrical Circle No.III, Kumarghat	03824-261227
Electrical Circle No.IV, Agartala	0381-2316677
Electrical Circle No.V, Ambassa	03826-222323

Electrical Division	Tel No.
Electrical Division No:-IV, Udaipur	03821-222343
Electrical Division, Amarpur	03821-262082
Electrical Division No: -VI, Bagafa	03823-262523
Electrical Division, Belonia	03823-222620
Electrical Division, Sabroom	03823-266558
Electrical Division No:-I, Agartala	0381-2223541
Electrical Division, Capital Complex	0381-2354051
Electrical Division No:-III, Agartala.	0381-2225755
ED-VIII Gakulnagar	0381-2361793
ED-XI Rabindranagar	0381-2750608
ED-II Dhamanagar	03822-220241
ED-V Kumarghat	03824-261291
DGM Kanchanpur	03824-265236
DGM Jirania	0381-2346073
DGM Mohanpur	0381-2343509
ED-X Khowai	03825-222258
DGM Teliamura	03825-244908
ED-VII Ambassa	03826-222315
DGM Kamalpur	03826-265201
DGM Manu	03824-262640

Electrical Sub-Division	Tel No.
Electrical Sub-Divn., Udaipur	03821-223529
Electrical Sub-Divn., Matabari.	03821-267937
Electrical Sub-Divn., Dhajanagar	03821-225076
Electrical Sub-Divn., Maharani	03821-266238
Electrical Sub-Divn., Killa	03821-274318
Electrical Sub-Divn., Kakraban	03821-265223
Electrical Sub-Divn., Amarpur	03821-263251
Electrical Sub-Divn., Ompi	03825-264231
Electrical Sub-Divn., Jatanbari	03821-264248
Electrical Sub-Divn., Bagafa	03823-262223
Electrical Sub-Divn., Jolaibari	03823-263248

Electrical Sub-Divn., Rajnagar	03823-264306
Electrical Sub-Divn., Belonia	03823-222249
Electrical Sub-Divn., Hrishyamukh	03823-268386
Electrical Sub-Divn., Satchand	03823-266275
Electrical Sub-Divn., Sabroom	03823-270371
Electrical Sub-Divn., Rupaichari	
Electrical Sub-Divn.-I, Banamalipur	0381-226640
Electrical Sub-Divn.-II, Banamalipur	0381-2226213
Electrical Sub-Divn.-III, Durgachaumuhani	0381-2321859
Electrical Sub-Divn.-IV, IGM	0381-2326405
Electrical Sub-Divn., Capital Complex	0381-2415827
Electrical Sub-Divn.-V, GB	0381-2356448
Electrical Sub-Divn., Durjoynagar	0381-2342098
Electrical Sub-Divn., Jogendranagar	0381-2302710
Electrical Sub-Divn., Sekerkote	0381-2360851
Electrical Sub-Divn., Amtali	0381-2376960
Electrical Sub-Divn., Pratapgarh	0381-2223554
Electrical Sub-Divn., Bordwali (R)	0381-2230233
Electrical Sub-Divn., Bordwali (U)	0381-2230233
Electrical Sub-Divn.-I, Bishalgarh	0381-2361794
Electrical Sub-Divn.-II, Bishalgarh	0381-2362986
Electrical Sub-Divn., Jampuijala	0381-2866248
Electrical Sub-Divn., Bisramganj	0381-2867266
Electrical Sub-Divn., Sonamura	0381-2750247
Electrical Sub-Divn., Melagarh	0381-2524246
Electrical Sub-Divn., Boxanagar	0381-2853228
Electrical Sub-Divn., Kathalia	0381-2851588
Electrical Sub-Divn.-I, Dharmanagar	03822-220337
Electrical Sub-Divn.-II, Dharmanagar	03822-232338
Electrical Sub-Divn., Kadamtala	03822-263217
Electrical Sub-Divn., Panisagar	03822-261236
Electrical Sub-Divn., Damcherra	03822-268307
Electrical Sub-Divn., Kumarghat	03824-261206
Electrical Sub-Divn., Kanchanbari	03824-263277
Electrical Sub-Divn.-I, Kailasahar	03824-222237
Electrical Sub-Divn.-II, Kailasahar	03824-223100
Electrical Sub-Divn., Kanchanpur	03824-265201
Electrical Sub-Divn., Pacharthal	03822-265364
Electrical Sub-Divn., Jirania	0381-2346224
Electrical Sub-Divn., Khayerpur	0381-2396012
Electrical Sub-Divn., Mandai	0381-2346071

Electrical Sub-Divn., Bodhg.nagar	0381-2391000
Electrical Sub-Divn., Ranirbazar	0381-2395060
Electrical Sub-Divn., Mohanpur	0381-2343227
Electrical Sub-Divn., Bamutia	0381-2397282
Electrical Sub-Divn., Khowai	03825-222259
Electrical Sub-Divn., Padmabill	03825-202583
Electrical Sub-Divn., Tulasikhar	03825-202574
Electrical Sub-Divn.-I, Teliamura	03825-262231
Electrical Sub-Divn.-II, Teliamura	03825-295907
Electrical Sub-Divn., Kalyanpur	03825-261231
Electrical Sub-Divn., Ambassa	03826-222231
Electrical Sub-Divn., Gandacherra	03826-265217
Electrical Sub-Divn., Kamalpur	03826-262538
Electrical Sub-Divn., Salema	03826-263287
Electrical Sub-Divn., Manu	03826-262213

Source: TSECL website:

https://www.tsecl.in/irj/go/km/docs/internet/TRIPURA/webpage/pages/Emergency_Helpline.html

APPENDIX 14: ENVIRONMENTAL MITIGATION PLAN

Table 1: Common Corrective Action Plan for Existing Substations

Non-Compliance Issue	Corrective Action	By whom	By when	Budget (source)
SHORT TERM CORRECTIVE ACTIONS				
General	<ul style="list-style-type: none"> • Provide all SS managers with EHS awareness training so they can understand and implement the corrective action that is required at each SS • Provide specific training to all SS managers/workers on PCBs to raise awareness of the risks and the need for compliance with national regulations; the Regulation of Use, Handling and Disposal of Polychlorinated Biphenyls and the Hazardous and Other Wastes (Management and Transboundary Movement) Rules. • Provide specific training to SS managers/workers on SF6 management, and management of end of life/defunct/damaged units like gas-based circuit breakers to ensure they are appropriately disposed of by a certified industrial waste management company who will need to remove SF6 and treat the equipment prior to disposal in accordance with International Electrotechnical Commission (IEC) standard 61634 and ensure the SF6 is not released to atmosphere. 	PMU E&S Officer with support of PIC	Upon loan effectiveness	TSECL with training expertise provided under PIC budget
	<ul style="list-style-type: none"> • Submit a status report for each SS confirming the implementation status of short-term corrective action plan to ADB for clearance prior to commencement of any works at the SS in question 	PMU E&S Officer with support of PIC	Before access to SS given to contractor	TSECL
	<ul style="list-style-type: none"> • Records of all EHS permits applicable to the SS to be made available at the SS site 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Before access to SS given to contractor	TSECL

Non-Compliance Issue	Corrective Action	By whom	By when	Budget (source)
Housekeeping/waste management	<ul style="list-style-type: none"> • Prohibit any open burning of waste at the SS site • Demark labelled storage areas for materials and segregated waste; ideally storage will be in a locked area, under cover to provide shelter from the elements, having fully enclosed garbage bins for the disposal of municipal solid waste, and where liquids or leachable materials are stored having an impermeable floor bunded to 110% capacity of the volume that is stored • If impermeable floor bunded to 110% is not available in the short-term, liquid and leachable materials/waste to be kept on drip trays to provide secondary containment • Tidy up the SS ensuring all materials and wastes including cables, broken electrical systems, meters, glass and plastic, oils etc. are collected up, segregated, and stored in the designated and labelled storage areas • Remove (and prohibit any further) end-of-life equipment or waste stored outside the SS boundary relocating it to designated and labelled storage areas within the SS • Remove all end-of-life equipment that has built up on site to TSECL stores/workshop with storage, transport, and disposal as per the GoI regulations following the waste hierarchy • Remove all other waste that has built up on site by appropriately licensed waste management company with all storage, transport, and disposal as per GoI regulations [including but not limited to the (i) Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2019 (ii) Construction and Demolition Waste Management Rules, 2016, (iii) E-Waste Management Rules, 2016, and (iv) Plastic Waste Management Rules, 2016] whilst following the waste hierarchy 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Before access to SS given to contractor, or if including corrective action in contract this is to be completed by EPC contractor before they commence works	TSECL

Non-Compliance Issue	Corrective Action	By whom	By when	Budget (source)
Transformers and oil leakage	<ul style="list-style-type: none"> • Filled drums (mineral oil) are all to be sealed and labelled with their contents with safety warnings • MSDS to be available at the SS site for all the materials used on site • Collect up and store empty and filled drums (mineral oil) in a locked, under cover, designated storage area, they should either be stored on an impermeable floor bunded to 110% capacity of volume stored, or if not available in the short-term kept on drip trays to provide secondary containment • Defunct transformers prior to being removed from site are to be placed in a designated storage area, they should either be stored on an impermeable floor bunded to 110% capacity of volume stored, or if not available in the short-term kept on drip trays to provide secondary containment • Inventory to be prepared of existing transformers on site, make, model, risk of PCBs and other details including transformer test report, details any maintenance works undertaken, dates oil changes, leakage incidents etc. • Clearly label all transformers as either containing PCBs, at risk of containing PCBs, or PCB-free provided documentary evidence exists¹⁹ • Carry out inspections and preventive maintenance to minimize oil leakages; ensure valves, nuts and bolts are fully functional and tightly secured, ensure rubber seals of radiators are intact • Existing transformers in a poor state of repair and which are currently leaking oil to be maintained/repared so they are left in good condition • Health and safety risk assessment for exposure of staff to PCBs to be undertaken before maintenance/repair work is undertaken on any existing SS transformers • Clean up all existing oil spill, excavate any contaminated soil and send for disposal (as hazardous waste) using appropriately licensed waste management company with all storage, transport, and disposal as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 • Make available spill management materials (sorbent pads, loose sorbent material, sand, etc.) next to the storage area for immediately soaking up any leaks or spills that do accidentally occur 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Before access to SS given to contractor, or if including corrective action in contract this is to be completed by EPC contractor before they commence works	TSECL

Non-Compliance Issue	Corrective Action	By whom	By when	Budget (source)
Escape of SF6	<ul style="list-style-type: none"> Inventory to be prepared of all SF6 containing equipment on site, their make and model, volume of SF6 contained, details of repair works undertaken, dates of SF6 replenishment, leakage incidents etc. Provide SF6 leakage detection equipment at all SS supporting SF6 containing equipment. Carry out inspections and preventive maintenance to minimize SF6 leakages. 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Before access to SS given to contractor, or if including corrective action in contract this is to be completed by EPC contractor before they commence works	TSECL
Noise, EMF, lighting, and ventilation	<ul style="list-style-type: none"> Existing vents/windows to be unblocked for SS that have placed control instruments and panels covering the windows Defunct bulbs/lights to be replaced Provide adequate natural and/or artificial lighting levels to meet the IFC EHS Guidelines on Occupational H&S (<i>Table 2.3.3. Minimum Limits for Workplace Illumination Intensity</i>) within control rooms, toilets, stairways, and other areas having regular staff movements 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Before access to SS given to contractor, or if including corrective action in contract this is to be completed by EPC contractor before they commence works	TSECL
First aid equipment	<ul style="list-style-type: none"> Make available fully stocked, in-date first aid kit in a prominent, signed position Provide eye wash station and water supply to shower located near the storage areas for fuel/oil/chemicals 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Before access to SS given to contractor, or if including corrective action in contract this is to be completed by EPC contractor before they commence works	TSECL
Fire safety equipment	<ul style="list-style-type: none"> Provide sand buckets, full of sand, placed in a prominent, signed location near to fire-risk locations such as transformers and oil storage areas Make available fire extinguishers (including for oil and electric fires) in a prominent, signed location near to fire-risk locations such as transformers and oil storage areas with service and expiration dates clearly labelled. Expired/exhausted fire extinguishers to be refilled/replaced so all are in date. 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Before access to SS given to contractor, or if including corrective action in contract this is to be completed by EPC contractor before they commence works	TSECL

¹⁹ In the absence of documentary evidence (e.g., contract specification or certification for supply of original transformer, maintenance records for oil replacement including material safety data sheet, or transformer oil test results etc.) for given transformers confirming they are PCB-free, all old transformers must be considered by the staff at risk of containing PCBs. Mineral oil-filled transformers were not designed to use PCBs, but many have been found to be contaminated with PCBs.

Non-Compliance Issue	Corrective Action	By whom	By when	Budget (source)
Community H&S	<ul style="list-style-type: none"> • Entire SS boundary to be well secured, existing boundary fence or wall to be installed/repared/replaced ensuring no gaps for entry of people or livestock and that it is sufficiently high so that it cannot be climbed over • For SS that are housing divisional offices to be fenced off from the SS so that office workers and members of community paying bills do not have access to the SS. • Gates are to be installed/repared/replaced and to be kept always closed except when there is vehicle/staff movement through the gate. Recommended to have a larger gate for the vehicles and a side gate for staff entry/exit. • Doors to control rooms to be kept shut during both day and night. • Security persons are to be deployed at all SS for 24x7 period with rotation/shifts. Number of security guards is to be determined by TSECL based on the size/area of the SS and adjacent land use. • Dedicated shelter to be provided at the site entrance for use by any security guards, shielding them from rain, wind, and extreme (hot and cold) temperatures. • Switch yard area/transformers are also to be fenced having a locked gate with visual and written warning signages including the ISO 7010 Hazard Type: Electrical Symbol warning of the risk of electrocution. • Safety signage with large and colorful display to be placed along SS boundary and at gate with visual and written warning signages including the ISO 7010 Hazard Type: Electrical Symbol warning of the risk of electrocution. • Safety sign to be placed to make local community aware that the SS site is out of bounds for livestock. 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Before access to SS given to contractor, or if including corrective action in contract this is to be completed by EPC contractor before they commence works	TSECL
Handling emergencies	<ul style="list-style-type: none"> • Identify and install emergency exit signage on all emergency exits • Keep clear all the emergency exits, remove blockages due to storage of end-of-life equipment • Provide first aid posters including first aid for electrocution incident • Prominently post a list of doctors/emergency health/fire station contacts (names/locations/phone numbers) list in case of emergency • Provide posters on fire safety • Establish and maintain an incident logbook 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Before access to SS given to contractor, or if including corrective action in contract this is to be completed by EPC contractor before they commence works	TSECL

Non-Compliance Issue	Corrective Action	By whom	By when	Budget (source)
H&S of staff	<ul style="list-style-type: none"> • Provide everyone who enters the SS with an OHS induction • Records of medical tests / health check-up of staff to be accessible by the SS Manager • All staff to be given required PPE and other requisite safety equipment. • Provide sufficient PPE spares available on site for visitors etc. • Ensure all staff and visitors always wear PPE including safety boots • Introduce disciplinary system for non-compliance with PPE requirements to enforce their use • All potential trip and fall hazards to be removed including repair of broken floor inside control rooms, cable drain tiles and covers, etc. • All the electrical equipment to have visual and written warning signage including the ISO 7010 Hazard Type: Electrical Symbol warning of the risk of electrocution. • Carry out inspections and preventive maintenance to ensure electrical standards are upheld • Employ third party to conduct pest control and safely remove existing pest hazards such as beehives where they are identified, pest control to be based on integrated pest management approaches and aim to reduce reliance on synthetic chemical pesticides especially those hazardous to human health and the environment, such as, the use of carbolic acid as deterrent to snakes. • Food waste to be stored in fully enclosed bins to avoid attracting rodents usually followed by snakes • Strict observation of COVID-19 requirements whilst pandemic is ongoing including wearing of masks, use of hand sanitizers, etc. • Health and safety risk assessment for exposure of staff to asbestos dust to be undertaken before maintenance/repair work is undertaken; potential presence of asbestos at the SS to be surveyed by using a competent third party²⁰ 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Before access to SS given to contractor, or if including corrective action in contract this is to be completed by EPC contractor before they commence works	TSECL

²⁰ In the event asbestos is found, its presence should be documented, and warning signs installed to avoid it being disturbed. If at risk of being disturbed thereby exposing workers to asbestos dust an Asbestos Removal Plan is to be prepared detailing how asbestos will be safely removed from site, asbestos must not be disturbed by workers but removed by a competent specialist asbestos contractor in accordance with Gol requirements, the WB-IFC EHS general guidelines and other GIIP. Asbestos waste must be safely and soundly disposed of as a hazardous waste material in accordance with Gol regulations and WB-IFC EHS general guidelines.

Non-Compliance Issue	Corrective Action	By whom	By when	Budget (source)
Drainage	<ul style="list-style-type: none"> • Removal of all stagnant water e.g., rainwater that has accumulated in empty drums etc. • In damp/wet areas the surfaces of the SS are to be cleaned so algae (slippiness) is not present and warning signs to be placed 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Before access to SS given to contractor, or if including corrective action in contract this is to be completed by EPC contractor before they commence works	TSECL
Sanitation and welfare facilities	<ul style="list-style-type: none"> • Provide potable drinking water supply meeting Gol drinking water standards (regular testing of drinking water is included in EMoP scope) • Provide safe access to existing toilets by removing all stored equipment from their entrance • For all existing toilets ensure adequate lightening, repairing of door, locks, and latches provided (as they are shared access toilets for both male and female) as well as hand washing facilities with soap and water • Cleaning of existing toilets on daily basis, use of disinfectant and floor cleaners • Ensure all sources of wastewater connected to septic tank • Ensure that septic tanks are well maintained • Install a soakaway for disposal of the septic tank wastewater, no untreated wastewater should be disposed of to surface water or ground • For the welfare of SS staff during their shifts provide a dedicated cooking area / clean eating area / rest area for staff on-site that meets Gol and ILO worker accommodation requirements 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Before access to SS given to contractor, or if including corrective action in contract this is to be completed by EPC contractor before they commence works	TSECL
Other	<ul style="list-style-type: none"> • Install a safe vehicular access for entry/exit from the Chawmanu substation to the road (public highway) having adequate sight lines for all drivers and warning signs of entranceway²¹ • TSECL access roads to Charipara substations to be surfaced before any works at the substation commences 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Before access to SS given to contractor, or if including corrective action in contract this is to be completed by EPC contractor before they commence works	TSECL

²¹ Entry to Chawmanu SS needs to be repaired and connected to the access road in front for entry of vehicles; presently the entrance is inaccessible to vehicles.

Non-Compliance Issue	Corrective Action	By whom	By when	Budget (source)
	<ul style="list-style-type: none"> • There is a huge banyan tree (<i>Ficus bengalensis</i>) within the proposed Tilla Bazar SS which shall not be felled during the ongoing construction works • Maintain vegetation at the SS that poses a health and safety hazard e.g., because gaps/channels/broken covers are hidden due to vegetation growth or snakes may be hidden within the grass etc. 			
LONG TERM CORRECTIVE ACTIONS				
General	<ul style="list-style-type: none"> • Develop and adopt corporate wide EHS policy and manuals/procedures (SOP) for SS operation • SOP developed to include guidelines for pollution prevention including management or handling procedures for oil spills, spillage, runoff from leaks off equipment, and waste management, including for hazardous waste management • SOP develop to include guidelines for H&S management including emergency preparedness • Ensure copy of EHS policy and SOP available at all SS • Provide SS managers/workers on training with respect implementation of the SOP • Submit a status report for each SS confirming the implementation status of long-term corrective action plan to ADB for clearance prior to commissioning of the SS in question by the EPC contractor 	PMU E&S Officer with support of PIC	Prior to commissioning by the EPC contractor	TSECL with guidance of ADB TA Consultant in preparing the SOP
Housekeeping/waste management	<ul style="list-style-type: none"> • In SS where a locked, under cover material and waste storage area with an impermeable floor bunded to 110% capacity of the volume stored are not available in the short-term for the storage of fuel/oil/chemicals and solid/hazardous waste construct such a storage area 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer (either as a separate undertaking or to be included in the scope of EPC contract)	Prior to commissioning by the EPC contractor	TSECL

Non-Compliance Issue	Corrective Action	By whom	By when	Budget (source)
Transformers and oil leakage	<ul style="list-style-type: none"> In SS where existing transformers are at risk of containing PCBs ensure they are tested²² (such testing is included in EMoP scope) For those transformers confirmed as containing PCBs ensure these are dechlorinated or removed from site with storage, transport, and disposal as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 In SS where bund of 110% capacity extending beyond the transformer footprint is not available in the short-term retrofit such a bund to existing transformers 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer (either as a separate undertaking or to be included in the scope of EPC contract)	By 31/12/2021 ²³	TSECL
Escape of SF6	<ul style="list-style-type: none"> Install SF6 leakage warning alarm for existing equipment containing SF6 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer (either as a separate undertaking or to be included in the scope of EPC contract)	Prior to commissioning by the EPC contractor	TSECL

²² The most suitable way to determine if PCB is present is for a suitably qualified institute to sample and analyze the oil in accordance with United Nations Environment Protection Agency (UNEP) Guidelines ([PCB ID 1st print-2.PDF \(unep.org\)](#)) following a health and safety risk assessment and plan referring to [PCB Transformers and Capacitors: From Management to Reclassification and Disposal - First Issue \(unep.org\)](#). It is not recommended to take an oil sample from hermetically sealed oil distribution transformers since the transformer itself is fully closed to the environmental condition, but a sample for PCB testing can be taken by experienced staff. Conservator type transformers can be readily tested. Once transformers have been found to contain PCBs they must be labelled as such, any PCB storage areas should also be marked to allow expeditious identification and response to a PCB accident. Similarly, transformers found to be PCB free should be marked as such for future reference of compliance with GoI regulations and the log of test results to support this kept by TSECL.

²³ Government of India Regulation of Use, Handling and Disposal of Polychlorinated Biphenyls permits the use of existing PCB containing equipment up until 31.12.2025 provided it is within its certified lifetime and properly maintained without possibility of leakage or release of PCBs into the environment with disposal of waste PCBs or contaminated equipment by 2028 in accordance with the Stockholm Convention.

Non-Compliance Issue	Corrective Action	By whom	By when	Budget (source)
Noise, EMF, lighting, and ventilation	<ul style="list-style-type: none"> • Control panel and other equipment within SS control buildings to be rearranged and placed in a manner to maximize natural ventilation and light for those SS where the ventilation and light is being obstructed • Switch yard lightening system to be improved so all areas well-lit at night when required 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer (either as a separate undertaking or to be included in the scope of EPC contract)	Prior to commissioning by the EPC contractor	TSECL
Fire safety equipment	<ul style="list-style-type: none"> • Ensure automatic fire alarm, fire suppression systems and firewalls installed 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer (either as a separate undertaking or to be included in the scope of EPC contract)	Prior to commissioning by the EPC contractor	TSECL
Handling emergencies	<ul style="list-style-type: none"> • Ensure a SS specific emergency preparedness plan is developed including the communication system and protocols for response to a fire, earthquake, flood, medical emergency etc. and followed for SS operation with regular fire drills and alarm tests conducted (copy kept on site) • Ensure all SS workers receive basic first aid and firefighting training with annual refreshers • Ensure that at least one staff at SS is fully trained as a first aider and fire marshal • 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Prior to commissioning by the EPC contractor	TSECL

Non-Compliance Issue	Corrective Action	By whom	By when	Budget (source)
H&S of staff	<ul style="list-style-type: none"> • Ensure H&S risk assessment is completed for the SS operation and maintenance works undertaken and that appropriate H&S management actions identified including a system of issuing permits for work at height etc. (copy of risk assessment and the action plan to be kept on site) • Building structural status – ensure building repairs are undertaken to maintain the integrity of control buildings especially in the event of an earthquake 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer (either as a separate undertaking or to be included in the scope of EPC contract)	Prior to commissioning by the EPC contractor	TSECL
Drainage	<ul style="list-style-type: none"> • Ensure SS has adequate drainage to avoid damp and wet conditions • Provide storm drainage at the SS with oil-water separator on all drains 	TSECL SS Manager with support PIU/Electrical Division under guidance of PMU E&S Officer	Prior to commissioning by the EPC contractor	TSECL

Table 2: Environmental Mitigation Plan–General

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
Detailed Design/Pre-construction Preparations Phase							
EMP in Bidding and Contract Document	<ul style="list-style-type: none"> The EMP forms an integral and binding part of the bidding documents and any updates to it will be incorporated into the contract document, the definitive EMP to which TSELC and their contractors must comply is that disclosed on ADB’s website. This includes any site-specific EMP included in the updated IEE following detailed design or any updates in response to unanticipated impacts. Contractors will comply with any corrective action plan required by TSECL and cover the costs where corrective action is required due to non-compliance on behalf of the contractor, its subcontractors or third parties. Contractors will ensure all their subcontractors and third parties, irrespective of being formally or informally employed by them, also comply with the EMP and any updates to it, as well as their own CEMP and that this responsibility is cascaded down any chain involved. Contractors will not engage in any activities described on the ADB Prohibited Investment Activities List in Appendix 5 of ADB’s SPS (2009) 	<p>Definitive EMP cleared by ADB, and related provisions included in signed contract document.</p> <p>No breaches of EMP by contractor, subcontractors or other third parties with prompt corrective action taken if required</p>	<p>TSECL counterpart fund</p> <p>Contractors to reflect in overall contract costs</p>	<p>Prior to issue of bidding documents and contract award for TSECL.</p> <p>On award of contract for contractors.</p>	<p>TSECL PIU/Electrical Divisions supported by PMU</p>	<p>TSECL PMU/Safeguard Unit support by PIC</p> <p>Copy of EMP related contract extracts will be attached to first EMR submission, or the EMR for the period in which the contract was awarded.</p>	<p>Implement the mitigation measures, comply for duration of contract</p>

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<ul style="list-style-type: none"> Contractors will put in place appropriate incentives and/or penalties for (non-) compliance by workers related to use of PPE, prohibition on firewood, fishing, hunting, or poaching by workers etc. 						
EMP and statutory requirement compliances	<ul style="list-style-type: none"> TSECL and their contractors to comply with all applicable national and state environment, health, and safety (EHS) regulatory requirements, ADB’s Safeguard Policy Statement 2009, the IFC EHS general guidelines and the sector guidelines for Electric Power Transmission and Distribution (April 2007) in addition to the mitigation measures set out in this mitigation plan and the EHS codes of practice (ECOP) – if there is any conflict between national requirements and measures set out in the EMP the most stringent provisions will take precedence Contractors are to obtain Consent to Establish for all construction plant including DG sets and all other applicable national EHS permissions or requirements prior to construction. Construction plant must not be operated by contractors until their Consent to Operate is obtained. Prior to the approval of detailed designs TSECL will consult ADB 	<p>100% of permissions obtained, or requirements met, prior to construction</p> <p>No breaches of compliance with regulatory requirements or GIIP</p> <p>IEE updated as required to reflect detailed design and cleared by ADB prior to the start of related works</p>	<p>TSECL counterpart fund</p> <p>Contractors to reflect in overall contract costs</p>	<p>Throughout project implementation period.</p> <p>Starting upon loan effectiveness for TSECL.</p> <p>Starting upon contract award for contractors.</p>	<p>TSECL PIU/Electrical Divisions supported by PMU</p>	<p>TSECL PMU/Safeguard Unit support by PIC</p> <p>Copy of all EHS related permissions/ requirements to be attached to the EMR for the period in which they were obtained</p> <p>Immediately inform ADB if unanticipated impacts are identified at any point during project implementation and, if required, update the IEE for clearance</p>	<p>Implement the mitigation measures, comply for duration of contract</p> <p>Provide copies of EHS permissions/ requirements and support TSECL in respect of any update to the IEE following detailed design.</p> <p>Immediately inform TSECL if unanticipated impacts are</p>

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	regarding the need to update the IEE. If required, the IEE will be updated for clearance and disclosure by ADB before approval and the start of related works including site establishment. If any other change in project scope or design occurs during project implementation, or if any unanticipated impacts are identified, TSECL to immediately inform ADB of the change.					and disclosure by ADB.	identified at any point in their contract.
EHS Safeguard Staffing	<ul style="list-style-type: none"> TSECL to appoint suitably qualified and experienced EHS staff to the PMU (safeguards unit) upon loan effectiveness as detailed in the main body of the EMP TSECL to ensure the PIC includes suitably qualified and experienced staff to support with EMP implementation as detailed in the main body of the EMP TSECL E&S Safeguards Officer to prepare a detailed training plan upon loan effectiveness elaborating how training and awareness raising activities required by EMP will be conducted and with the support of PIC conduct required training sessions on EMP implementation and GRM operationalization for all those with management responsibilities to clarify requirements, roles and 	<p>100% of required safeguard staff required are on board to oversee EMP implementation</p> <p>Detailed training plan reflecting EMP requirements developed upon loan effectiveness and training records maintained</p> <p>Trainings and awareness raising</p>	<p>TSECL counterpart fund</p> <p>Contractors to reflect in overall contract costs including costs of safeguard staff as BOQ line</p>	<p>Upon loan effectiveness for TSECL</p> <p>Upon contract award for contractors. Contractors to ensure requisite staff are appointed to the project. Separate EHS staff for each contract package reporting to contractor's management.</p>	<p>TSECL PIU/Electrical Divisions supported by PMU</p>	<p>TSECL PMU/Safeguard Unit support by PIC</p> <p>Records of all training activities are to be retained.</p> <p>Training undertaken will be documented and reported in EMRs including photos and records of participants</p>	Implement the mitigation measures, comply for duration of contract

	<p>responsibilities, record keeping and reporting at each stage of the project.</p> <ul style="list-style-type: none"> • TSECL E&S Safeguards Officer will be delegated authority under the contract to be able to halt construction works if any EHS issues arise. • Contractors to appoint a suitably qualified and experienced, dedicated Environment Officer and dedicated Health and Safety Officer as detailed in the main body of the EMP who are to be based on site full-time • Each active construction site is to have adequate health and safety supervision to ensure the health and safety of all workers and local communities to include a suitably qualified and experienced Senior Engineer having NEBOSH/IOSH certification or similar qualification who is based on-site full-time and nominated to the role of EHS Supervisor with responsibility for ensuring EMP implementation, acting on the advice of, and reporting to their safeguards team. • Each Senior Engineer will be supported by full-time on-site Health and Safety steward(s) with at least one steward for each 50 persons. • Contractors must not discriminate and must proactively encourage the employment of suitably skilled women on the project. • Contractors must proactively encourage local employment for 	<p>delivered in accordance with the training plan</p> <p>Contractors and construction workers fully aware of their responsibilities under the EMP through training</p>				<p>(including the gender breakdown data)</p> <p>List of safeguard staff and copies of CVs to be submitted in first EMR, any updates/ changes in safeguard staffing specified in subsequent EMRs</p>	<p>Records of all training activities are to be retained.</p> <p>CVs for approval of all the safeguard team submitted as part of bid or immediately after receipt of award of work letter for approval of TSECL before field mobilization</p> <p>Once approved, safeguard team to be mobilized at site upon handing over of the site to the contractors by TSECL or issue of mobilization letter whichever comes earlier</p>
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					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>unskilled roles especially in TTAADC areas whilst ensuring suitably qualified and experienced workers for skilled roles; local labor can be used for manual work and eligible local workforce for clerical and office jobs. However, precedence must be given to ensuring that all workers are appropriately skilled given the hazardous nature of distribution works and so local workers will be limited to few unskilled positions.</p> <ul style="list-style-type: none"> • No child will be employed, and no under 18s will be engaged on construction site (hazardous work) • Contractors to provide medical/accident insurance for all workers (formal and informal) for the duration of their contracts • Contractors to provide at least 10 days sick leave for all construction workers 						

<p>Establishment and operation of GRM</p>	<ul style="list-style-type: none"> • TSECL to establish an effectively operating 3-tier GRM as per the IEE, and identify GRM focals and a GRC • Contractor’s safeguards team will act as site GRM Focal and keep affected persons and local communities informed of the status of work and be readily available onsite to receive, document and deal with grievances at site level. • TSECL with support of contractor to inform all potentially affected persons and local communities within 500m of substations/test laboratory and 50m of distribution line ROWs (UG and OHL) of the existence of the GRM as well as the GRM process and means of submitting project grievance to TSECL. Community awareness raising of the GRM will be undertaken verbally, through local tribal/village heads, community meetings, one-on-one consultations with landowners; through the distribution of notices/pamphlets/posters; and through other media outlets – all awareness raising activities are to be documented. • Encourage use of the GRM and clarify that this does not prevent affected persons from pursuing any legal action, if they feel it is needed, and inform communities about the ADB Accountability Mechanism and their possibility to resort to it if any 	<p>GRM as stipulated in EIA operationalized, affected persons aware of its existence and are actively using GRM to raise their grievances.</p> <p>100% of grievances received are recorded and resolved in a timely manner as per GRM process.</p>	<p>TSECL counterpart fund</p> <p>Contractors to reflect in overall contract costs</p>	<p>Throughout project implementation period.</p> <p>Upon loan effectiveness for TSECL.</p> <p>Upon contract award for contractors.</p>	<p>TSECL PIU/Electrical Divisions supported by PMU</p>	<p>TSECL PMU/Safeguard Unit support by PIC</p> <p>Records to be kept of all grievances received and their resolution for reporting per the IEE.</p> <p>Details of GRM being operation, including photos of awareness raising activities to be submitted in first EMR.</p> <p>Details of all grievances received and resolved during the period to be reported in subsequent EMRs.</p>	<p>Implement the mitigation measures, comply for duration of contract</p> <p>Implement the informal site level GRM per the IEE, and support TSECL in resolving and addressing grievances entering the formal GRM, keep record of all grievances registered, status, time taken for redressal and outcomes, etc.</p> <p>Internal GRM for workers for work related grievances, keep record of all grievances registered, status, time taken for redressal and outcomes, etc.</p>
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	<p>grievance is not resolved by the project level GRM.</p> <ul style="list-style-type: none"> • Details of GRM, details of concerned persons – name, designation, contact numbers including phone/SMS/What’s App, address and timeline of redressal are to be displayed at substations and construction site offices. • TSECL to post clearly visible signboards at the entrances to all substations/test laboratory with contact details including the name, designation, contact numbers, address plus the timeline and process of redressal together with a suggestion box that will be regularly checked for any grievances received. During construction, the contractors will be responsible for posting these highly visible signboards at the construction site offices and their active construction sites, including contact details of both the TSECL and contractor’s GRM focal persons as well as a suggestion box to be regularly checked. • GRM will be available to all workers for receiving and handling complaints about unfair treatment or unsafe living or working conditions, ensuring no coercion nor reprisal. Construction workers will be given access to register any grievances with the contractors or direct access to the TSECL GRM Focal. 						
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Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<ul style="list-style-type: none"> Contractors to carry out awareness raising for all construction workers about the GRM at the start of their employment on site including disseminating GRM contact details on noticeboards at construction site offices and at employer provided staff accommodation. Suggestion boxes to be provided for construction workers at construction site offices and at employer provided staff accommodation. 						

<p>Meaningful consultations and information disclosure</p>	<ul style="list-style-type: none"> TSECL to locally disclose in a timely manner the IEE with executive summary translated into Bengali language, any updates to it, and other environment safeguards documentation as set out in the IEE e.g., via TSECL website, TSECL offices (HQ/Circle/Division/ Subdivisions), all 27 existing substations, and other construction site offices. Brochures and posters on the main findings of the IEE and where the full version can be accessed, as well as a translation of the executive summary of the IEE, will be printed in Bengali and made available/displayed for public scrutiny at places easily accessible to affected persons and other interested parties – including but not limited to the TSECL’s Circle/Division/ Subdivision offices, substations and construction sites – and if requested access to a printed copy of the full IEE will be provided and if required translated free of charge. TSECL E&S Officer to prepare detailed consultation plan upon loan effectiveness to be followed by TSECL and contractor including that in the context of the COVID-19 pandemic all consultations are carried out following latest national COVID-19 requirements and WHO 	<p>IEE and other environment safeguard documents locally disclosed and accessible to affected persons</p> <p>Consultation plan developed reflecting ongoing consultation requirements upon loan effectiveness</p> <p>Local communities and other concerned stakeholders kept informed throughout project implementation, and aware of construction etc.</p>	<p>TSECL counterpart fund</p> <p>Contractors to reflect in overall contract costs</p>	<p>Throughout project implementation period.</p> <p>Upon loan effectiveness for TSECL.</p> <p>Prior to the commencement of works for contractor, and then ongoing throughout construction</p>	<p>TSECL PIU/Electrical Divisions supported by PMU</p>	<p>TSECL PMU/Safeguard Unit support by PIC</p> <p>Consultation will be documented and reported in updated IEE and/or EMRs including photos and records of participants (including gender breakdown data)</p>	<p>Implement the mitigation measures, comply for duration of contract</p> <p>Contractor to remain actively involved with local communities through ongoing consultations</p>
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	<p>social distancing and hygiene guidelines provided in the IEE</p> <ul style="list-style-type: none"> • Contractors to undertake and document meaningful consultations in each subdivision including with potentially affected persons and local communities within 500m of the substations/test laboratory and 50m of distribution line ROWs (UG and OHL) as well as other stakeholders including local authorities and public utilities during detailed design in order that any concerns raised during consultations can be reflected in the choice of SS/test laboratory layout, route alignment and construction method – consultation proforma in Appendix 16 is to be completed during detailed design and will be submitted as part of the IEE update. • Through community meetings, one-on-one consultations with affected persons, dissemination of brochures/pamphlets/posters, and other media outlets contractors to provide at least one-month advance notice to potentially affected persons and local communities within 500m of the substations/test laboratory and 50m of distribution line ROWs (UG and OHL) about the schedule and details of planned construction works including its anticipated impacts, including anticipated traffic disruption (road closures, diversions, including notices/signs on either end and 						
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					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>marking of the diversion routes) to help manage any disruption and disturbance and potential conflicts with the local communities and then keep them updated of progress and changes in schedule throughout construction works – all meaningful consultations are to be documented.</p> <ul style="list-style-type: none"> • Contractors to directly liaise one-on-one with the receptors within 50m of substations/test laboratory and within the distribution line RoWs who will be most affected, update them on a weekly basis so they are fully informed of the nature of works and their schedule. They will be specifically notified about the commencement of works and any high dust or noise activities (especially earthworks) • Local communities as well as individual property owners within 500m are to be consulted by contractors when selecting sites for temporary construction facilities outside of TSECL substations prior to finalization of their location – all meaningful consultations are to be documented. 						

<p>EMP in detailed design, EHS impacts and risks of the project during construction in general, planning for onsite EHS management and preparation of CEMP</p>	<ul style="list-style-type: none"> Contractors to ensure that detailed designs reflect requirements of the IEE/EMP and international engineering best practice/good EHS practices During detailed design contractors to ensure Gol seismic design requirements are followed especially for buildings and pole foundations; structural designs to be checked for seismic safety by design team and an independent expert, separate to design team, to confirm international good practice seismic design standards are met. During detailed design climate the change adaptation measures²⁴ from the adaptation assessment need to be incorporated by the contractors. Contractors to develop a Construction Environmental Management Plan (CEMP) including required sub-plans reflecting the IEE/EMP requirements including the ECoP and international engineering best practice/good EHS practices and submit their CEMP to TSECL for approval prior to any works commencing on site including site establishment. CEMP and sub-plans will be living documents, to be updated as required and re-approved by TSECL as construction proceeds, if construction methods or site conditions change, in response to an accident, incident, near miss etc. 	<p>TSECL approved detailed designs minimize impacts and risks on EHS during subsequent stages of the project</p> <p>TSECL approved CEMP and subplans to minimize impacts and risks on EHS during subsequent stages of the project.</p>	<p>Contractors to reflect in contract costs</p>	<p>Pre-construction stage; compliance prior to any works commencing on site including site establishment</p>	<p>TSECL PIU/Electrical Divisions supported by PMU</p>	<p>TSECL PMU/Safeguard Unit support by PIC</p> <p>Review detailed design, CEMP and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.</p> <p>Copy of CEMP and any updates to be attached to EMR during the period in which they are approved.</p>	<p>Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment</p>
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²⁴ ADB. 2022. Climate Risk and Adaptation Assessment, Tripura Power Distribution Strengthening and Generation Efficiency Improvement Project.

	<ul style="list-style-type: none"> • CEMP to provide details on how the contractors plan to implement the construction mitigation measures specified in the IEE/EMP and relevant parts of the WB-IFC EHS General/Electric Power Transmission and Distribution Guidelines including the Construction and Demolition section. • CEMP will include Construction Method Statement identifying all construction activities, schedule, access routes, anticipated traffic volumes, and construction methods to be used as well as temporary construction facilities needed and their location e.g., laydown areas, stores, construction workers rest areas, toilets/washrooms, temporary worker camps/overnight accommodation etc. • CEMP will include (i) prohibitions on fishing, hunting, poaching, protected areas etc. (ii) a wildlife identification and rescue protocol including an emergency fauna rescue and handling procedure, including contacts of forest and protected area management, nearest veterinary etc. (iii) measures to avoid the spread of invasive species including the installation of washing stations for the pressure washing of vehicles at the site entrance, and (iv) a Chance Find Procedure for physical cultural resources in accordance with the ECOP. 						
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	<ul style="list-style-type: none"> • Contractor to seek to locate all temporary construction facilities required including laydown and storage areas within the boundaries of TSECL land (substations) except for overnight accommodation for workers that could be provided in existing properties off-site. • If other public or private land is required for temporary construction facilities due to lack of space within TSECL substations noisy and dusty facilities or those that may generate sediment laden runoff or wastewater (e.g., concrete batching plant, hot mix plant, refueling areas, temporary worker camps, maintenance yards, storage areas) must be sited at least 500m from residential property and outside of biodiversity sites and physical cultural resources.²⁵ • Laydown and storage areas that are not potential pollution sources may be located minimum of 50m distant but must be away from residential properties and not block accesses or road use. • No land requiring clearance of vegetation/supporting forest habitat is to be used – land use to be negotiated with private owner with submission of all necessary documents such as land ownership papers demonstrating agreement for temporary land use with a private landowner to TSECL with a 						
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²⁵ Such as legally protected areas including national parks, wildlife sanctuaries, protected ASI and GoT monuments; other internationally and nationally recognized sites such as Key Biodiversity Areas, Important Bird Areas, ESZ, notified forest areas including protected forest, reserve forest, and proposed reserve forest, and the regulated area associated with protected ASI and GoT monuments.

Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Responsibilities		
					Implementation	Supervision and Monitoring	Contractor
	<p>photographic record of pre-project condition</p> <ul style="list-style-type: none"> Design of temporary worker camps/overnight accommodation to conform to IFC EHS general guidelines, ILO's guidance on worker accommodation²⁶ and regulations of GoI and to be approved by TSECL. Contractors to provide all basic requirements (beds and beddings, mosquito nets, artificial lights, natural lights, windows and ventilation, fans, emergency exits, firefighting equipment, kitchen and dining halls, mobile charging points, toilets and washing facilities, potable drinking water, recreational space etc.) Contractors will use locally sourced materials as far as practical to reduce transportation, but all raw materials will be sourced only from existing licensed sources e.g., aggregates from quarries which hold Prior Environmental Clearance and valid crusher operating documents from SPCB. Records to be kept of all the materials used and source with copies of licenses etc. 						
Generation of construction wastes; use of	<ul style="list-style-type: none"> Use of any asbestos containing materials is prohibited. 	TSECL approved detailed designs	Contractors to reflect in	Pre-construction stage;	TSECL PIU/Electrical Divisions	TSECL PMU/Safeguard	Implement the mitigation measures,

²⁶ https://www.ilo.org/wcmsp5/groups/public/@ed_emp/@emp_ent/@multi/documents/publication/wcms_116344.pdf

					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
hazardous materials	<ul style="list-style-type: none"> • Use of non-PCB based oil for transformers/transformer oil is prohibited. • Use of chlorofluorocarbons (CFCs) and halon-based substances are prohibited. • Equipment purchased by the contractors is to be accompanied by letter from the manufacturer stating that it is guaranteed PCB free and to be labelled as PCB free before its installation. Contractors to provide TSECL with material data sheets for the insulating oil used in transformers. • Contractors to develop as sub-plans of their CEMP reflecting the requirements of the General EHS Guidelines and the ECOP: <ul style="list-style-type: none"> ○ a materials management plan (MMP) and a pollution prevention plan (PPP) covering dust and emissions to air management, noise management, the protection of water resources and environmentally sound and safe storage, use, and disposal of all fuels, chemicals and oils used on site and an emergency preparedness and response plan in the event of any 	<p>minimize impacts and risks on EHS during subsequent stages of the project</p> <p>TSECL approved CEMP and subplans to minimize impacts and risks from hazardous materials and construction wastes during subsequent stages of the project.</p> <p>No breaches of compliance with regulatory requirements or GIIP</p>	contract costs	compliance prior to any works commencing on site including site establishment	supported by PMU	<p>Unit support by PIC</p> <p>Review detailed design, CEMP sub-plans and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.</p> <p>Copy of CEMP and any updates to be attached to EMR during the period in which they are approved.</p>	comply during detailed design and prior to any works commencing on site including site establishment

					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>leaks or spills (e.g., of oil, etc.) or an incident such as flood in accordance with national laws and regulations and the IFC EHS General Guidelines in relation to the use and storage of fuel, oil, and chemical including prevention and control of hazards associated with spill prevention, emergency response, spill clean-up and remediation. No piling or blasting is to be undertaken for construction.</p> <ul style="list-style-type: none"> ○ construction waste management plan (CWMP) dealing with all solid and hazardous waste generated in an environmentally sound and safe manner, per national regulations and the IFC EHS General Guidelines section on Waste Management. Where possible, the CWMP will ensure surplus materials will be reused or recycled, disposal will be the last resort. It will cover the safe and sound handling and management of: 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<ul style="list-style-type: none"> o Food waste which can be composted to reduce the need for landfill o Plastic waste – prioritize reuse and recycling o Other domestic waste e.g., cans, paper etc. much of which will be able to be recycled o Demolition waste e.g., bricks, concrete etc. a lot of which can be reused during construction o Metals – can be recycled o Wood – can be recycled o Hazardous waste including used oil which can be reused o Liquid waste (wastewater) Interstate movement of construction waste will need to be factored in given the given the lack of suitably engineered and licensed solid and hazardous waste facilities within Tripura. Nearest state where suitably licensed hazardous waste management facilities exist is West Bengal (M/s West Bengal Waste Management Ltd. Shrikrishnapur, Purba 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>Midnapore, Haldia, West Bengal - integrated facility- both secured landfill and incinerator). Contractors to provide adequate facilities for the collection, separation, and storage of construction waste (including from temporary workers camps/overnight accommodation) on-site and safe transportation for composting or recycling or disposal through reputable, legitimate, licensed third parties with all waste transfer records retained. Composting of biodegradable waste on-site may be permitted if facilities are established early on having sufficient volume to accommodate both construction and O&M wastes. Leaving or disposing of construction wastes by burying them on-site or disposing of them at unlicensed waste management facilities is strictly prohibited. Unsanitary open dumps in Tripura are not to be used by the contractor or their</p>						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	third parties. Burning of waste on-site is also strictly prohibited.						
Occupational health and safety risks	<ul style="list-style-type: none"> Contractors to comply with Gol labor rules and regulations for the protection of workers; statutory H&S and labor requirements including permits, licenses, and insurances for all workers to be obtained and maintained throughout the project. Contractors to undertake facilitated H&S risk assessment with TSECL through a workshop attended by PMU/PIU/PIC during the detailed design (and at other key stages) so that it can inform both the detailed design and pre-construction preparations, considering both occupational and community H&S risks resulting from subsequent stages of the project. Facilitated workshop will involve the design and construction team of the contractors and TSECL operational staff. Informed by the outcome develop a H&S Plan as a sub-plan to the CEMP to avoid, minimize and mitigate occupational H&S risks in accordance with the IFC EHS General Guidelines sections on Occupational Health and Safety as well as a labor management sub-plan addressing employment of 	<p>TSECL approved detailed designs minimize impacts and risks related to Occupational Health and Safety during subsequent stages of the project</p> <p>Facilitated H&S risk assessment completed before approval of H&S Plan</p> <p>TSECL approved CEMP and subplans to minimize impacts and risks to Occupational Health and</p>	Contractors to reflect in contract costs	Pre-construction stage; compliance prior to any works commencing on site including site establishment	TSECL PIU/Electrical Divisions supported by PMU	<p>TSECL PMU/Safeguard Unit support by PIC</p> <p>Review detailed design, CEMP sub-plans and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.</p> <p>Copy of CEMP and any updates to be attached to EMR during the period in which they are approved.</p>	Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment

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Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>migrant workers, sanitation and welfare, gender-based violence/sexual exploitation, abuse, and harassment prevention etc. TSECL will be required to approve the H&S sub-plan and then ensure their own staff on-site follow it when on site.</p> <ul style="list-style-type: none"> • H&S Plan will include: <ul style="list-style-type: none"> ○ Safety Training Program – to provide general and specialized training courses for all workers on the site and at all levels of supervision and management. General courses will consist of (i) an initial Safety Induction which all workers will be required to attend prior to being allowed to work on site, all visitors and project workers who have not attended the safety induction course must be always accompanied by inducted workers when within the working area. and (ii) periodic safety training refreshers covering similar topics to induction, conducted not less than once every six months. All subcontractor workers will 	<p>Safety during subsequent stages of the project.</p> <p>No breaches of compliance with regulatory requirements or GIIP</p>					

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>be required to participate in relevant training courses appropriate to the nature, scale, and duration of the subcontract. Since they have heightened risk only trained workers must undertake certain activities e.g., working at height, working in confined spaces, working with electricity etc. Workers must have attended such training before they are involved in relevant works and the contractor must either offer an internal training course or organize for attendance at an external specialist training course. Workers must have a training record of attending a suitable training course. Untrained workers will not be permitted to work at height, enter confined spaces, work with live electricity etc.</p> <ul style="list-style-type: none"> ○ Medical Check-Up/Health Surveillance – of workers fitness, eyesight, hearing, respiratory health, and communicable and noncommunicable diseases before works commence; 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>and then repeated every six months by the contractor during construction. Only workers who have passed their fitness test and have the requisite medical clearance must undertake certain activities e.g., working with electricity etc.</p> <ul style="list-style-type: none"> ○ Safety Meetings – as detailed in the IEE/EMP will be conducted monthly during construction phase by TSECL. During construction the meetings will require attendance by the safety representatives of all contractors and subcontractors on-site. The minutes of all safety meetings including actions agreed will be taken and sent to TSECL within seven days of the meeting. ○ Safety Inspections – the contractor will regularly inspect, test, and maintain all safety equipment, scaffolds, guardrails, working platforms, hoists and other lifting equipment, ladders and other means of access, lighting and signage, firefighting 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>equipment, first aid kit, stock take and condition of PPE etc. Signs will be graphic and in the languages of workers, kept clear of obstructions and legible to read. Lighting will meet illumination guidelines for the working area as per IFC EHS Guidelines on OHS. Equipment, which is damaged, dirty, incorrectly positioned or not in working order, will be immediately repaired, or replaced, by the contractor.</p> <ul style="list-style-type: none"> ○ Site Audit - during construction the contractor's H&S officer and TSECL will undertake monthly audits of compliance with the health and safety plan. ○ Personal Protective Equipment (PPE) as a last resort where risks cannot be avoided – workers will be provided (before they start work) with appropriate PPE at no cost to the workers. PPE provided to workers (regardless formal and informal, directly contracted or subcontracted) in 						

Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Responsibilities		
					Implementation	Supervision and Monitoring	Contractor
	<p>accordance with Factories Act 1948, Gol and the Table 2.7.1. Summary of Recommended Personal Protective Equipment according to Hazard in IFC EHS Guidelines on OHS including safety shoes, helmets, goggles, earmuffs, and face masks and ensure that this is always worn by them with a strict disciplinary system (no work condition if not compliant) being enforced for any non-compliance.</p> <ul style="list-style-type: none"> ○ Work Zone Noise Levels: during construction protective measures need to be provided and as per the WB-IFC EHS Guidelines on OHS, Table 2.3.1. sets the level at 85 dB (A) for 8 hours exposure this being more stringent than the Gol requirements will be adopted, as well as 140 dB(C) peak/instantaneous noise exposure for workers working near the high noise generating machinery. High noise work areas must be 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>adequately signposted. In these high noise work areas PPE in the form of sound reducing earmuffs/ear plugs to the workers are to be provided. In the first instance however, reduction in noise levels to the lowest practical level must be achieved by adoption of suitable preventive measures, such as, use of enclosures with suitable absorption material, etc. Workers operating in the high noise work areas will be given auditory tests as part of health surveillance.</p> <ul style="list-style-type: none"> ○ EMF levels at the construction site to be kept within international good practice levels as per ICNRP (reference and peak values) for the occupational exposure. ○ Electricity: IFC EHS Guideline on Electric Power Transmission and Distribution requirements for working with electricity will be observed with only licensed electricians that meet the requirements set 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>out in them allowed to work on live electricity with strict adherence to safety standards including those listed in said guidelines. Live lines will be deactivated and properly grounded before work is performed on, or in proximity, to the lines and this will be checked and certified in writing by the contractor's Health and Safety Officer in advance. While working at heights personal safety measures such as harnesses, tool bags, ropes etc. will need to be provided.</p> <ul style="list-style-type: none"> o Emergency Preparedness and Response Sub-Plan including communication systems and protocols to report an emergency e.g., health emergency, work-related accident including electrocution, traffic accident, accident involving the community, natural disaster including flooding, fire, virus outbreak etc. It will need to be developed in consultation with local 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>emergency services with adequate fire and first aid first-responders based on the construction site to facilitate immediate response. Provide readily available first-aid for workers as well as an ambulance for more serious cases. Make arrangements for a doctor on call and nearest Health Center and/or Hospital for emergency cares of workers. Regular drills will be required involving all workers to prepare for an incident.</p> <ul style="list-style-type: none"> Unless transformers have been certified PCB free workers interacting with them must wear suitable chemical and/or oil resistant gloves, goggles, and protective clothing whilst taking samples and/or working with transformers.²⁷ Water supply to sink/shower and eye wash station to be provided on- 						

²⁷ If oil meets the skin, the workers should immediately rinse the affected area with large amounts of running water. This may be done in a sink if the hands are the only portion of the body contacted or under a safety shower if the exposure area is more extensive. If large parts of the skin met with the oil, the workers should remove contaminated clothing while under the shower for a minimum of 15 minutes. Hand wash, safety shower and eyewash stations are therefore required to be available for immediate use.

Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Responsibilities		
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	<p>site during works due to risk of PCB coming into contact with skin.</p> <ul style="list-style-type: none"> In undertaking H&S risk assessment and preparing H&S Plan adequate attention will be given to the risks associated with COVID-19 pandemic and other communicable viral diseases. National restrictions for containing the spread of COVID-19 must be complied with and ADB guidance to be followed, as well as further guidance detailed in the IEE.²⁸ COVID-19 vaccination program to be completed for all workers before works commencement and kept up to date with booster vaccinations on schedule as recommended by Gol requirements. Construction workers to be given medical checkup per statutory requirements and including checks for COVID-19 symptoms before being allowed on site; 						

²⁸ Contractors will provide adequate sanitation and welfare facilities including hand washing and clean PPE in sufficient quantity on-site and at temporary worker camps/overnight accommodation so workers can follow healthy hygiene practices; contractors will also consider the ability of communities to comply with protective measures such as regular handwashing and the local health care facilities' capacity to deal with any infections agreeing with the nearest Health Center and/or Hospital for emergency cares of workers. Particular attention must be paid to accommodation of the construction workforce to avoid spreading of the virus within the local communities. Include response flow chart and contact details to deal with any construction worker or community member being diagnosed with COVID-19 during the works. To limit contacts and hence contamination risk, the same workers should be grouped in accommodation, transport, and work teams. Practice physical distancing of >1m to lower the risk of disease spread and use a face mask in workplace if physical distancing cannot be maintained. Check health condition of workers on daily basis, for example, use of self-certification forms and temperature checks before being allowed on the construction site. Medical insurance will be provided by contractors for all workers with sick leave allowance to ensure symptomatic workers do not attend site; contractors will avoid no-work-no-pay policies, whereby by fear of not getting paid workers would be tempted to report to work and hide any symptoms.

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>medical records are to be maintained on-site. Ensure employees can take time off sick without being penalized, including any self-isolation for COVID-19 that is required.</p> <ul style="list-style-type: none"> Contractors will set up an accident reporting system for any health and safety incidents (near miss, minor, lost time, fatal) involving workers or community to be reported to TSECL within 24 hours of occurrence with a response plan detailing the incident and how its reoccurrence will be avoided. TSECL to then report any lost time or fatal incidents to ADB within 48 hours. Record of all incidents and response taken should include date, time, details of incident, treatment given and outcome, and lessons learnt for the future. Contractors will ensure all workers are covered by insurance to pay out in the event of a disability or fatality. Emergency contact number and details for medical, fire, etc. are to be displayed in all construction sites. Contractors will provide temporary facilities for construction workers e.g., sanitation and welfare facilities and a good standard of living and 						

Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Responsibilities		
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	<p>working conditions as per national and state laws and regulations and international good practice guidance as per IFC EHS General Guidelines,²⁹ EBRD,³⁰ and ILO³¹ including:</p> <ul style="list-style-type: none"> ○ Indoor toilets (one per six staff) with hand washing facilities and if overnight accommodation³² private bathing area, showers or baths, all connected to existing sewage system or septic tank with soak away, ○ Shaded rest area that is accessible and can accommodate the number of workers on site, ○ Indoor food preparation and separate clean eating area, provision of sufficient fuel supply for cooking other than wood, ○ Enclosed garbage bins for disposal of waste generated by workers, as burning of 						

²⁹ 2007, IFC EHS: <https://www.ifc.org/wps/wcm/connect/1d19c1ab-3ef8-42d4-bd6b-cb79648af3fe/2%2BOccupational%2BHealth%2Band%2BSafety.pdf?MOD=AJPERES&CVID=nPtgxyx>

³⁰ https://www.ebrd.com/downloads/about/sustainability/Workers_accomodation.pdf

³¹ https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:R115#:~:text=The%20aim%20should%20be%20that,the%20purchase%20of%2C%20such%20accommodation .

³² Use of locally hired workers may eliminate the need for the establishment of temporary construction camps by contractors but all employee provided accommodation is to meet EMP requirements.

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>waste will be prohibited, and</p> <ul style="list-style-type: none"> ○ Potability testing before work commencement, drinking water supply that meets Gol drinking water standards to be provided. • Contractors will determine if they source canned drinking water from an existing commercial supplier (as the preferred option) or provide their own source of treated water for workers; all drinking water provided is to be regularly tested and confirmed to meet Gol drinking water standards. For sources other than canned drinking water undertake baseline water quality sampling per EMoP (Appendix 17) to confirm source suitability and, if necessary, provide additional water treatment facilities during construction to facilitate safe drinking water supplies. If contractors use existing or install their own borewell for construction water supply permissions shall be obtained from authorities together with agreement of local communities before abstraction. • Contractor to ensure all members of their project management team, 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>safeguards team, design team, and construction management team attend the TSECL provided EMP trainings.</p> <ul style="list-style-type: none"> Contractors to conduct their own trainings for their construction management and provide all workers and visitors on site, irrespective of them being formally or informally employed by the contractor, subcontractor or third party with an EHS induction before being allowed on site – induction to cover orientation on EHS requirements and roles and responsibilities in relation to EMP implementation, dos and don'ts in relation to the construction site, employer provided staff accommodation, code of conduct and interaction with local communities, protected areas, forest land, interaction with wildlife etc. Contractors to ensure topics covered by training and induction include, but are not limited to, good housekeeping at all times; environmentally safe and sound waste management practices; hygiene and communicable disease prevention including COVID-19 and HIV/AIDS; gender-based violence and sexual exploitation, abuse and 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>harassment prevention; code of conduct, interaction with local communities and culturally acceptable practices; biodiversity conservation awareness; fire safety prevention; prohibition on firewood collection by workers; prohibition on trapping, hunting, fishing, or poaching by workers; chance find procedures; H&S including use of PPE; etc.</p> <ul style="list-style-type: none"> • Prior to site establishment, contractors will prepare with guidance of labor experts a worker Code of Conduct and information video/brochure/leaflet for distribution to all workers during induction addressing culturally acceptable practices etc. Code must be informed by the CEMP and address the following aspects: <ul style="list-style-type: none"> ○ Zero tolerance in respect of health and safety ○ Requirement on always wearing PPE on site ○ Zero tolerance of bribery or corruption ○ Respect for local community and customs, avoiding community conflict situations especially in tribal areas 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<ul style="list-style-type: none"> ○ Zero tolerance of illegal and unacceptable activities/behavior, including but not limited to engagement in: prostitution; gender-based violence/sexual exploitation, abuse, and harassment; illegal sale or purchase of alcohol; sale, purchase, or consumption of drugs; gambling; fighting ○ Alcohol and drugs policy and testing regime ○ Role of workers in good housekeeping ○ Role of workers in maintaining good hygiene including COVID-19 measures e.g., social distancing ○ Respect of wildlife and the environment ○ Description of disciplinary measures for infringement of the code of conduct and other employer rules (e.g., immediate removal from site, fine etc.) ● Contractors to familiarize and ensure their workers are aware of the cultural requirements of the areas in which works are 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>undertaken, especially TTAADC and minority community villages, and reflect this in the code of conduct.</p> <ul style="list-style-type: none"> • Contractor to consider the use of security personnel to ensure workers comply with the code of conduct especially adjacent to the international border and in other areas with a higher conflict risk.³³ • For security purposes escorts from Tripura State Rifles may be requested from the State Home Ministry if the conflict situation is assessed as hostile by TSECL otherwise contractor is to provide security personnel. • Contractors will prepare with guidance of health experts HIV/AIDS/COVID-19 information video/brochures/leaflets for distribution to all workers during induction, covering factual health issues as well as behaviour change issues (e.g., social distancing for COVID-19) around the transmission and infection of HIV/AIDS/COVID-19 and other communicable diseases. • Contractors to conduct regular emergency preparedness and response drills involving all workers 						

³³ [Good Practice Handbook: Use of Security Forces: Assessing and Managing Risks and Impacts \(ifc.org\)](https://www.ifc.org/good-practice-handbook-use-of-security-forces-assessing-and-managing-risks-and-impacts)

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>irrespective of them being formally or informally employed by contractor, subcontractor or third-party to prepare them in case of an environmental or health and safety incident including fire, spillage, natural disaster, disease outbreak, etc. It will also cover identifying and reporting wildlife incidents and the risk of forest fire.</p> <ul style="list-style-type: none"> • Emergency preparedness and response training for construction management will include modules on first aid and fire safety including include training on how to use first aid and firefighting equipment provided on-site, and the scenario of a potential or confirmed COVID-19 infection • Contractors to continue to deliver short monthly EHS refresher sessions to construction management and all workers and cover pertinent environmental, health and safety topics on daily basis in toolbox talks to be delivered to all workers. • Contractors to ensure workers with a specific role have, before been allocated the task, attended specialized health and safety trainings related that role e.g., health and safety stewards, first aiders, fire safety officers, as well as 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	ensuring workers have received task-specific trainings for working at height, demolition, working with electricity, etc. Only allow suitably trained and qualified workers to work on electrical equipment and at height, these workers must have training record of attending suitable training course on electrical safety and working at height and be provided with and wear the appropriate PPE for their role. Untrained workers must not be permitted to work with live electricity or at height.						
Community health and safety risks	<ul style="list-style-type: none"> Insurance to include a community liability clause for payment of compensation in case of any accidents because of construction. Contractors to undertake facilitated H&S risk assessment with TSECL through a workshop attended by PMU/PIU/PIC during the detailed design (and at other key stages) so that it can inform both the detailed design and pre-construction preparations, considering both occupational and community H&S risks resulting from subsequent stages of the project. Resulting H&S Plan especially the Emergency Preparedness and Response Sub-Plan will address the management 	<p>TSECL approved detailed designs minimize impacts and risks related to Community Health and Safety during subsequent stages of the project</p> <p>Facilitated H&S risk assessment completed</p>	Contractors to reflect in contract costs	Pre-construction stage; compliance prior to any works commencing on site including site establishment	TSECL PIU/Electrical Divisions supported by PMU	<p>TSECL PMU/Safeguard Unit support by PIC</p> <p>Review detailed design, CEMP sub-plans and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.</p> <p>Copy of CEMP and any updates</p>	Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>of both occupational and community health and safety risks.</p> <ul style="list-style-type: none"> Contractors in conjunction with local municipalities, tribal/village heads, and the media with the support of CSOs to organize health and safety campaigns for construction and electrical safety community awareness raising activities in local communities and schools within 500 m of the substations/test laboratory and 50m of the distribution line ROW (UG and OHL) prior to construction and then again prior to commissioning of substations/energizing the distribution lines/installation of smart meters about how to avoid electrical incidents having greater emphasis on operational hazard and risks, etc. In particular, the local community is needing to be educated by the contractors and TSECL with respect to the importance of maintaining the horizontal and vertical clearance from buildings in order that they do not erect new buildings within this zone as has reportedly occurred in all the instances where safety clearances are breached. Community awareness programs will use distribution of posters, leaflets, and safety booklets to all households in Bengali language 	<p>before approval of H&S Plan</p> <p>TSECL approved CEMP and subplans to minimize impacts and risks to Community Health and Safety during subsequent stages of the project.</p> <p>No breaches of compliance with regulatory requirements or GIIP</p>				<p>to be attached to EMR during the period in which they are approved.</p> <p>Awareness raising will be documented and reported in EMRs including photos and records of participants (including the gender breakdown data)</p>	

					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>within 500m of the substations and 50m along the RoW distribution lines as well as face-to-face orientation at the village/community level. Translations will also be available in local languages in the TTADC area and other areas with tribal or minority communities. These posters and safety booklets will be available to also pick up within substations, local electrical offices of TSECL.</p> <ul style="list-style-type: none"> Contractors to develop and distribute leaflets/pamphlets/posters to the local community covering (i) health awareness including HIV/AIDS/Covid-19 and other communicable diseases, and (ii) the conduct of construction workers that can be expected. 						

Table 3: Environmental Mitigation Plan–Substations (SS)³⁴ and Test Laboratory

Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Responsibilities		
					Implementation	Supervision and Monitoring	Contractor
Detailed Design/Pre-construction Preparations Phase							
Existing substations corrective actions	<ul style="list-style-type: none"> TSECL will comply with the short-term corrective actions before access is granted to the contractor or incorporate corrective action requirements into the bidding and contract documents so that the contractor is responsible to address them. TSECL to submit a report on status of short-term corrective actions to ADB for clearance prior to the contractor being given access to the substation in question to undertake construction work. TSECL will comply with the long-term corrective actions before commissioning of the substations by the contractors; they will undertake corrective actions that may involve works as either a separate undertaking or include it in the scope of the contract so that the contractor is responsible to address them. TSECL to submit a report on status of long-term corrective actions to ADB prior to commissioning of substations by the contractors 	Existing facilities comply with the national laws and regulations and ADB Safeguard Policy Statement 2009 requirements	TSECL counterpart fund, costs to meet CAP before commissioning will be borne by TSECL.	For the existing substations short-term corrective actions to be complied with by TSECL prior to granting access to the contractor with long-term corrective actions complied with before commissioning of the substations	TSECL PIU/Electrical Divisions supported by PMU	TSECL PMU/Safeguard Unit support by PIC	N/A unless included by TSECL in scope of contract, in which case implement the mitigation measures

³⁴ For the installation of RMU and other distribution line equipment in the public domain (outside the boundary of existing substations) the distribution line mitigation is to be followed by the Package 1 contractor in addition to the requirements of this mitigation plan (O&M of the RMU is covered by this EMP)

Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Responsibilities		
					Implementation	Supervision and Monitoring	Contractor
For upgrading of existing substations	<ul style="list-style-type: none"> Contractors at request of TSECL to address any short-term or long-term corrective actions as part of their scope of works in undertaking works at the 27 existing substations. 	<p>100% of short-term corrective actions implemented in a timely manner prior to contractor being given access.</p> <p>100% of long-term corrective actions implemented in a timely manner prior to commissioning of substations.</p>	Contractors to reflect in contract costs	For the existing substations short-term corrective actions to be complied with prior to commencement of works with long-term corrective actions complied with before commissioning of the substations	TSECL PIU/Electrical Divisions supported by PMU	TSECL PMU/Safeguard Unit support by PIC	Implement the mitigation measures
EMP in detailed design, EHS impacts and risks of the project during construction in general, planning for onsite EHS management and preparation of CEMP	<ul style="list-style-type: none"> Detailed design to ensure works will only take place on modified habitat found within the boundaries of the existing substation/electrical subdivision office, and that no trees need to be cut. There is a huge banyan tree (<i>Ficus bengalensis</i>) within the proposed Tilla Bazar SS which shall not be felled. For sources of operational drinking water undertake baseline drinking water quality sampling per EMoP (Appendix 17) to confirm source suitability and provide water treatment facilities (RO) that 	TSECL approved detailed designs minimize impacts and risks on EHS during subsequent stages of the project	Contractors to reflect in contract costs	Pre-construction stage; compliance prior to any works commencing on site including site establishment	TSECL PIU/Electrical Divisions supported by PMU	<p>TSECL PMU/Safeguard Unit support by PIC</p> <p>Review detailed design and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.</p>	Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment

					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>facilitate safe drinking water supplies meeting GOI drinking water standards.</p> <ul style="list-style-type: none"> • Permissions for any new borewell installation shall be obtained from authorities including NOC from Central Ground Water Board together with agreement of local communities before abstraction. Detailed design to include water meters for monitoring of water abstracted. • Detailed design to minimize visual impact and clutter. • Detailed design to maintain topography of the sites as far as practical and minimize the extent of earthworks and thus dust. During detailed design, contractors will quantify extent of earthworks required, amount of spoil to be generated and location for disposal of excavated spoil through landscaping within the site boundary – generation of excess spoil to be avoided. • Contractors to identify presence of any unstable land and conduct geotechnical/slope stability analysis with slopes to be graded with drainage installed to minimize landslide risk. Ensure resulting slope design/topography does not exacerbate surface erosion and/or 						

Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Responsibilities		
					Implementation	Supervision and Monitoring	Contractor
	<p>trigger a landslide; all disturbed areas are to be revegetated. Bioengineering methods can be considered for slope protection.</p> <ul style="list-style-type: none"> • Conduct drainage risk assessment and incorporate effective drainage design (allowing for climate change) to prevent possible flooding or waterlogging of the substation during the wet season, whilst ensuring that surface runoff from the project site is no more than the existing runoff rate. • For the test laboratory install a secure boundary fence or wall that is sufficiently high it cannot be climbed over, the test laboratory is to be fenced off from the subdivisional office so that only test laboratory workers will have access to it • For the test laboratory install a gated, safe vehicular access for entry/exit off public highway having adequate sight lines for all drivers and warning signs of entranceway (existing site entrance can be used) • For test laboratory building contractor to provide adequate natural and/or artificial lighting levels to meet the IFC EHS Guidelines on Occupational H&S (<i>Table 2.3.3. Minimum Limits for Workplace Illumination Intensity</i>) 						

					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>and take a life-cycle approach to detailed design, considering the use of construction materials and the energy and water efficiency of the building during operation adopting the “green building” concept e.g., using natural ventilation for reducing the need for air conditioners. Detailed design is to include rainwater harvesting and enable TSECL to readily fit solar panels on building rooftop once operational.</p> <ul style="list-style-type: none"> • Detailed design to ensure all lighting is of energy efficient LED type with solar powered LED lighting where practical Use of fluorescent/HPSV lamps will be avoided since they are less energy efficient/classed as hazardous waste for purposes of disposal. • Outdoor lighting to be installed must be of low intensity with little or no blue wavelength and operated using passive infrared (PIR) technology movement sensors set at person height so as not to be kept permanently on overnight, it must be directional and shielded, so light does not fall outside the substation/test laboratory boundaries. • For test laboratory DG set for emergency power back up will be a 						

Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Responsibilities		
					Implementation	Supervision and Monitoring	Contractor
	<p>“green” generator type – a silent or soundproofed generator housed within enclosure which will meet GoI emission standards and CPCB/GIIP stack design requirements.</p> <ul style="list-style-type: none"> For test laboratory detailed design will provide for sanitation and welfare facilities as per national and state laws and regulations and international good practice guidance as per IFC EHS General Guidelines,³⁵ EBRD,³⁶ and ILO³⁷ including indoor toilets (one per six staff and separate for men/women) with hand washing facilities connected to septic tank with soak away and a dedicated cooking area / clean eating area / rest area for staff on-site etc. Dedicated shelter to be provided at the site entrance for use by security guards, shielding them from rain, wind, and extreme (hot / cold) temperatures. 						

³⁵ <https://www.ifc.org/wps/wcm/connect/1d19c1ab-3ef8-42d4-bd6b-cb79648af3fe/2%2BOccupational%2BHealth%2BAnd%2BSafety.pdf?MOD=AJPERES&CVID=nPtqyx>

³⁶ https://www.ebrd.com/downloads/about/sustainability/Workers_accommodation.pdf

³⁷ https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:R115#:~:text=The%20aim%20should%20be%20that,the%20purchase%20of%2C%20such%20accommodation .

					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<ul style="list-style-type: none"> Detailed design of building to include emergency exits with emergency exit signage Provide fully stocked, in-date first aid kit installed in a prominent, signed position, first aid posters and emergency contacts to also be displayed Provide eye wash station and water supply to shower located near the storage areas for fuel/oil/chemicals Provide sand buckets, full of sand, placed in a prominent, signed location near to fire-risk locations such as transformers and oil storage areas Provide fire extinguishers (including for oil and electric fires) in a prominent, signed location near to fire-risk locations such as transformers and oil storage areas with service and expiration dates clearly labelled Provide automatic fire alarm and fire suppression system in test laboratory building along with posters on fire safety. All electrical hazards will feature written and visual warning signs that meet the IEEE standards to include the ISO 7010 "Hazard Type: Electrical Symbol" warning of the risk of electrocution. 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
Procurement of gas insulated equipment including ring main units (RMU) – release of SF6 as GHG	<ul style="list-style-type: none"> Use of alternative insulation medium (such as Hydrophobic Cycloaliphatic Epoxy) to be considered as the preferred option. If no alternative the use of SF6 in gas insulated equipment must be minimized. Detailed design of any gas insulated equipment will comply with international norms and standards for handling, storage, and management of SF6. Equipment to be hermetically pressure sealed “sealed for life” units, contain less than 2 kg of SF6 and be tested and guaranteed by the supplier at less than 0.1% leakage rate. SF6 leakage detection kit to be provided for O&M. SF6 in fire extinguishers provided at substations should also be avoided. 	TSECL approved detailed designs minimize impacts and risks on EHS during subsequent stages of the project, all SF6 project equipment must have <0.1% leakage rate etc.	Contractors to reflect in contract costs	Pre-construction stage; compliance prior to any works commencing on site including site establishment	TSECL PIU/Electrical Divisions supported by PMU	TSECL PMU/Safeguard Unit support by PIC Review detailed design and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.	Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment
Renovation/ repair/civil works at substations and construction of test laboratory - installation of new equipment and control systems – increased dust and noise levels, waste generation,	<ul style="list-style-type: none"> Design of all new substation transformers to be mounted on impermeable surface bunded to 110% capacity to collect oil spill, leaks, and overflows; transformers to be sited in a fenced area that can be kept locked. Provision of oil-water separator on all surface water drainage. Provide well designed, covered, segregated materials and waste storage area of sufficient size to accommodate all anticipated 	TSECL approved detailed designs minimize impacts and risks on EHS during subsequent stages of the project	Contractors to reflect in contract costs	Pre-construction stage; compliance prior to any works commencing on site including site establishment	TSECL PIU/Electrical Divisions supported by PMU	TSECL PMU/Safeguard Unit support by PIC Review detailed design and prerequisite inputs to confirm all measures required by the EMP have been adequately	Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment

					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
accidental spillage, and leakage of oils	<p>storage requirements, ensure storage areas can be locked, are well-ventilated and will not reach extreme temperatures. Ensure space also provided in the storage area for solid and hazardous waste garbage bins to be stored. Fuel/oil/chemical/waste storage areas must have an impervious floor and be bunded so that the capacity of each bund is sufficient to contain at least 110% of the maximum design storage capacity within storage area.</p> <ul style="list-style-type: none"> • Design of outdoor storage area for transformers at test laboratory to be an impermeable surface bunded to 110% capacity to collect oil spill, leaks, and overflows. • Impermeable floors and bunds must be made of a sufficiently impervious surface to allow for the retention and easy recovery of any liquid, they must not be connected to the surface water drainage system. • Provide spill prevention kits (sorberent pads, loose sorberent material, etc.) at storage areas and other at-risk locations within clearly labelled containers. • For test laboratory detailed design to include for installation of a septic tank with soakaway to which all wastewater to be connected so no 	<p>Compliance with noise levels: 1-hour LAeq 70 dB(A) at the site boundary, 55dB(A) within commercial zones, 45 dB(A) at the nearest residential properties including those in commercial zones and 40dB(A) within 100m buffer of silent zones</p> <p>Compliance with ICNRP occupational/ community EMF exposure levels (reference and peak values)</p>				incorporated.	

					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>untreated wastewater will be disposed of to surface water or ground in operation, septic tank/soakaway effluent to meet GOI wastewater standards.</p> <ul style="list-style-type: none"> • Locate new transformers; storage areas; and septic tanks/soak away at least 50m from ponds and borewells to reduce pollution risk, if closer proximity is required due to site layout further assessment to be carried out by contractors to demonstrate using a source-pathway-receptor model there will be no adverse impact on aquatic ecology or human health. • Detailed design to ensure maximum sound power level of equipment at 1 m is 85 dBA through use of sound attenuation, in areas where these noise levels will be exceeded OHS noise warning signage identifying that ear protection to be worn must be installed as part of detailed design. • Layout bay extensions so transformers are the furthest distance possible from the adjacent receptors to minimize noise generated from operation. Where possible the quietest available equipment with manufacturer-supplied noise mitigation will be installed. 						

					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<ul style="list-style-type: none"> Contractors to ensure that the detailed design enables operation to always comply with 1-hour LAeq 70 dB(A) at the site boundary, 55dB(A) within a commercial zone, 45 dB(A) at the nearest residential properties including those in commercial zones, and 40dB(A) within 100m buffer silent zones as identified in Table 4-30 of the IEE. If after detailed design the noise levels at the site boundary or receptors will exceed the required noise levels, then an acoustically designed noise barrier will need to be installed around the substation/test laboratory perimeter to enable the required noise level to be met. As operational noise is permanent the acoustic noise barrier will need to be a permanent installation as part of the detailed design. Contractors will also ensure that ICNRP occupational/community EMF exposure levels (reference and peak values) will be achieved 						
Pre-Construction Enabling Works, Construction, and Commissioning Phases							
Generation of dust, noise and general disturbance and disruption to affected	<ul style="list-style-type: none"> Comply with the EMP including ECOP during construction works and contractors' approved CEMP including MMP and PPP sub-plans 	Compliance with GoI and GoT regulations and	Contractor to reflect in contract costs	Prepare during pre-construction and comply throughout construction	TSECL PIU/Electrical Divisions supported by PMU	TSECL PMU/Safeguard Unit support by PIC	Implement mitigation measures for the duration of construction

					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
communities and vegetation/trees/wildlife	<ul style="list-style-type: none"> Provide at least one-month advance notice to local community through tribal/village heads about the schedule of and details of planned construction works and continue to undertake consultation with affected persons Ensure all stationary emission sources are maintained in good working order in accordance with manufacturer instructions and have passed applicable emission tests. Hold valid PUC emission certificates of all construction vehicles Open burning of wastes generated by project-related activities to be strictly prohibited Minimize removal of existing vegetation and topsoil. Slope stability measures identified during detailed design to be implemented during construction to minimize landslide risk. Excavated spoil to be reused as a landscaping material. Topsoil disturbed will be separately stored and used to restore exposed surfaces which will be promptly revegetated with native species to Tripura including areas used for temporary construction facilities. 	<p>guidelines including emission standards</p> <p>No increase in existing background air pollution levels</p> <p>Compliance with noise levels: 1-hour LAeq 70 dB(A) at the site boundary, 65dB(A) at the nearest commercial properties, 55 dB(A) at the nearest residential properties including those within commercial zones and 50dB(A) within 100m of silent zones (no nighttime work is allowed).</p>		stage (mobilization, construction, and commissioning works)			

	<ul style="list-style-type: none"> • Keep stockpiles of soil, aggregate and waste materials covered with canvas or tarpaulin when spoil heaps are not active to avoid suspension or dispersal of fine soil particles during windy days and to prevent disturbance by stray animals and stored at least 10m from waterbodies. • Excavation and other earthworks will be conducted during the dry season to minimize soil erosion and sedimentation of watercourses although this has potential to exacerbate dust impact. • During the dry season or in windy conditions undertake water sprinkling at least twice a day on unsurfaced areas. • During night no works will be permitted at substations/test laboratory. Daytime for purposes of noise monitoring is taken as from 6am to 10pm. Contractors working hours (including the movement of heavy vehicles for construction on off-site access roads) will be 7 am – 7 pm. • Residents within 500m will be informed well in advance of the construction schedule for noisy activities taking place on-site. Noisy construction activity at substations (especially earthworks) will only take place between the hours of 8 am - 6 pm. No noisy work and heavy vehicle movements will take place on Saturdays and during school/college/university exam periods. 	<p>EMP/CEMP requirements successfully implemented as determined through regular site checks, photographic record etc.</p> <p>No outstanding biodiversity, dust, noise and general disturbance and disruption grievances from local communities or other interested stakeholders</p>					
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					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<ul style="list-style-type: none"> No work on Sundays, holidays and festival days. Sensitive receptors to be consulted with any other special days when they would wish noise levels to be minimized. For substations with properties in 50m loud construction noise must be limited to only very short periods of activity to minimize disturbance. Layout substations/test laboratory to keep noisiest construction works the furthest distance possible from adjacent receptors and adopt construction methods that ensure noise generated from construction is minimized. Construction noise (only daytime) will be limited to 1-hour LAeq 70 dB(A) at the site boundary, 65dB(A) in commercial zones, 55 dB(A) at the nearest residential properties including those in commercial zones, and 50dB(A) within 100m buffer of silent zones as identified in Table 4-30 the IEE. If the noise levels at the site boundary or receptors will exceed the required noise levels, are more than 3dBA above background when already exceeded, or there are complaints then a temporary acoustically designed noise barrier will need to be installed around the substation/test laboratory perimeter 						

Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Responsibilities		
					Implementation	Supervision and Monitoring	Contractor
	<p>to be able to meet required noise level.</p> <ul style="list-style-type: none"> • Sound levels received by workers must not be over 85 dB(A) during continuation of 8 working hours without wearing PPE. • Contractors to undertake quantitative air and noise quality monitoring as per the EMoP (Annexure 17) • In addition to quantitative monitoring (as per EMoP) contractors will undertake weekly dust soiling checks of surfaces of adjacent properties during earthworks and help with cleaning of external surfaces of property if dust is evident. • If air and noise standards/guideline levels are exceeded, an increase in existing background air pollution or noise (>3dB) levels is recorded where they were already exceeded, or complaints are received contractor will be required to implement additional dust or noise mitigation e.g., barricading/isolating sources of dust, use of wheel wash, adjusting working methods, or placing of temporary acoustically designed noise barriers to ensure the standard/guideline is met. 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<ul style="list-style-type: none"> No trees will be cut at substations test laboratory Trainings will be provided to workers on identification of threatened species, dos and don'ts regarding chance encounter with wild animals (especially those species that can be dangerous to man like snakes, elephants, bison, leopards, bears etc.) and wildlife rescue protocols; contacts of District Forest Officer will be displayed in the contraction office 						
Generation of construction wastes and use of hazardous materials	<ul style="list-style-type: none"> Comply with the EMP including ECOP during construction works and contractors' approved CEMP including PPP and CWMP sub-plans, following the General EHS Guidelines including on the use and storage of fuel, oil, and chemical including prevention and control of hazards associated with spill prevention, emergency response, clean up and contaminated soil remediation. 	<p>Compliance with GoI and GoT regulations and guidelines including discharge standards</p> <p>No deterioration in soil and water quality from baseline levels</p> <p>EMP/CEMP requirements successfully implemented as</p>	Contractor to reflect in contract costs	Prepare during pre-construction and comply throughout construction stage (mobilization, construction, and commissioning works)	TSECL PIU/Electrical Divisions supported by PMU	TSECL PMU/Safeguard Unit support by PIC	Implement mitigation measures for the duration of construction

	<ul style="list-style-type: none"> • Contractor to provide adequate facilities for handling and storage of construction materials to reduce the amount of waste that is caused by damage or exposure to the elements and a system for the collection/storage of wastes generated. • Fuel, oil, and chemicals used to be kept under lock and key and stored in labelled, sealed containers on drip trays to provide secondary containment. In designated storage areas, they will be located on an impermeable surface and be under cover. • Provide spill prevention kits (sorbent pads, loose sorbent material, etc.) at storage areas and other at-risk locations within clearly labelled containers. • Provision of designated hard standing areas for equipment servicing, refueling and wash down at least 50m from watercourses, springs, and wells, with drainage directed through oil and grease interceptors before being discharged into a settling pond prior to discharge offsite. • No wastewater will be discharged direct to surface waterbodies or groundwater without adequate treatment. Use of pit latrines is prohibited as is open defecation and urination. Provision of adequate on-site sanitation facilities including septic tanks with soak-aways or alternative temporary sanitary facilities that do not allow untreated 	<p>determined through regular site checks, photographic record etc.</p> <p>No outstanding pollution or waste related grievances from local communities or</p> <ul style="list-style-type: none"> • other interested stakeholders 					
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	<p>disposal of sewage to adjacent water bodies e.g., portable toilets where the wastewater generated is enclosed in a container and will later be taken offsite for wastewater treatment and disposal.</p> <ul style="list-style-type: none"> • Minimize waste generation, restrict use of plastics and polyethene and use recyclable/biodegradable materials during construction to the extent possible • Any plant or equipment that is rejected during the installation and commissioning due to damage or failure to immediately be removed from the site and returned to the supplier • Constructions wastes, rejects, parts, etc. are not to be dumped outside substation boundary but stored for disposal in a temporary designated storage area. • Site surrounding soil contamination/exposed to oil leakage to be assessed for potential contamination and appropriate removal and/or remediation measures for any oil or PCB contamination implemented, as addressed in the section on contaminated soil in the General EHS Guidelines. • It must be ensured that spoil reused on site is not contaminated with solid and hazardous waste (including oil spills) by maintaining good housekeeping and waste segregation/storage/transport/disposal. If spoil is contaminated it will need to be taken off site by a 						
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					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	licensed waste management operator for disposal at a licensed waste management facility suitable for accepting hazardous waste.						

	<ul style="list-style-type: none"> • Records of excavated spoil, generated waste, and transfer records will be kept by the contractors. Contractors will keep copies of the waste management company's licenses on file at the site office. Document all volumes and types of wastes generated and removed off site (inert, solid, hazardous) using transfer notes, to be taken by licensed waste contractors who should reuse/recycle or dispose of the waste according to type to suitably licensed and engineered waste management facilities. • Collect and transport construction waste to appropriately engineered and licensed solid/hazardous waste management facilities. No licensed engineered solid or hazardous waste landfill exists in Tripura, licensed landfills that are available are unsanitary open dumps and are not to be used by the contractor. Municipal waste collection systems must not be used as this is likely to mean that the waste is open dumped. Hazardous waste will need to be safely stored for disposal per the GoI Hazardous Waste (Management, Handling & Transboundary) Rule 2016 as amended in neighbouring state due to lack of facilities in Tripura - West Bengal where suitably licensed hazardous waste management facilities exist. • Removed electrical and mechanical equipment will be handed over to 						
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	<p>TSECL or transported to designated TSECL Circle warehouse as per the direction of TSECL who will reuse or recycle using SPCB authorized vendors as per the condition of the equipment, if fit for use they will be stored for reuse by TSECL or they will be auctioned off as scrap material. Disposal of old transformers and other hazardous wastes shall be as per the Hazardous and Other Wastes (management and transboundary movement) Rules, 2016, GoI. Other wastes will be recycled using SPCB authorized vendors or suitably engineered and licensed waste management facilities for inert or solid waste.³⁸</p> <ul style="list-style-type: none"> • TSECL and contractors involved with the decommissioning and disposal of old transformers will be required to follow the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 for transport, storage, and disposal of potentially PCB oil containing transformers. Disposal must involve facilities capable of safely transporting (closed trucks) and disposing of hazardous waste containing PCBs. In stores, these transformers will need to be stored undercover on a bunded concrete pad or drip tray enough to contain 110% of the liquid contents should they spill or leak. 						
Occupational and community	<ul style="list-style-type: none"> • Comply with the EMP including ECOP as well as following the agreed detailed design, complying 	Compliance with Gol and GoT	Contractor to reflect in contract costs	Prepare during pre-construction	TSECL PIU/Electrical Divisions	TSECL PMU/Safeguard	Implement mitigation measures for

³⁸ TSECL to establish a contract/MOU with the nearest solid and hazardous waste management facility (West Bengal) and licensed waste recyclers in Assam for the environmentally safe and sound disposal of all its solid and hazardous wastes

<p>health and safety risk</p>	<p>with approved CEMP including H&S and labor management sub-plans and the IFC EHS General Guidelines in relation to occupational/community H&S including the IFC EHS Guideline on Construction and Demolition and the IFC Electric Power Transmission and Distribution Guidelines and avoid H&S incidents by taking a “zero tolerance” approach to the works.</p> <ul style="list-style-type: none"> • Contractor is responsible for ensuring H&S of everyone on construction site including visitors and sub-contractor workers regardless they have been formally or informally employed. • Ensure adequate health and safety supervision is always on site (if staff temporarily off sick or on short term leave of less than a fortnight contractor to provide a named alternate in advance; if safeguard staff are on longer term leave, are posted elsewhere, or resign, contractor to ensure replacement CV is submitted to TSECL in 7 days of the contractor becoming aware with the staff joining the site within one month) • Require workers to confirm they have seen and understood the requirements of the health and safety plan before proceeding with the work. • Construction plant and equipment used on or around the site will be modern and fitted with appropriate safety devices. 	<p>regulations and guidelines</p> <p>No fatalities or lost time incidents 100% of H&S incidents including near miss recorded, immediately investigated, and corrective action taken to prevent repeat.</p> <p>EMP/CEMP requirements successfully implemented as determined through regular site checks, photographic record etc.</p> <p>No outstanding health and safety grievances from workers, local communities or other interested stakeholders</p>		<p>and comply throughout construction stage (mobilization, construction, and commissioning works)</p>	<p>supported by PMU</p>	<p>Unit support by PIC</p>	<p>the duration of construction</p> <p>Any incidents and how they were handled, will be reported in monthly progress reports by the contractor to the TPGL.</p> <p>Any long-term absences of safeguards staff will be approved by TSECL within 7 days of receiving official applications with CV of nominated alternate or replacement. CV may be declined if not comparable to the original staff.</p>
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	<ul style="list-style-type: none"> • Ensure adequate health and safety signage is provided – using graphics and in Bengali and other languages of the workers found on site. • MSDS or equivalent data/information in Bengali and other languages of the construction workers are to be readily available to any exposed workers and the first-aid personnel. • Ensure good housekeeping at construction site, storage areas, staff accommodation, etc. -- to be kept neat and tidy, e.g., no materials, equipment, trash laying around, cleanup worksites so that they are free of debris on daily basis. • If works are not completed within the day the contractor must not leave any hazardous conditions (e.g., unsigned, unfenced, and unlit open excavations without means of escape and emergency contacts in case an accident occurs) overnight unless absolutely no access by public can be ensured. • Contractors to avoid busy settlements and/or sensitive habitation for transportation of equipment and construction materials and systems to SS outside the dense urban areas. • In the dense urban areas transport equipment only during non-rush hours i.e., avoid the hours of 6am to 8 am and 4pm to 6 pm to minimize traffic congestion. 						
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					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<ul style="list-style-type: none"> Road safety standards and norms to be strictly implemented by contractor, construction vehicles to strictly follow GoI road regulations 						
Operational and Maintenance Phase							
EHS impacts and risks of the project during O&M in general	<ul style="list-style-type: none"> For test laboratory obtain National Accreditation Board of Testing and Calibration Laboratories (NABL) accreditation as per IS: 17025:2005 (general requirements for all competence of testing and calibration laboratories) For SS and test laboratory develop operational SOP building on corrective action plan and covering pollution control, solid and hazardous waste management, health and safety risk assessments and management plans addressing both occupational and community risks and including permit to work system of critical activities such as electrical or work at height and emergency preparedness and response provisions (content will be similar to those of the construction phase but tailored to reflect operational aspects) Substation/test laboratory workers will need to be trained in SOP and good housekeeping practices including how to clean up oil/fuel spills and dispose of contaminated 	<p>Compliance with GoI and GoT regulations and guidelines</p> <p>No fatalities or lost time incidents 100% of H&S incidents including near miss recorded, immediately investigated, and corrective action taken to prevent repeat.</p> <p>Compliance with noise levels: 1-hour LAeq 70 dB(A) at the site boundary, 55dB(A) within</p>	<p>TSECL internal cost</p> <p>Test laboratory contractor to reflect in contract costs</p>	<p>Prepare during pre-construction/ construction phase and comply throughout O&M</p>	TSECL PIU/Electrical Divisions	TSECL PMU/Safeguard Unit	<p>For test laboratory contractor for first six months before handover to TSECL.</p> <p>Contractor will provide comprehensive theoretical and hands-on training for nominated TSECL staff to operate the test laboratory independently. Further for the first six months trained staff shall be provided by the contractor to operate the test laboratory</p>

					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>sorbent material which would be treated as hazardous waste etc.</p> <ul style="list-style-type: none"> • During maintenance activities mitigation measures applicable to the construction phase are also applicable to TSECL maintenance workers or contractors and are to be followed • Material Safety Data Sheets for all fuel/oil/chemical kept on site to be posted • Records volumes of waste generated and keep transfer records at the substation/test laboratory with copies of the waste management company's licenses on file. • For test laboratory DG set emission standards will be regularly checked using a third party NABL laboratory once every 6 months • During O&M, internal audits will be undertaken by the TSECL E&S Safeguards Officer and Health and Safety Officer 	<p>commercial zones, 45 dB(A) at the nearest residential properties including those in commercial zones and 40dB(A) within 100m of silent zones</p> <p>Compliance with ICNRP occupational/community EMF exposure levels (reference and peak values) at substations</p> <p>EMP requirements</p>					<p>whilst providing on the job training for the nominated TSECL staff, during this period they will be responsible for O&M EMP implementation.</p>

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
Gas insulated equipment including ring main units (RMU) – release of SF6 as GHG	<ul style="list-style-type: none"> Inventory to be maintained of all SF6 containing equipment at SS and RMU, their make and model, volume of SF6 contained, details of repair works undertaken, dates of SF6 replenishment, leakage incidents etc. Inventory to be used to monitor SF6 leakage from SS and RMU. If trend of lowering gas pressure is observed investigate the cause and rectify any leak per the manufacturer’s instruction. If SF6 used on site or in RMU carry out regular inspections and periodic preventative maintenance to minimize SF6 leakages; monitor SF6 leakage rates using leak detection equipment For RMU SF6 leakages to trigger an alarm at the nearest concerned SS from which staff at to immediately attend to stop the leakage. SOP to define a safe SF6 retrieval arrangement with appropriate handling, storage, disposal process for end-of-life circuit breakers and RMU equipment by a certified industrial waste management company who will need to remove SF6 and treat the equipment prior to disposal in accordance international good practice 	<p>successfully implemented as determined through regular site checks, photographic record etc.</p> <p>No outstanding grievances from local communities or other interested stakeholders</p>					

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	International Electrotechnical Commission (IEC) standard 61634 to ensure SF6 not released to atmosphere.						
Use of mineral oil for transformers – accidental spillage contaminating both land and water	<ul style="list-style-type: none"> • Maintain inventory of transformers on site, make, model, risk of PCBs and other details including transformer test report, details any maintenance works undertaken, dates oil changes, leakage incidents etc. • Carry out regular inspections and periodic preventive maintenance to minimize oil leakages; ensure valves, nuts and bolts are fully functional and tightly secured, ensure rubber seals of radiators are intact • The acceptance of mineral oil at substation and transformers at test laboratory to be accompanied with Material Safety Data Sheet and certification that it is PCB free.³⁹ • Unless transformers have been certified PCB free workers interacting with them must wear suitable chemical and/or oil resistant gloves, goggles, and protective clothing whilst taking 						

³⁹ In the absence of documentary evidence (e.g., contract specification or certification for supply of original transformer, maintenance records for oil replacement including material safety data sheet, or transformer oil test results etc.) for given transformers confirming they are PCB-free, all old transformers must be considered by the staff at risk of containing PCBs. Mineral oil-filled transformers were not designed to use PCBs, but many have been found to be contaminated with PCBs.

					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<p>samples and/or working with transformers.</p> <ul style="list-style-type: none"> Transformers at the test laboratory must only be stored on the impermeable surface bunded to 110% capacity to collect oil spill, leaks, and overflows. The waste oil including samples and oil-soaked rags from test laboratory to be disposed as hazardous waste using appropriately licensed waste management company with all storage, transport, and disposal as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 Maintain spill management materials (sorbent pads, loose sorbent material, sand, etc.) next to storage areas for immediately soaking up any leaks or spills that do accidentally occur 						
Occupational health safety of maintenance staff - accident risk	<ul style="list-style-type: none"> Maintain incident logbook and medical tests / health check-up of staff Provide everyone who enters the SS/test laboratory with an OHS induction Keep vents/windows unblocked and replace defunct bulbs/lights immediately 						

	<ul style="list-style-type: none"> • Ensure all SS workers receive basic first aid and firefighting training with annual refreshers • Ensure that at least one staff at SS is fully trained as a first aider and fire marshal • Maintain fully stocked, in-date first aid kit, keep first aid posters and emergency contact lists that are posted up to date • Maintain firefighting systems including in-date fire extinguishers and full sand buckets and keep fire safety posters up • Carry out regular inspections and periodic maintenance to ensure electrical standards are being upheld • Keep emergency exits clear at all times and maintain emergency exit signs • Maintain written warning signages including the ISO 7010 Hazard Type: Electrical Symbol warning of the risk of electrocution. • Collect, segregate, and store in the designated and labelled storage areas all wastes including food wastes for onward disposal as per construction. • Undertake regular pest control using integrated pest management approach • Maintain vegetation at the SS that poses a health and safety hazard • Prohibit the use of herbicides, pesticides or burning to control any vegetation growth or to manage vegetation waste. 						
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					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	<ul style="list-style-type: none"> O&M to be performed only by suitably qualified and experienced workers who are regularly trained staff of TSECL or a contractor under supervision of a Health and Safety Officer following the SOP for H&S. O&M workers to be given required PPE and other requisite safety equipment, provide sufficient PPE spares available on site for visitors etc. Sanitation and welfare facilities as per construction will also be required for O&M workers. Continue to provide potable drinking water supply meeting GoI drinking water standards (regular testing of drinking water is included in EMoP scope) Cleaning of toilets on daily basis, use of disinfectant and floor cleaners; keep toilets/septic tank/soakaway maintained Periodic spot monitoring using mobile phone app of noise levels and ambient EMF for substations at the boundary fence/near transformers to ensure they are below the occupational/community noise levels and ICNRP occupational/community EMF exposure levels 						
Community H&S risks due to	<ul style="list-style-type: none"> Maintain security and prevent entry by the local community and 						

Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Responsibilities		
					Implementation	Supervision and Monitoring	Contractor
presence of distribution lines – impact on surrounding community, noise, EMF, accidents etc.	<p>livestock by maintaining adequate boundary fencing or wall, always keeping control room doors and gates shut, and having security persons present 24x7 to prevent unauthorized public access and trespass.</p> <ul style="list-style-type: none"> • RMU in the public domain to be kept secure (doors/gates shut and locked) • There is a risk of fire associated with RMU although use of solid or SF6 gas insulation minimizes this. All necessary precautions to ensure emergency procedures are to be posted and fire extinguishers available at the location of the RMUs in the event of a fire. • Maintain written warning signages including the ISO 7010 Hazard Type: Electrical Symbol warning of the risk of electrocution. • Regular checks and periodic maintenance of equipment like transformers and capacitors to minimize corona noise emissions. • TSECL in conjunction with local municipalities, tribal/village heads, and the media with the support of CSOs to continue to organize health and safety campaigns on electrical safety community awareness raising activities in local 						

					Responsibilities		
Project Activity or Environment Impacts/Risks	Mitigation Measures	Performance Standard	Budget/Source	Schedule	Implementation	Supervision and Monitoring	Contractor
	communities and schools within 500 m of the substations/test laboratory						

Table 4: Environmental Mitigation Plan–Distribution Lines

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
Detailed Design/Pre-construction Preparations Phase							

<p>Impact on vegetation along alignment and interference with community activity, economic loss to commercial or farmlands, crops, rubber plantations, etc.</p>	<ul style="list-style-type: none"> Contractor to complete the environmental assessment checklist included in Appendix 16 of the IEE for each distribution line/subdivision for TSECL approval (after having received ADB clearance) alongside detailed design and confirm all components meet the subproject component selection criteria in the IEE including (i) use existing alignments and/or road RoWs wherever available; (ii) avoid legally protected areas including national parks, wildlife sanctuaries, protected ASI and GoT monuments; (iii) avoid other internationally and nationally recognized sites such as Key Biodiversity Areas, Important Bird Areas, ESZ, notified forest areas and the regulated area associated with protected ASI and GoT monuments; and (iv) minimize damage to existing trees and properties encroaching into existing RoWs ensuring safety clearances are maintained.⁴⁰ Meaningful consultation to be undertaken for each distribution line/subdivision by contractor to inform them of the planned works - consultation proforma in Appendix 17 of the IEE to be submitted for TSECL approval alongside their detailed design. Prior to TSECL approval of the detailed designs and commencement of construction seek ADB clearance of the 	<p>Final distribution route alignments comply with the subproject component selection criteria in IEE.</p> <p>100% of consolidated environmental assessment forms and consultation proformas submitted to and cleared by ADB before the commencement of works</p> <p>IEE updated by TSECL and cleared by ADB prior to approval of detailed designs.</p> <p>100% landowner consent obtained and/or compensation paid prior to commencement of works</p> <p>Pre-condition survey approved before</p>	<p>TSECL counterpart fund, contractors to reflect in contract costs</p> <p>RP budget for compensation</p>	<p>Pre-construction stage; compliance prior to any works commencing on site including site establishment</p>	<p>TSECL PIU/Electrical Divisions supported by PMU</p>	<p>TSECL PMU/Safeguard Unit support by PIC</p> <p>Review environmental assessment checklists received via PIU and consolidate for onward submission to ADB together with the updated IEE.</p> <p>Consultation will be documented and reported in updated IEE and/or EMRs including photos and records of participants (including gender breakdown data)</p> <p>Review detailed design and prerequisite inputs to confirm all measures required by the EMP have been adequately</p>	<p>Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment</p> <p>Provide copies of completed environmental assessment checklists and consultation proformas to PIU for consolidation</p> <p>Advise TSECL of need for pole replacement or other temporary disturbances to private land.</p> <p>Support TSECL in the update of the IEE for ADB clearance prior to commencement</p>
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⁴⁰ New lines that trigger Category A (activities with significant adverse environmental impacts that are irreversible, diverse, or unprecedented) shall not be taken up under the distribution component. New lines that result in the significant conversion or degradation of natural habitat or which are within a critical habitat (area of analysis for distribution line) and have not been demonstrated through a site-specific assessment to comply with ADB's SPS 2009 critical habitat requirements shall not be taken up under the distribution component. New lines and related facilities must avoid legally protected areas including national parks, wildlife sanctuaries, ecologically sensitive areas, protected ASI and GoT monuments. Any new lines and related facilities must avoid other internationally and nationally recognized sites such as Key Biodiversity Areas, Important Bird Areas, Ramsar sites, World Heritage Sites and their buffer zones, notified ecologically sensitive zones (ESZ) around protected areas, notified forest areas including protected forests, reserve forests and proposed reserve forests, and the regulated zone (up to 300m) of protected ASI and GoT monuments. New lines and related facilities must avoid significant damage to local physical cultural resources and not require physical cultural resources to be removed from their current location. New overhead lines must not be laid across school or hospital compounds or playgrounds. New lines and related facilities must minimize damage to existing trees outside of forest areas and properties whilst ensuring horizontal and vertical safety clearances are maintained. New lines must create minimum disturbance to existing pedestrian and traffic routes in terms of blockages or diversions. New underground cables must avoid damage to public utility services (water or gas pipelines, telephone lines etc.) For any minor diversions of existing lines, the principles for new lines will be followed.

	<p>consolidated environmental assessment forms and update the IEE as required, confirm no change from the impacts and risks described and assessed in the IEE, or undertake site-specific assessment and develop the site-specific EMP if required, seeking ADB clearance of any updated IEE before works start.</p> <ul style="list-style-type: none"> • Carefully select the line route to minimize impacts on existing structures (e.g., buildings) and roads, tracks, crops, canals, or drains etc. • Contractor to undertake ROW walkover and enumerate any structures within the ROW and if safety clearances are being met, submit survey report alongside detailed design. • In all cases including conversion of distribution lines where safety clearances are currently encroached upon the minimum horizontal and vertical electrical clearances, as required by the Indian Electricity Rules and Regulations, are to be maintained with respect to the ground, roads, railway lines and habitations, to ensure safety of human beings and livestock in the vicinity of the distribution lines. • If safety distances are found not to be complied with during reconditioning of existing lines, the distribution line will have a 	<p>commencement of works</p> <p>Local communities and other concerned stakeholders kept informed throughout project implementation, and aware of construction etc.</p> <p>TSECL approved detailed designs minimize impacts and risks on EHS during subsequent stages of the project</p>				<p>incorporated.</p>	<p>nt of any works on site</p>
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	<p>minor realignment to facilitate compliance.</p> <ul style="list-style-type: none"> • Given greater vulnerability of children to health and safety risk, the crossing of school compounds and playgrounds will be avoided by routing new and existing distribution lines to be reconducted outside them and any other similar community facilities. • If deviation from existing alignment is required to ensure safety clearances new route to be determined in consultation with affected communities to avoid or minimize economic/livelihood losses and inconvenience to landowners, road users etc. • Underground cables shall generally follow the existing overhead distribution line routes that they shall replace sticking to the existing RoW of the road, although a slight shift towards the road center and minor diversions may be required to avoid impact on trees, properties, public utility services etc. • Distribution line alignment to be designed to be within road reserves as far as is practical, having minimal impact on private land. Agricultural and other private land shall be avoided to the extent feasible, but if unavoidable, then compensation of standing crop damage/trees lost during installation shall be paid by TSECL at the market 						
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	<p>value prior to construction in accordance with the resettlement plan. Schedule works to avoid or minimize crop disturbance where lines cross private land, such as undertaking works in between crops.</p> <ul style="list-style-type: none"> • In urban areas RMUs will be placed so they do not block the footpath/road or sites used by street vendors etc. Temporary disturbance due to entry/exit pits of UG cables will be compensated for in accordance with the resettlement plan. • If distribution line requires works beyond the international border fence deviation of the route alignment is recommended. If works are required beyond the fencing permission from Border Security Force will first be obtained and safety measures advised followed. No works will be done between one hour before sunset and one hour after sunrise beyond the international border fencing and workers will be required not to leave the demarcated working area. For subdivisions where the international border is present and there may be a risk of workers accidentally straying over the border, then worker orientations and code of conduct will cover risks of working close to and measures to ensure security whilst working near the border and contractor will consider 						
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	<p>employing security personnel to oversee the workers.</p> <ul style="list-style-type: none"> • In relation to cumulative impact contractors to liaise with other utilities regarding the timing and extent of other construction works in the same road ROW and ensure plans for construction works are coordinated so emissions/disruption/ disturbance are minimized. • For private property including physical cultural resources or public utilities that may be damaged during construction, including from potential vibration damage (buildings, roads, drains etc.) photographic and/or structural pre-condition surveys are to be completed by the contractors and agreed with TSECL prior to any works, including site establishment. These must be documented in a pre-project condition report, which will serve as baseline in case any inadvertent damage or vibration impact to property occurs. If risk of structural damage to adjacent properties from vibration identified due to current condition, consider alternative construction method or temporary relocation of occupants during works if at risk. Contractors will be required to restore any structural or cosmetic property damage that is caused by their works to at least pre-project condition at their own cost. 						
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Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Responsibilities		
					Implementation	Supervision	Contractor
Impacts on wildlife and protected areas	<ul style="list-style-type: none"> No distribution lines will pass through any internationally or nationally important biodiversity sites.⁴¹ In Kanchanpur sub-division of North Tripura district, any distribution lines in Jampui Hills block must avoid passing adjacent to forest areas above 600 m asl since the endemic, CR <i>Cyrtodactylus montanus</i> may be found along rocky roadside cuttings adjacent forest areas; this includes undesignated forest areas No temporary project facilities shall be established within 500m of any internationally or nationally important biodiversity sites. 	<p>Final distribution route alignments comply with the subproject component selection criteria in IEE.</p> <p>IEE updated by TSECL and cleared by ADB prior to approval of detailed designs.</p> <p>TSECL approved detailed designs minimize impacts and risks on EHS during subsequent</p>	Contractors to reflect in contract costs	Pre-construction stage; compliance prior to any works commencing on site including site establishment	TSECL PIU/Electrical Divisions supported by PMU	<p>TSECL PMU/Safeguard Unit support by PIC</p> <p>Review environmental assessment checklists received via PIU and consolidate for onward submission to ADB together with the updated IEE.</p> <p>Review detailed design and prerequisite inputs to confirm all measures required by</p>	<p>Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment</p> <p>Provide copies of completed environmental assessment checklists and consultation proformas to PIU</p>

⁴¹ Due to the need for detailed ecological assessment with respect to potential construction impacts and the lead in time required to secure wildlife/forest clearances TSECL decided conversion of existing lines routed through such locations would be excluded from the scope of the distribution component. IEE has confirmed that no notified forest area will be impacted by any of the 33kV and 11kV distribution lines; if any low-tension lines are identified to be passing along roads through notified forest habitat, then site-specific assessment and management planning (such as ensuring no trees are cut, no works one hour before sunset to one hour after sunrise to avoid disturbing fauna, awareness raising for worker, and full time ecological supervision to ensure minimal disturbance throughout the works) must be undertaken by a professional ecologist including consultation with Forest Officials regarding the detailed design and construction method with undergrounding (an acceptable along existing roads in forest lands as it will eliminate all operational risks to wildlife) or rerouting outside the area rather than reconductoring adopted as the preferred option. The EPC Contractor must secure written permission for the works from Department of Forests even if clearances are not legally required. Consultation proforma to be submitted for TSECL approval alongside detailed design - consultation proforma in Appendix 16 of the IEE. ADB will only clear the updated IEE after the forest department's written permission has been obtained until which time no works must commence.

	<ul style="list-style-type: none"> Contractor to employ field ecologists to undertake ROW walkover, map habitat and species encountered, and enumerate the number and species of trees requiring to be cut and lopped, submit survey report alongside detailed design. Presence or absence of sensitive receptors and the following critical habitat species to be confirmed by field ecologists searching for indicators of their presence as well as actual sightings during route surveys: <i>Aquilaria malaccensis</i> (Agarwood) where trees present especially in plantation, <i>Nilssonina nigricans</i> (Black Softshell Turtle) if temple ponds crossed, <i>Gyps bengalensis</i> (White-rumped Vulture), <i>Manis pentadactyla</i> (Chinese pangolin) in rural areas, and <i>Trachypithecus payer</i> (Phayre's Leaf Monkey) and <i>Macaca leonina</i> (Northern Pig Tailed Macaque) in rural areas/plantation especially within 10km of Wildlife Sanctuaries. District Forest Officers and local communities will also be consulted on species occurrence by the field ecologist. The results of the ecological walkover surveys shall be part of any site-specific assessment and be used to update the IEE. In case of presence of critical habitat species either directly observed by the ecologist during the ecological walkovers or 	<p>stages of the project</p> <p>Existing LT lines passing through RF/PRF/PF rerouted to avoid any work in forest land unless site-specific management plan agreed.</p>				<p>the EMP have been adequately incorporated.</p>	<p>Advise TSECL of need for pole replacement or other temporary disturbances to forest land.</p> <p>Support TSECL in the update of the IEE for ADB clearance prior to commencement of any works on site</p>
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	<p>identified from consultation, species specific ecological surveys to be carried out by the field ecologists of the EPC contractor based on standard ecological methodologies as approved by the PIC. The result of the survey shall be used to inform final distribution line alignment.</p> <ul style="list-style-type: none"> • Trainings will be provided to workers on identification of threatened species, dos and don'ts regarding chance encounter with wild animals (especially those species that can be dangerous to man like snakes, elephants, bison, leopards, bears etc.) and wildlife rescue protocols; contacts of District Forest Officer will be displayed in the contraction office • For subdivisions where biodiversity sites are present and there may be a risk of workers accidentally straying into these areas then worker trainings and the code of conduct will cover measures to ensure that wildlife will be protected. • Route alignment to ensure works will only take place on modified habitat. • Minimize the felling of the trees through route alignment by avoiding areas with a high concentration of trees. Cutting or trimming of trees will only be 						
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	<p>planned when required to meet safety clearance requirements.</p> <ul style="list-style-type: none"> • Excavation pits to be placed to avoid the area beneath tree crowns (zone for root protection) and other vegetation. • UG cable alignment placed to avoid tree crowns especially mature trees. Root damage to trees is to be avoided so unstable trees do not present a public safety hazard. • No Agarwood trees permitted to be cut and if found along the route alignment an alternative routing must be taken to avoid the tree if found present. • Ensure the requisite forest department approvals for any tree cutting are in place pre-construction, Public Works Department will also be consulted. • Public trees will be compensated by compensatory afforestation (planting at least 10 trees for each tree cut) as per forest department requirements. TSECL will provide funds to the forest department based on the number of public trees counted by the EPC Contractor to be cut and confirmed by PIC and monitor the progress of the compensatory plantation process that it has funded to ensure that planting takes place such that no net loss of biodiversity is obtained. • Compensation for the loss of any private trees in the RoW would be 						
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	<p>based on their replacement cost, as defined in the RIPP.</p> <ul style="list-style-type: none"> • Use of anticlimbing devices on all distribution poles to prevent climbing of them by primates. • For all OHL in addition to using CC and ABC bird/primate sensitive design to be adopted for the distribution poles with accessories installed by the EPC contractor such that there is no risk of electrocution, these requirements differ for CC and ABC as per Table 5-6 of the IEE including the following: <ul style="list-style-type: none"> ○ Ensure no insulation gaps at wire splices or place them >1m from pole (covered wire splice prevents insulation gaps) ○ Use insulation-piercing connectors with non-energized exterior for taps and equipment ○ Use covered jumpers for taps and equipment ○ Cover all primary voltage bushings with insulating wildlife caps ○ Extend wire-to-dead end connection >1m from pole with insulator or link ○ Maintain integrity of wire cover at tangent insulators (no stripping) ○ Regardless of traditional or clamp-top tangent insulators being used, there should be no gaps in wire cover. ○ Use anchoring clamps to secure cable to pole without coverage 						
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					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	gaps, to secure ABC to poles without any wire stripping <ul style="list-style-type: none"> For areas where elephants are regularly found, such as Khowai and Gomati districts, EPC contractors will ensure no distribution lines are crossing the elephant movement areas. In these districts outside of the habitations, overhead lines to be installed with the ground clearance above ground from the lowest conductor to cater to the height of adult elephant with its trunks raised, at least 6m, to avoid any chance of electrocution risk 						
Impact on physical cultural resources and aesthetics due to presence of distribution lines	<ul style="list-style-type: none"> No distribution lines to pass through prohibited or regulated zone of protected monuments.⁴² No temporary project facilities shall be established within ASI or GoT protected monuments or their regulated zone. 	TSECL approved detailed designs minimize impacts and risks on EHS during subsequent	Contractors to reflect in contract costs	Pre-construction stage; compliance prior to any works commencing on site including site establishment	TSECL PIU/Electrical Divisions supported by PMU	TSECL PMU/Safeguard Unit support by PIC Review detailed design and prerequisite	Implement the mitigation measures, comply during detailed design and prior to any works

⁴² Due to the need for detailed archaeological assessment with respect to potential construction impacts and the lead in time required to secure no objection certificates TSECL decided conversion of existing lines routed through such locations would be excluded from the scope of the distribution component. IEE has confirmed that no protected monuments will be impacted by any of the 33kV and 11kV distribution lines; if any low-tension lines are identified to be passing along roads through a prohibited or regulated zone (300m) then site-specific assessment and management planning (including full time archaeological supervision throughout the works) must be undertaken by a professional archaeologist including consultation with ASI regarding the detailed design and construction method with rerouting outside the area or undergrounding rather than re-conductoring adopted as the preferred option. TSECL must secure no objection certificate from ASI if works remain within 300m. Consultation proforma to be submitted for TSECL approval alongside detailed design - consultation proforma is in Appendix 16 of the IEE. ADB will only clear the updated IEE after the no objection certificate has been obtained until which time no works must commence.

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<ul style="list-style-type: none"> Demarcation of the working area by the contractor and avoidance of encroachment outside the agreed corridor of impact. Minimize visual impacts/amount of visual clutter through sensitive route alignment of overhead lines and RMU placement having cognizance of any above ground physical cultural resources adjacent. Contractors to conduct an inventory (and condition surveys) of physical cultural resources in and adjacent to the RoW prior to the start of any works including site clearance along all new and existing distribution line routes. Demarcation of physical cultural resources such as trees or shrines to be avoided and retained. 	<p>stages of the project</p> <p>Local communities and other concerned stakeholders kept informed throughout project implementation, and aware of construction etc.</p> <p>Existing LT lines passing through prohibited or regulated zone of protected monument rerouted unless site-specific management plan agreed.</p>				inputs to confirm all measures required by the EMP have been adequately incorporated.	commencing on site including site establishment of any works on site

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<ul style="list-style-type: none"> • New lines and minor deviations to be sited to minimize visual impact and the amount of visual clutter in consultation with affected communities; consultation to be undertaken by contractor and consultation proforma to be submitted for TSECL approval alongside detailed design - consultation proforma in Appendix 16 of the IEE to be submitted for TSECL approval alongside detailed design. • Contractors to consult individual households where a new pole location is within or directly adjacent to private property or where the line passes directly over private property prior to finalizing detailed design - consultation proforma in Appendix 16 of the IEE to be submitted for TSECL approval alongside detailed design. 						

<p>Risks of damages to sub-surface utilities and chance find of physical cultural resources during construction.</p>	<ul style="list-style-type: none"> Contractor to check with relevant local authorities (gas, electric, water, telecoms) whether there are known pipes, cables, or other utility lines and carry out a scan using Cable Avoidance Tool (CAT) to identify any unknown underground utilities prior to excavation and adjust UG cable route alignment to avoid them. Railway line crossings of OHL will be installed underground using a Horizontal Directional Drilling (HDD) machine to maintain the railway safety or in conduit pipes in overhead bridges. Contractor to obtain necessary approvals from the municipalities (Dharmanagar and Agartala) and other utility providers prior to the start of works. Contractors to identify in consultation with service providers appropriate measures to minimize period of disruption to utilities and reduce health and safety risks during installation. If services must be disrupted contractors (via service providers if appropriate) to notify affected communities well in advance of any power outage etc. CEMP to set out the agreed procedures in case chance finds are encountered including stop work and inform TSECL who shall inform DOA. 	<p>100% of clearances obtained before commencement of works</p> <p>TSECL approved detailed designs minimize impacts and risks on EHS during subsequent stages of the project</p>	<p>Contractors to reflect in contract costs</p>	<p>Pre-construction stage; compliance prior to any works commencing on site including site establishment</p>	<p>TSECL PIU/Electrical Divisions supported by PMU</p>	<p>TSECL PMU/Safeguard Unit support by PIC</p> <p>Review detailed design and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.</p>	<p>Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment of any works on site</p>
<p>Procurement of ring main units (RMU) for UG</p>	<ul style="list-style-type: none"> Use of alternative insulation medium (such as Hydrophobic Cycloaliphatic Epoxy) to be 	<p>TSECL approved detailed designs</p>	<p>Contractors to reflect in contract costs</p>	<p>Pre-construction stage; compliance prior</p>	<p>TSECL PIU/Electrical Divisions</p>	<p>TSECL PMU/Safeguard</p>	<p>Implement the mitigation measures,</p>

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
cables – release of SF6 as GHG	<p>considered as the preferred option.</p> <ul style="list-style-type: none"> • If no alternative the use of SF6 in equipment must be minimized. • Detailed design of any gas insulated equipment will comply with international norms and standards for handling, storage, and management of SF6. Equipment to be hermetically pressure sealed “sealed for life” units, contain less than 2 kg of SF6 and be tested and guaranteed by the supplier at less than 0.1% leakage rate. • Installation of RMUs to be designed and operated so that any leakage will trigger an alarm at the nearest concerned staffed substation requiring O&M staff to rectify the situation immediately. 	<p>minimize impacts and risks on EHS during subsequent stages of the project, all SF6 project equipment must have <0.1% leakage rate etc.</p>		<p>to any works commencing on site including site establishment</p>	<p>supported by PMU</p>	<p>Unit support by PIC</p> <p>Review detailed design and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.</p>	<p>comply during detailed design and prior to any works commencing on site including site establishment</p>

<p>Community health and safety risk from equipment mobilization, construction activities, toppling of poles during installation, spills and leakages, traffic congestions, as a result of passing over/alongside houses, busy/congested settlements or sensitive land uses like schools, hospitals, etc.</p>	<ul style="list-style-type: none"> • Contractor to ensure structural safety of poles especially in the event of high winds/cyclones (allowing for climate change) or an earthquake (Seismic Zone V) by designing for maximum loadings and following Gol codes; select an appropriate foundation design considering both climatic and seismic risks present. • Design to include adequate pole foundation in order that all poles remain vertical during operation, and that the lines are tensioned. • Contractors to identify existing lines that need to be rerouted to avoid passing over houses/meet safety clearances or where existing poles are located within the compound of houses etc. • For reconductoring to CC or ABC old poles or poles previously incorrectly installed may need to be replaced. • Contractors to identify presence of and avoid locating poles on any unstable land. For distribution lines in complex terrain conduct geotechnical/slope stability analysis and identify slope stability measures during detailed design to minimize the risk of pole uprooting and causing the line to fall or landslide occurrence. Bioengineering methods can be considered for slope protection. Particular attention will be paid to the design of pole foundations along steep roads, which have an 	<p>TSECL approved CEMP and subplans to minimize impacts and risks to Community Health and Safety during subsequent stages of the project.</p> <p>Compliance with ICNRP community EMF exposure levels (reference and peak values)</p>	<p>Contractors to reflect in contract costs</p>	<p>Pre-construction stage; compliance prior to any works commencing on site including site establishment</p>	<p>TSECL PIU/Electrical Divisions supported by PMU</p>	<p>TSECL PMU/Safeguard Unit support by PIC</p> <p>Review CEMP sub-plans and prerequisite inputs to confirm all measures required by the EMP have been adequately incorporated.</p>	<p>Implement the mitigation measures, comply during detailed design and prior to any works commencing on site including site establishment</p>
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	<p>eroded embankment and sloping land on one or both sides.</p> <ul style="list-style-type: none"> • Underground cables will be bored and laid using trenchless method through Horizontal Directional Drilling (HDD) machine. • Install on all poles a visual and written warning signages to the public to include the ISO 7010 Hazard Type: Electrical Symbol warning of the risk of electrocution. • Install lighting arrestors along all distribution lines. • Install anti-climbing deterrents on all the poles and suitable means of ensuring security of the cable to avoid vandalism. • To prevent against cable break incident of new UG cables cable markings will be installed above the cable to inform those who may be excavating in future. In case the armor is broken by a third party and the core damaged, protection relays in the RMU or substation to which the UG cables connect will be designed to detect this and stop sending electricity immediately by automatically opening switchgear in the substation to prevent a live shock to the person. • RMUs located in the public domain will be in a gated area or secured cabinet that automatically locks shut so that members of the public cannot access electrical equipment, RMUs are to feature written and visual warning signs 						
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	<p>that meet the IEEE standards to include the ISO 7010 "Hazard Type: Electrical Symbol" warning of the risk of electrocution.</p> <ul style="list-style-type: none"> • If not already in-situ install around the base of all ground mounted transformers to which distribution lines connect a fence with locked gate and for pole mounted transformers a suitable anti-climbing deterrent to be used, together with provision of hazard warning signs. • Transformers for HVDS will preferably be pole mounted, if ground mounted is required then they must be installed on an impermeable concrete foundation with bunding and secure fencing with written and visual warning signs that meet the IEEE standards to include the ISO 7010 "Hazard Type: Electrical Symbol" warning of the risk of electrocution. • Contractors will also ensure that ICNRP occupational/community EMF exposure levels (reference and peak values) will be achieved • If during the route survey contractors identify existing transformers not maintained in good condition and to which the distribution lines must connect these are to be reported to TSECL. TSECL will need to either remove or maintain/repair the transformer, so it is left in good condition. Health and safety risk 						
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	<p>assessment for exposure to PCBs to be undertaken before removal/maintenance/repair/connection work is undertaken on any existing transformers.⁴³</p> <ul style="list-style-type: none"> • Distribution line works shall be taken up during daytime unless otherwise agreed with the local community. • H&S plan for distribution line works to include a Traffic Management sub-plan considering both the safety of pedestrians and vehicles and need to avoid traffic congestion; it is to be developed in consultation with relevant local authorities to ensure proper execution of traffic controls including where temporary blockage of one lane of the road or footpath is needed for installation. • Traffic management will need to be done in consultation with the affected communities to ensure they are aware of likely disruption. • Post warning signs and manage traffic movements to protect the travelling public and its workers as necessary and ensure drivers obey road rules and travel at a safe speed given the nature of local roads and size of vehicles involved. Road safety and warning signs must be posted at 500m, 100m, and immediately in advance of the distribution line works at least two weeks prior to the works commencing to inform 						
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⁴³ In the absence of documentary evidence (e.g., contract specification or certification for supply of original transformer, maintenance records for oil replacement including material safety data sheet, or transformer oil test results etc.) for given transformers confirming they are PCB-free, all old transformers must be considered by the staff at risk of containing PCBs. Mineral oil-filled transformers were not designed to use PCBs, but many have been found to be contaminated with PCBs. If existing transformers are at risk of containing PCBs TSECL will request contractors to test them to inform compliance with the Government of India Regulation of Use, Handling and Disposal of Polychlorinated Biphenyls by 31.12.25 (such testing by contractor is included in EMoP scope)

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<p>the public of turning vehicles and the temporary blockage of one lane of the road during pole installation works.</p> <ul style="list-style-type: none"> • For congested and narrow roads flagmen should be utilized to warn road users of the situation. • Scaffolds and safety nets will be used to protect pedestrians and vehicles (and the conductor itself) from potential injury/damage during conductor stringing – this will be used wherever stringing of OH conductor crosses over roads, presenting a possible risk to traffic, waterbodies, or is in settlement presenting a possible risk to local communities. • Cut vegetation, excavated soil, poles and conductors will need to be stored outside of habitation, not block access or road use. • Contractors will be required to ensure that safe access ways to public and private amenities (including schools, hospitals, clinics, places of worship (temples, mosques, churches, shrines) etc.) are maintained throughout the construction period. 						
Pre-Construction Enabling Works, Construction, and Commissioning Phases							

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
Construction area preparation, clearance of land and vegetation for distribution lines – temporary disturbance or accidental damage to public and private property including agricultural crops, plantations, trees and vegetation, structures (e.g., houses, offices, shops), roads, pathways, drains, canals, public utilities, etc.	<ul style="list-style-type: none"> Comply with the EMP including ECOP during construction works and contractors' approved CEMP Follow design drawings and implement careful construction practices to avoid damage to existing public and private property outside the working area. Demarcation of the working area and avoid encroachment outside the agreed corridor of impact. Demarcation of mature trees and any <i>Aquilaria malaccensis</i> (Agarwood) to be avoided and retained Only the marked trees within the ROW are to be felled after joint verification and approval of tree list by TSECL. Undertake works requiring tree cutting/trimming outside the bird breeding season. Before cutting/trimming trees check for presence of the nesting birds or roosting bats. Removal of invasive plant species during site clearance in an ecologically sound manner. Store cut vegetation away from the roadside, any vegetation material not handed over to the landowner will be immediately removed from site for disposal by a licensed waste management 	<p>Compliance with Gol and GoT regulations and guidelines</p> <ul style="list-style-type: none"> 100% of existing public and private property left in same condition as prior to construction. <p>EMP/CEMP requirements successfully implemented as determined through regular site checks, photographic record etc.</p> <p>No outstanding biodiversity or property damage related grievances from local communities or other interested stakeholders</p>	<p>Contractor to reflect in contract costs</p> <ul style="list-style-type: none"> 	<p>Prepare during pre-construction and comply throughout construction stage (mobilization, construction, and commissioning works)</p>	TSECL PIU/Electrical Divisions supported by PMU	TSECL PMU/Safeguard Unit support by PIC	Implement mitigation measures for the duration of construction

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<p>contractor once cutting works are completed.</p> <ul style="list-style-type: none"> • Prompt revegetation of disturbed areas on the completion of works with plant species native to Tripura. • Existing poles will be removed by pulling the complete pole from the ground; poles will not be cut off at the ground level. Poles will then be cleaned, and any material attached to the pole (including concrete) removed. Unused pits will then be backfilled and compacted completely with enough backfill piled above grade to prevent depressions being created by natural compaction and the disturbed ground vegetated. • No construction works from one hour before sunset to one hour after sunrise in rural areas where there is no existing human disturbance and distribution lines are within a 10km buffer of the WLS. • Wildlife identification and rescue protocol to be followed including stopping of all construction works in the area where the wildlife is observed to avoid any human-animal conflict followed by intimation to TSECL/PIC and the 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<p>Range Officer and District Forest Officer (DFO) in whose territorial jurisdiction the wildlife has been identified and shall be involved in any rescue action. The intimation message will be detailed including location, name of the wildlife species (if identified), injury to humans or animal, if any, and the present situation. Intimation will also be provided to the local police station for support for crowd management and control. All assistance to be provided to the wildlife rescue team mobilized by the Forest and Wildlife Department by the EPC contractor.</p> <ul style="list-style-type: none"> • All unanticipated damage to existing public and private property shall be restored to pre-project condition and/or compensated at the cost of the contractor in line with the RIPP entitlement matrix. 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
<ul style="list-style-type: none"> Risks of damages to sub-surface utilities and chance find of physical cultural resources during construction. 	<ul style="list-style-type: none"> Comply with the EMP including ECOP during construction works and contractors' approved CEMP including chance find procedures On completion restore or rehabilitate any shut off or damaged utilities to at least their original condition in conjunction with the relevant utilities to minimize the public inconvenience All unanticipated damage to existing public utilities shall be restored immediately to pre-project condition and/or compensated at the cost of the contractor in line with the RIPP entitlement matrix. Follow chance find procedure if physical cultural resources are found during construction works; if physical cultural resources are encountered, all works at the find site to be immediately halted. 	<p>Compliance with Gol and GoT regulations and guidelines</p> <p>EMP/CEMP requirements successfully implemented as determined through regular site checks, photographic record etc.</p> <p>No outstanding property grievances from local communities or other interested stakeholders</p>	Contractor to reflect in contract costs	Prepare during pre-construction and comply throughout construction stage (mobilization, construction, and commissioning works)	TSECL PIU/Electrical Divisions supported by PMU	TSECL PMU/Safeguard Unit support by PIC	Implement mitigation measures for the duration of construction

<ul style="list-style-type: none"> • Generation of dust, noise and general disturbance and disruption to affected communities 	<ul style="list-style-type: none"> • Comply with the EMP including ECOP during construction works and contractors' approved CEMP including MMP and PPP sub-plans • Provide at least one-month advance notice to local community through tribal/village heads about the schedule of and details of planned construction works and continue to undertake consultation with affected persons; directly liaise one-on-one with receptors in the ROW or in the vicinity of entry/exit pits and RMU footprint for underground cables including informal street vendors and specifically notify them about the commencement of work etc. • Ensure all stationary emission sources are maintained in good working order in accordance with manufacturer instructions and have passed applicable emission tests. • Hold valid PUC emission certificates of all construction vehicles • Open burning of wastes generated by project-related activities to be strictly prohibited • Provide a central covered warehouse for storage of construction materials; only volumes of material required for the day's work will be stored on-site while construction vehicles transporting stone, sand, and other dust generating materials 	<p>Compliance with GoI and GoT regulations and guidelines including emission standards</p> <p>No increase in existing background air pollution levels</p> <p>Compliance with noise levels: during daytime 65dB(A) at the nearest commercial properties, 55 dB(A) at the nearest residential properties including those within commercial zones and 50 dB(A) within 100m buffer of silent zones.</p> <p>EMP/CEMP requirements successfully implemented as determined through regular site checks, photographic</p>	<p>Contractor to reflect in contract costs</p>	<p>Prepare during pre-construction and comply throughout construction stage (mobilization, construction, and commissioning works)</p>	<p>TSECL PIU/Electrical Divisions supported by PMU</p>	<p>TSECL PMU/Safeguard Unit support by PIC</p>	<p>Implement mitigation measures for the duration of construction</p>
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					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<p>will be covered with a canvas or tarpaulin.</p> <ul style="list-style-type: none"> Keep stockpiles of soil, aggregate and waste materials covered with canvas or tarpaulin when spoil heaps are not active to avoid suspension or dispersal of fine soil particles during windy days and to prevent disturbance by stray animals and stored at least 10m from waterbodies. During the dry season or in windy conditions undertake water sprinkling at least twice a day on unpaved areas present along the ROW Dust emissions will be further minimized by adopting a rolling construction method and immediately restoring the surface of excavations including road pavements once construction activities are completed. For UG cables entry/exit pits will be refilled with temporary repaving of the excavated area done manually immediately once cable installation is completed. Soil scattered on pavements and roads shall be immediately swept up to avoid windblown dust. Impose speed limits on construction vehicles to minimize the spread of dust from roads 	<p>record etc.</p> <p>No outstanding dust, noise and general disturbance and disruption grievances from local communities or other interested stakeholders</p>					

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Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<p>along areas where sensitive receptors are located (residences, shops, schools, clinics, temples, etc.)</p> <ul style="list-style-type: none"> • HDD equipment will use water as a drilling fluid to reduce noise level • During night no works will be permitted, contractors working hours will be 7 am – 7 pm, unless in commercial zones with dense urban areas for reasons of road safety and avoiding traffic congestion it is otherwise agreed in writing with the municipal authorities and following consultation with all adjacent residents/occupants of buildings to avoid noise nuisance • No noisy work and heavy vehicle movements will take place on Saturdays and for works in proximity to school/college/university no works during exam periods. No work on Sundays, holidays and festival days. Sensitive receptors to be consulted with any other special days when they would wish noise levels to be minimized. • Loud construction noise, breaking and drilling activities in particular, must be limited to very short 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<p>periods of activity adjacent to receptors to minimize disturbance.</p> <ul style="list-style-type: none"> • Contractor to use suitably designed mufflers or sound reduction equipment on breakers/drills and ensure all leaks in the air line are sealed on them. • Maximum allowable noise levels for commercial zones are 65dB(A) during daytime (0600-2200) and 55dB(A) during nighttime (2200-0600), at residential receptors including those in commercial zones noise levels are 55 dB(A) during daytime and 45 dB(A) during nighttime and within 100m buffer from silent zones 50 dB(A) during daytime and 40 dB(A) during nighttime are not to be exceeded. • If air and noise standards/guideline levels are exceeded, an increase in existing background air pollution or noise (>3dB) levels is recorded where they were already exceeded at the nearest substation, or complaints are received contractors will be required to implement additional dust or noise mitigation e.g., barricading/isolating sources of 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	dust, adjusting working methods, or placing of temporary acoustically designed noise barriers to ensure the standard/guideline is met. <ul style="list-style-type: none"> • Sound levels received by workers must not be over 85 dB(A) during continuation of 8 working hours without wearing PPE. 						

<p>Interference with local drainage/water bodies and soil erosion during auguring and excavation for pole foundation.</p>	<ul style="list-style-type: none"> • Comply with the EMP including ECOP during construction works and contractors' approved CEMP including MMP and PPP sub-plans • Slope stability measures identified during detailed design to be implemented during construction to minimize landslide risk. • Use of auguring to limit the area to be disturbed for installation pole foundation. • Excavation and other earthworks will be conducted during the dry season to minimize soil erosion and sedimentation of watercourses although this has potential to exacerbate dust impact. • Minimize removal of existing vegetation and topsoil, exposed surfaces will be promptly revegetated with native species to Tripura including the areas around the pole foundations and areas used for temporary construction facilities • Topsoil disturbed will be separately stored and used to restore the surface of the excavated areas. • Infertile and rocky material will where possible be reused as fill material, if it needs to be taken off site it will be disposed by licensed waste management operator at designated disposal area suitable for inert waste. • Soil exposed to oil leakage from transformer equipment that 	<p>Compliance with Gol and GoT regulations and guidelines</p> <p>No deterioration in soil and water quality from baseline levels</p> <p>EMP/CEMP requirements successfully implemented as determined through regular site checks, photographic record etc.</p> <p>No outstanding grievances from local communities or other interested stakeholders</p>	<p>Contractor to reflect in contract costs</p>	<p>Prepare during pre-construction and comply throughout construction stage (mobilization, construction, and commissioning works)</p>	<p>TSECL PIU/Electrical Divisions supported by PMU</p>	<p>TSECL PMU/Safeguard Unit support by PIC</p>	<p>Implement mitigation measures for the duration of construction</p>
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Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<p>distribution lines are connecting to is to be removed from site for disposal as a hazardous waste</p> <ul style="list-style-type: none"> Records of excavated spoil, generated waste, and transfer records will be kept by the contractors. Contractors will keep copies of the waste management company's licenses on file at the site office. Document all volumes and types of wastes generated and removed off site (inert, solid, hazardous) using transfer notes, to be taken by licensed waste contractors who should reuse/recycle or dispose of the waste according to type to suitably licensed and engineered waste management facilities. Construction activities must not limit the availability of or restrict access to water sources used by local communities for drinking or hygiene purposes. No construction material, solid waste, toxic or hazardous material to be poured or thrown into drains or waterbodies for dilution or disposal. Care to be taken for alignments that pass over river crossings/bridges. 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<ul style="list-style-type: none"> Natural flow of waterbodies must not be obstructed or diverted to another direction. 						
Generation of construction wastes use of hazardous materials	<ul style="list-style-type: none"> Comply with the EMP including ECOP during construction works and contractors' approved CEMP including PPP and CWMP sub-plans, following the General EHS Guidelines including on the use and storage of fuel, oil, and chemical including prevention and control of hazards associated with spill prevention, emergency response, clean up and contaminated soil remediation. 	<p>Compliance with Gol and GoT regulations and guidelines including discharge standards</p> <p>No deterioration in soil and water quality from baseline levels</p> <p>EMP/CEMP requirements successfully implemented as determined through regular site checks, photographic record etc.</p> <p>No outstanding pollution or waste related grievances from local communities or other interested stakeholders</p>	Contractor to reflect in contract costs	Prepare during pre-construction and comply throughout construction stage (mobilization, construction, and commissioning works)	TSECL PIU/Electrical Divisions supported by PMU	TSECL PMU/Safeguard Unit support by PIC	Implement mitigation measures for the duration of construction

	<ul style="list-style-type: none"> • Only water to be used as a drilling fluid for HDD, do not allow the use of oil or bentonite clay as a drilling fluid. Where water is used any excess must be disposed of to open ground for percolation, or if no open ground to waiting tanker trucks for proper disposal, it must not be disposed of to surface water. • Fuel, oil, and chemicals used to be kept under lock and key and stored in labelled, sealed containers on drip trays to provide secondary containment. In designated storage areas, they will be located on an impermeable surface and be under cover. • If transformers are temporarily disturbed during pole replacement, they must be handled carefully and stored (ideally undercover) on drip trays to provide secondary containment of 110% of the liquid contents should they spill or leak. • Unless transformers have been certified PCB free workers interacting with them must wear suitable chemical and/or oil resistant gloves, goggles, and protective clothing whilst taking samples and/or working with transformers. • Provide spill prevention kits (sorbent pads, loose sorbent material, etc.) at storage areas and other at-risk locations within clearly labelled containers. 						
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					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<ul style="list-style-type: none"> • Provision of designated hard standing areas for equipment servicing, refuelling and wash down at least 50m from watercourses, springs, and wells, with drainage directed through oil and grease interceptors before being discharged into a settling pond prior to discharge offsite. • No wastewater will be discharged direct to surface waterbodies or groundwater without adequate treatment. • Use of pit latrines will be prohibited as will be open defecation and urination and uncivil use of roads or private premises by construction workers. • For the transient works provision of adequate on-site temporary sanitation facilities (one toilet per six workers) that do not allow untreated disposal of sewage to adjacent water bodies e.g., portable toilets where the wastewater generated is enclosed in a container and will later be taken offsite for wastewater treatment and disposal. In urban areas arrangements for access to alternative sanitary facilities (e.g., existing public toilets) that do not allow untreated disposal of 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	sewage to adjacent water bodies may be provided. <ul style="list-style-type: none"> Minimize waste generation, restrict use of plastics and polyethene and use recyclable/biodegradable materials during construction to the extent possible 						

	<ul style="list-style-type: none"> • Collect and transport construction waste to appropriately engineered and licensed solid/hazardous waste management facilities. No licensed engineered solid or hazardous waste landfill exists in Tripura, licensed landfills that are available are unsanitary open dumps and are not to be used by the contractor. Municipal waste collection systems must not be used as this is likely to mean that the waste is open dumped. Hazardous waste will need to be safely stored for disposal per the GoI Hazardous Waste (Management, Handling & Transboundary) Rule 2016 as amended in neighbouring state due to lack of facilities in Tripura - West Bengal where suitably licensed hazardous waste management facilities exist. • Removed electrical and mechanical equipment, old bare conductor lines and poles will be handed over to TSECL or transported to designated TSECL Circle warehouse as per the direction of TSECL who will reuse or recycle using SPCB authorized vendors as per the condition of the equipment, if fit for use they will be stored for reuse by TSECL or they will be auctioned off as scrap material. Disposal of old transformers and other hazardous wastes shall be as per the Hazardous and Other Wastes (management and transboundary 						
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Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Responsibilities		
					Implementation	Supervision	Contractor
	<p>movement) Rules, 2016, GoI. Other wastes will be recycled using SPCB authorized vendors or suitably engineered and licensed waste management facilities for inert or solid waste.⁴⁴</p> <ul style="list-style-type: none"> • TSECL and contractors involved with the decommissioning and disposal of old transformers (notably those confirmed as containing PCBs that must be removed from the distribution network by 31.12.25) will be required to follow the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 for transport, storage, and disposal of potentially PCB oil containing transformers. Disposal must involve facilities capable of safely transporting (closed trucks) and disposing of hazardous waste containing PCBs. In stores, these transformers will need to be stored undercover on a bunded concrete pad or drip tray enough to contain 110% of the liquid contents should they spill or leak. 						

⁴⁴ TSECL to establish a contract/MOU with the nearest solid and hazardous waste management facility (West Bengal) and licensed waste recyclers in Assam for the environmentally safe and sound disposal of all its solid and hazardous wastes

<p>Occupational health and safety of workers – falls, electrocutions, accidents during loading and unloading activities, working along/beside roads, snake bites, exposure to increased noise etc.</p>	<ul style="list-style-type: none"> • Comply with the EMP including ECOP as well as following the agreed detailed design, complying with approved CEMP including H&S and labor management sub-plans and the IFC EHS General Guidelines in relation to occupational health including the IFC EHS Guideline on Construction and Demolition and the IFC Electric Power Transmission and Distribution Guidelines and avoid H&S incidents by taking a “zero tolerance” approach to the works. • Contractor is responsible for ensuring H&S of everyone on construction site including visitors and sub-contractor workers regardless they have been formally or informally employed. • Ensure adequate health and safety supervision is always on site (if staff temporarily off sick or on short term leave of less than a fortnight contractor to provide a named alternate in advance; if safeguard staff are on longer term leave, are posted elsewhere, or resign, contractor to ensure replacement CV is submitted to TSECL in 7 days of the contractor becoming aware with the staff joining the site within one month) • Require workers to confirm they have seen and understood the requirements of the health and safety plan before proceeding with the work. 	<p>Compliance with Gol and GoT regulations and guidelines</p> <p>No fatalities or lost time incidents 100% of H&S incidents including near miss recorded, immediately investigated, and corrective action taken to prevent repeat.</p> <p>EMP/CEMP requirements successfully implemented as determined through regular site checks, photographic record etc.</p> <p>No outstanding health and safety grievances from workers</p>	<p>Contractor to reflect in contract costs</p>	<p>Prepare during pre-construction and comply throughout construction stage (mobilization, construction, and commissioning works)</p>	<p>TSECL PIU/Electrical Divisions supported by PMU</p>	<p>TSECL PMU/Safeguard Unit support by PIC</p>	<p>Implement mitigation measures for the duration of construction</p> <p>Any incidents and how they were handled, will be reported in monthly progress reports by the contractor to the TPGL.</p> <p>Any long-term absences of safeguards staff will be approved by TSECL within 7 days of receiving official applications with CV of nominated alternate or replacement. CV may be declined if not comparable to the original staff.</p>
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					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<ul style="list-style-type: none"> Construction plant and equipment used on or around the site will be modern and fitted with appropriate safety devices. Ensure good housekeeping at construction site, storage areas, staff accommodation, etc. -- to be kept neat and tidy, e.g., no materials, equipment, trash laying around, cleanup worksites so that they are free of debris on daily basis. 						
Community health and safety risk from equipment mobilization, construction activities, toppling of poles during installation, spills and leakages, traffic congestions, as a result of passing over/alongside houses, busy/congested settlements or sensitive land uses like	<ul style="list-style-type: none"> Comply with the EMP including ECOP as well as following the agreed detailed design, complying with approved CEMP including H&S and traffic management sub-plans and the IFC EHS General Guidelines in relation to community H&S Fence off construction site including material stockpiles/storage areas from public access. Provide robust barricade/fence, hazard warning signage, and security presence whilst working in areas accessible to the public. Do not allow children to play in or adjacent to the construction site. If works are not completed within the day the contractor must not leave any hazardous conditions (e.g., unsigned, unfenced, and 	<p>Compliance with GoI and GoT regulations and guidelines</p> <p>No fatalities or lost time incidents 100% of H&S incidents including near miss recorded, immediately investigated, and corrective action taken to prevent repeat.</p> <p>EMP/CEMP requirements successfully implemented as</p>	Contractor to reflect in contract costs	Prepare during pre-construction and comply throughout construction stage (mobilization, construction, and commissioning works)	TSECL PIU/Electrical Divisions supported by PMU	TSECL PMU/Safeguard Unit support by PIC	Implement mitigation measures for the duration of construction

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
schools, hospitals, etc.	<p>unlit open excavations without means of escape and emergency contacts in case an accident occurs) overnight unless absolutely no access by public can be ensured.</p> <ul style="list-style-type: none"> • Transport equipment only during non-rush hours i.e., avoid the hours of 6am to 8 am and 4pm to 6 pm with the timing of works planned in conjunction with other construction works to minimize the cumulative impacts they may cause traffic congestion. • In dense urban areas or on busy roads installation works affecting footpaths and roads to avoid rush hours i.e., avoid the hours of 6am to 8 am and 4pm to 6 pm. • Temporary pedestrian and traffic diversions are to be put in place per the approved traffic management plan. Diversion works to be immediately dismantled on completion of works and the footpath and roads restored to their original condition. • Safety guides should be provided where works are on footpaths or in locations of pedestrian crossings to help guide pedestrians, especially vulnerable persons, • safely around the working area. 	<p>determined through regular site checks, photographic record etc.</p> <p>No outstanding health and safety grievances from local communities or other interested stakeholders</p>					

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<p>Safe access to property, footpaths and roads should be maintained and safe alternative routes and access provided and clearly signed where there are temporary diversions or blockages.</p> <ul style="list-style-type: none"> • Road safety standards and norms to be strictly implemented by contractor, construction vehicles to strictly follow Gol road regulations • Damage to roads must be immediately repaired to ensure that local communities can continue to safely use the public highways. • On completion of construction works roads must be left by the contractors in no poorer condition than when construction started. 						
Operational and Maintenance Phase							
<p>EHS impacts and risks of the project during O&M in general including occupational and community health and safety risks</p> <p>Community H&S risks due</p>	<ul style="list-style-type: none"> • During maintenance activities mitigation measures applicable to the construction phase are also applicable to TSECL maintenance workers or contractors and are to be followed • Carry out regular inspections (at least monthly) on the distribution lines and periodic maintenance to ensure that integrity of the poles and line is in good condition including possible conductor 	<p>Compliance with Gol and GoT regulations and guidelines</p> <p>100% of project transformers are PCB free by 31.12.25</p> <p>No fatalities or lost</p>	TSECL internal cost	Prepare during pre-construction/ construction phase and comply throughout O&M	TSECL PIU/Electrical Divisions	TSECL PMU/Safeguard Unit	NA

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
to presence of distribution lines – hazards of electrocution, lightning strike, strong winds snapping live cables etc. Humans can climb poles and get electrocuted	<p>snapping and de-energizing of the line within three cycles to avoid the potential for electrocution from a breakage, the clearances are maintained, and electrical standards are being upheld.</p> <ul style="list-style-type: none"> • Inspection protocol should confirm electrical safety warning signs and lighting arrestors in place and identify any missing or corroded parts (including protection for birds) for immediate replacement. • If property is found to be encroaching into the safety clearances notification is to be immediately issued to the owner/occupier by TSECL along with awareness raising materials with respect to the importance of maintaining the horizontal and vertical clearance from buildings and the matter will be taken up further in consultation with the appropriate authorities. • Regular pruning or lopping of trees ensure the integrity and safety of the OH distribution lines • Removal of invasive plant species during routine vegetation maintenance in an ecologically sound manner 	<p>time incidents 100% of H&S incidents including near miss recorded, immediately investigated, and corrective action taken to prevent repeat.</p> <p>Compliance with safety clearances along OH distribution lines</p> <p>EMP requirements successfully implemented as determined through regular site checks, photographic record etc.</p> <p>No outstanding grievances from local communities or other interested stakeholders</p>					

	<ul style="list-style-type: none"> • Prohibit the use of herbicides, pesticides or burning to control any vegetation growth or to manage vegetation waste. • RMU and access to other electrical equipment in the public domain to always be kept secure (doors/gates shut and locked) • There is a risk of fire associated with RMU although use of solid or SF6 gas insulation minimizes this. All necessary precautions to ensure emergency procedures are to be posted and fire extinguishers available at the location of the RMUs in the event of a fire. • Maintain written warning signages including the ISO 7010 Hazard Type: Electrical Symbol warning of the risk of electrocution. • Maintain inventory of transformers on the distribution network, make, model, risk of PCBs and other details including transformer test report, details any maintenance works undertaken, dates oil changes, leakage incidents etc. • Carry out regular inspections and periodic preventive maintenance to minimize oil leakages; ensure valves, nuts and bolts are fully functional and tightly secured, ensure rubber seals of radiators are intact. Any leaking oil that is observed must be immediately addressed. • Unless transformers have been certified PCB free workers interacting with them must wear 						
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Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<p>suitable chemical and/or oil resistant gloves, goggles, and protective clothing whilst taking samples and/or working with transformers.</p> <ul style="list-style-type: none"> • For all maintenance works undertake risk assessment and prepare H&S plan in accordance with EHS Guidelines, considering occupational and community H&S and including adherence to electrical safety standards and emergency preparedness and response plan with communication systems and protocols to report an emergency. • O&M to be performed only by suitably qualified and experienced workers who are regularly trained staff of TSECL or a contractor under supervision of a Health and Safety Officer with an appropriately equipped first aid kit and appropriate fire extinguishers immediately available for use • Restricting working at height and with electricity only by workers who are trained and certified to do so. • O&M workers to be given required PPE and other requisite safety equipment • Workers to observe guidelines to minimum approach distances for 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	<p>excavations, tools, vehicles, pruning, and other activities when working around power lines.</p> <ul style="list-style-type: none"> • Testing of structural integrity prior to proceeding with the work and the use of fall protection measures such as harnesses, tool bags, ropes etc. • Proper grounding and deactivation of live power lines during maintenance work or when working near the lines. • Map distribution lines in GIS and share the information of the routing of all underground cables to the relevant authorities that may be undertaking works that could disturb them • In the event of an incident such as cable break TSECL staff/community must immediately notify the nearest TSECL incident coordinator for handling measures: power cuts, technical O&M staffing to inspect and repair. • TSECL in conjunction with local municipalities, tribal/village heads, and the media with the support of CSOs to continue to organize health and safety campaigns on electrical safety community awareness raising activities in 						

					Responsibilities		
Project Activity or Environment Impacts/ Risks	Mitigation Measures	Performance Standard	Budget/ Source	Schedule	Implementation	Supervision	Contractor
	local communities and schools within 50 m of the ROWs <ul style="list-style-type: none"> In case of fire events, explosion, and other related situations, given the TSECL may not be available immediately in rural locations the community should be educated with respect to emergency response with 24/7 emergency contact numbers for TSECL included on signs; TSECL will need to ensure this is manned 24/7 to ensure that it is effective reporting route. 						

APPENDIX 15: EHS CODES OF PRACTICE

1. The contractor shall acquaint themselves with the project-level EMP as well as the national and state EHS requirements of all the current statutes, ordinances, by-laws, rules and regulations or their instruments having the force of law including without limitation those relating to protection of the environment, social, health and safety, importation of labour, damages to property, protection of environment, etc. The contractor will take all necessary measures and precautions (i) to ensure that the execution of the works and all associated operations on site or offsite are carried out in conformity with these requirements, and (ii) to avoid any nuisance or disturbance to adjacent receptors/local community arising from the execution of works. The contractor shall record any incidents and the action taken to resolve the situation in a logbook. The contractor will also carry out daily on-site and off-site inspections at adjacent receptors to monitor compliance with the CEMP and subplans, levels of pollution (dust, waste etc.) experienced or any disruption/disturbance caused, record inspection results, and make the inspection log available when asked.

A. Environment

Biodiversity

- Ensure clear demarcation of the working area, avoid encroachment outside the agreed corridor of impact.
- Site clearance including demolition, vegetation clearance, tree cutting and earthworks will be conducted cautiously under the supervision of an ecologist to minimize impacts on vegetation/trees/wildlife.
- In the first instance works will be scheduled outside the nesting and breeding seasons of fauna found at the project site, generally during and immediately after the monsoon season.
- Prior to demolition, vegetation clearance, tree cutting and earthworks including excavations for foundations, the construction area will be checked by an ecologist for any signs of nests, burrows etc. If nesting or burrowing animals are observed, then construction works will be postponed until any young are confirmed to have left the nest/burrow and adequate time has been given for adult animals to depart. In the interim they will be demarked to avoid accidental damage or disturbance being caused. If nest/burrows occupancy is unclear, only manual works under close supervision of an ecologist will be permitted. Only when this indicates no animals are likely to be harmed by the works must they proceed.
- Tree cutting and vegetation clearance will only be conducted after detailed tree enumeration inventory (of the number, location, size, and species of tree that they will need to cut) has been completed by the contractor, trees to be cut have been individually marked, and the trees / vegetation / shrubs to be removed have been surveyed by an ecologist to confirm that no nesting or roosting fauna is present.
- Similarly, buildings or structures will only be demolished after they have been surveyed by an ecologist to confirm that no nesting or roosting fauna is present. Only when an ecologist indicates no nesting/roosting animals are likely to be harmed must the works proceed.
- Under GoT legislation the cutting of trees will require permission from the Forest Department who will verify the trees to be felled and then accord permission for felling. Cut trees will be transferred to the Forest Department for disposal as timber or firewood.

- Ensure clear marking of vegetation to be removed before clearance, and supervision of clearing activities to ensure clearance is kept to a minimum. No globally threatened or nationally protected plant species will be cut.
- Excavated pits will be robustly fenced or covered to prevent fauna accidentally falling in, further an escape ramp will be provided to allow their escape.
- Use of herbicides or burning to clear vegetation or burning of vegetation trimmings is strictly prohibited.
- All fuel, oil, and chemicals stored, and all refueling will take place at least 100 m from dense vegetation/trees to minimize the risk of fire.
- Strict prohibition on the purchase, sale, and use of firewood, timber and NTFPs by contractor and their workers – trainings are to be provided.
- Strict prohibition on trapping, hunting, fishing, poaching or intentional injury of wildlife by contractor and their workers – trainings are to be provided so that workers know the threatened species that could potentially be encountered, and that they must not intentionally disturb or attack wild animals.
- Contractor to provide good standard of staff accommodation with heating and all meals to help discourage breaches of prohibition by the workers – provide alternative fuel source LPG / electric heaters for communal kitchens and for heating of employer provided staff accommodation.
- No litter, food or other foreign material will be thrown or left around the site and must be placed in covered garbage bins to prevent it being taken by monkeys etc.
- Regular, compulsory awareness raising activities with support of an ecologist will be undertaken to reinforce these biodiversity prohibitions with strict penalties as well as how to interact with wildlife encountered on site.
- Drivers employed to be skilled and receive training on to how to avoid traffic collisions with wildlife especially when driving at night on rural roads.
- Dispose of any invasive plant material encountered in an ecologically sound manner.
- Imported materials must be free of any invasive plant material, certification of the same to be submitted to TSECL for all the imported sand, gravel, and landscaping related material.
- Checking on incoming and outgoing vehicles; at site entrance install a wash station to thoroughly pressure wash and clean all vehicles to remove any invasive plant material or seeds before they are imported to the project site and again on leaving the project site to minimize accidental spread.
- Maintain records of sightings, supported by photographs, of any threatened species observed or any animal casualties occurring at the project site or in traffic collision, including a cause of death if known, to be reported to TSECL and Forest and Wildlife Officials.
- From one hour after sunrise to one hour before sunset no noisy works will be permitted, to minimize disturbance to fauna.
- If wildlife including that which poses a risk to human (snakes, elephants, bison, leopards, bears etc.) is observed, no works will take place in that area and a protection zone will be clearly marked to prevent any accidental disturbance until the wildlife has left the area or has been safely rescued and released in suitable habitat outside the project footprint, with support of the Forest and Wildlife Officials.

Chance Find Procedures

- Brief workers and drivers with the support of a local cultural heritage expert on the known physical cultural resources near the project site/along access roads and chance find protocol, the types of finds that will need to be reported and penalties applying for tampering with them through induction and toolbox talks before the commencement of any works.
- Implement chance find procedure as soon as any potential physical cultural resources encountered during construction activities.
- If suspected physical cultural resources are encountered, all works at the find site should be immediately halted. Strictly ensure no known physical cultural resources or chance finds are tampered with.
- Contractor to declare a chance find to TSECL within 24 hours of find. TSECL to report on any chance find having occurred within 48 hours to ADB.
- The find should be assessed by a competent official of government, ASI, and procedures to avoid, minimize or mitigate impacts to such physical cultural objects should then be agreed in writing with them.
- Services of a local cultural heritage expert to be procured by the contractor if they are required to handle chance finds.
- All artifacts, structures, articles of antiquity value and other remains of cultural/religious and archaeological significance to be reported and handled as per the Ancient Monuments and Archaeological Sites and Remains Act, 1958 as amended, and all other applicable national requirements
- Work will not begin or resume until the procedures to avoid, minimize, or mitigate impacts to the physical cultural resources have been agreed with Archaeological Survey of India (ASI) and implemented in full.
- If avoidance is not feasible, and no alternatives to removal exist, cost-benefit assessment needs to be carried out to assess whether the project works should continue or stop at site. If the project benefits outweigh the anticipated cultural heritage loss from removal which is unlikely unless in case of resource of local value, following clearance of ADB, the physical cultural resources should be removed and preserved using the best available technique in accordance with relevant provisions of national heritage protection laws and decrees as well as international best archaeological practice.
- Records to be maintained of all finds, including chain of custody instructions for movable finds.

Pollution Prevention

Pollution from Construction Equipment, Plant and Vehicles

- Use of modern equipment, exclude over-aged or worn-out equipment or vehicles from the construction site
- All equipment, plant, and vehicles used for construction works are of a modern design, use (i) battery or electric powered, or (ii) low GHG emission options where available.
- Take necessary measures to maintain all equipment in good condition. All equipment, plant, and vehicles including DG sets to be regularly serviced and maintained in good working order in accordance with manufacturer instructions and have passed applicable emission tests; keep log of maintenance work undertaken.
- Belching of black smoke prohibited.

- Prohibit engine idling
- All equipment, plant, and vehicles including DG sets to meet GoI emission standards and have the latest engine emission design (BS IV/VI)
- All construction vehicles including those for transportation of personnel to have valid Pollution under Control (PUC) Certificate
- Contractor will comply with gross vehicle and axle load limits
- Position any stationary emission sources (e.g., water pumps, diesel generators, compressors, etc.) as far as practical from the nearest properties

Air Pollution (Dust)

- Minimize the extent of earthworks and thus dust generation during construction.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site
- Housekeeping of the site will be regularly carried out to minimize the fugitive emission from material handling areas, internal access roads, and construction waste storage areas.
- Stockpiles of spoil and other dust generating materials to be kept to a minimum necessary to undertake works for the day and covered with tarpaulin
- Minimize double handling (loading and unloading) and drop loads to reduce the dust generation
- Cover exposed soil with materials like gravel to minimize re-suspension of dust, consider seeding stockpiles if not required to be used immediately to minimize the windblown dust
- Locate stores/stockpiles of loose construction material (cement, sand aggregates etc.) at least 100m from the adjacent properties and enclose them by a solid fence to reduce windblown dust.
- If not in an enclosed building/store keep stockpiles of loose soil, aggregate and waste materials covered with heavy tarpaulin to avoid suspension or dispersal during windy days.
- Trucks importing loose raw materials or removing spoil must be covered with tarpaulin tied down securely to the body of vehicles to reduce dust generation.
- Impose speed limits on construction vehicles on off- and on-site access roads to minimize exhaust and dust emissions especially where access roads run adjacent to properties
- Sprinkle earthworks, off- and on-site access roads that are not blacktopped, and material stockpiles with water during the construction period to avoid dust being dispersed by wind and mitigate dust related issues due to frequent movement of construction vehicles as necessary i.e., 2-3 times per day but more often if needed during excavations, dry and windy conditions that enable dust to be easily mobilized and the dust to be visible.
- Regularly clean dust from the off-site access roads during and immediately after construction work is completed.
- Strictly prohibit the burning of wastes generated by project-related activities.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives
- Ensure workers working near or having long exposure to vehicle exhausts and earthworks are provided with clean N95 dust masks to avoid inhalation or particulate matter and other pollutants.
- Periodic medical respiratory checks to be performed on workers exposed to high dust levels.

Noise and Vibration

- Use of modern equipment, exclude over-aged or worn-out equipment or vehicles from the construction site
- All equipment, plant, and vehicles including DG sets to meet Gol noise emission standards.
- Select construction techniques and low noise generating equipment e.g., less than 55 dBA sound pressure level at 1m, and stage noisy works to limit their duration to minimize noise and vibration
- Fit all equipment and vehicles used in construction with exhaust silencers where the manufacturer's design allows this
- Position any stationary emission sources (e.g., water pumps, diesel generators, compressors, etc.) as far as practical from the nearest properties
- Prohibit engine idling
- Prohibit use of horn by construction vehicles
- Impose speed limits on construction vehicles on off- and on-site access roads to minimize noise emissions especially where access roads run adjacent to properties
- Provide appropriate PPE (acoustic ear plugs or earphones capable of reducing noise levels to 85 dB(A) for hearing protection) to any workers subjected to noise levels of 85 dBA for more than 8 hours per day and ensure they wear it e.g., if piling etc.
- No unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C) or average maximum sound levels of 110 dB(A).
- Periodic medical hearing checks to be performed on workers exposed to high noise levels of 85 dBA for more than 8 hours per day.

Soil and Water Pollution from Fuel, Oil, Chemical

- Avoid storage of all fuel, oil, and chemicals in areas located within 100m of surface water and groundwater springs, etc. to avoid direct contamination or contamination through run off
- Establish dedicated fuel, oil, and chemicals stores (drums/containers/tanks) on impermeable bunded area of 110% volume to avoid spills and leaks contaminating soil and affecting water quality
- Secondary containment design to also consider means to prevent contact between incompatible materials in the event of a release.
- Drums, containers or tanks of fuel, oil, or chemicals to be labelled and kept in a designated, labelled storage area under lock and key when not in use.
- Place all drums or containers of fuel, oil, or chemicals on drip trays if not sited on impermeable surface with 110% bunded capacity.
- There should be no full or empty containers, tanks or drums that are left on open ground.
- Place all equipment that containing fuel or oil on drip trays it not sited on impermeable surface with 110% bunded capacity.
- Undertake refilling or refueling only on areas of hard protected soil, preferably bunded, at least 100m from surface water with all drainage directed through oil

interceptors. No vehicle or equipment maintenance activities will be permitted to take place on open ground

- Provide drip trays/catch basins or other overflow/drip containment measures at connection points or possible overflow locations during refilling or refueling
- Maintain adequate supplies of spill containment equipment/absorbents such as sand immediately on-hand in the event of an incident
- Use of dripless hose connections for vehicle tanks and fixed connections with storage tanks
- Use dedicated fittings, pipes, and hoses on containers or tanks and regularly inspect their condition
- Use of refilling or refueling equipment that is compatible and suitable for the characteristics of the materials being transferred and designed to ensure safe transfer
- Overfills of drums, containers, and tanks to be prevented as they are among the most common causes of leaks and spills resulting in soil and water contamination, this can be achieved by:
 - Checklist of measures to follow during filling operations
 - Provision of automatic fill shutoff valves to prevent overfilling
 - Installation of gauges on containers or tanks to measure volume inside
 - Use of pipe connections with automatic overfill protection (float valve)
 - Pumping less volume than available capacity by ordering less material than its available capacity
- Provision of overfill or over pressure vents that allow controlled release to a capture point
- Maintain procedures to prevent hazardous materials from being stored in incorrect containers or tanks
- Provide spill response kit with sufficient absorbent materials (e.g., sorbents, dry sand, sandbags) on-site for immediately soaking up any fuel, oil, or chemical leaks/spills that do accidentally occur
- Provision of oil-water separator on all drainage systems
- Do not allow washing of equipment or vehicles in surface water and ensure all washing water is discharged to sedimentation basin and oil interceptor instead of directly to surface water.
- Provision of designated hard standing areas for equipment servicing, refueling and wash down located at least 100m from surface water bodies, groundwater springs, with drainage directed through oil and grease interceptors before discharge into a settling pond
- Washing out concrete trucks will be prohibited on-site unless impermeable concrete washout area is provided specifically for this purpose; washouts to be emptied when 75% full.
- Cement will be stored in enclosed storage facilities and not exposed to the elements.
- Do not undertake any concrete mixing within 100m of surface water
- Spent engine oil from the equipment will be collected and sent for recycling and re-use.
- Hot mix plant will be located on impermeable surface to prevent seepage of tar into the soil

Soil And Water Pollution from Sanitation

- Strict prohibition on open defecation and urination by construction workers
- No use of pit latrines
- Construction sites and employer provided staff accommodation will be equipped with toilets and washing facilities that do not discharge untreated water.
- Toilets and washing facilities to be connected to septic tank (with soakaway) – these will be located 100 m from any groundwater well (existing and new borewells) or alternatively sanitary facilities that do not allow the untreated disposal of sewage direct to adjacent water bodies or ground e.g., enclosed mobile toilets for disposal of wastewater off-site to the nearest municipal sewage treatment works will be used.
- No untreated wastewater is to be discharged direct to surface water or the ground
- Licensed contractors will be required to collect septage/sludge from septic tanks and mobile toilets on a regular basis for disposal to municipal wastewater treatment
- Regular maintenance will be undertaken for the sanitary sewage treatment system during construction and contractor will immediately rectify any overflows, leakage, foul odor etc.
- Contractor is to maintain a logbook of water abstracted and used as well as effluent generated.

Soil Erosion and Surface Water Runoff Management

- Works over or near watercourses will adopt protection measures to guard against loss of soil that would result in the turbidity of water.
- Implement measures to prevent landslides to avoid contamination of rivers by soil.
- Undertake construction during the dry season to minimize exposed areas subject to erosion by surface water runoff and to avoid flood risk, leading to accidents and/or water contamination.
- Deep excavations to be limited to dry season to prevent the need to pump out and dispose of sediment laden water.
- In wet conditions, minimize use of heavy machinery and consider the temporary installation of removable steel plates or geotextile layer where access roads are not yet constructed.
- In the working area separately strip any fertile topsoil and store in an ecologically sensitive manner in order that it may be reused in landscaping work. Topsoil will be stored in a designated area in low level spoil heaps to reduce compaction and retain soil structure and fertility to the extent possible; spoil heaps to be covered to prevent soil erosion by wind blow and surface water runoff.
- Minimize soil erosion and surface water runoff by reducing the extent of vegetation, soil clearance and earthworks, revegetating earthworks on completion, and covering stores of sand and spoil with tarpaulin. Undertake sequenced construction method and revegetate areas immediately construction activities are completed in one area rather than undertaking earthworks on all parts of the site to minimize the area of bare ground exposed at any one time.
- Material stores will be surrounded by cut off drains/silt fences to prevent sediment laden runoff.
- Ensure surface water runoff from the construction site shall not discharge directly to surface water. Sediment control measures in the form of silt traps and sedimentation tank will be provided to treat surface run-off before disposal.

- If water from excavations is pumped it must be disposed of via a sedimentation basin, it must not be disposed of directly to surface water.
- Water sprinkling will be controlled such that no excess surface water runoff or pooling/ponding occurs.
- Dumping of construction waste including excess spoil into streams and drains is prohibited.

2. Construction of three-stage sedimentation ponds/tanks with an inlet, mid, and outlet section is required to allow sediment to settle out of surface water runoff before release of water. Silt fences can be used to channel surface water runoff to the sedimentation pond/tank. The working volume of the sedimentation pond/tank must be sufficient to allow for a minimum hydraulic retention time of at least 120 minutes under the peak surface water runoff conditions. If runoff rates exceed the capacity of a sedimentation pond/tank, one or more additional sedimentation ponds/tanks will be needed in parallel to accommodate the higher flow rates. Maximum sediment accumulation in the sedimentation pond/tank must be 25% or less.

Sedimentation Pond/Tank Illustrations



Source: Minnesota Storm Water Manual, <https://www.eng.auburn.edu/research/centers/hrc-temp/news/erosion-control.html>, <https://cals.ncsu.edu/crop-and-soil-sciences/extension/training-programs/workshops/erosion-and-sediment-control/>

Materials and Waste Management

- Import all materials from existing licensed sources and keep records of all materials used, and sources.
- Storage yards will be fenced using a solid fence to catch windblown material.
- Use durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time.
- Purchase perishable construction materials e.g., paints incrementally to reduce spoilage of unused materials.
- Use building materials that have minimal packaging to avoid generation of excessive packaging waste
- Use construction materials containing recycled content when possible and in accordance with technical standards
- Prior to the start of works the contractor will ensure the waste management (collection, storage, transport, and disposal) system is established at the construction sites and employer provided staff accommodation for domestic solid waste and construction waste is established at the construction site
- Waste shall be managed according to the waste management hierarchy of reduce waste generated, reuse waste materials where possible, recycle materials and finally safely and soundly dispose of residual waste material. Encourage recovery of recyclable wastes that could be reused or sold to recyclers, rather than disposing of it.
- Minimize waste generation, restrict use of plastics and polyethene and use recyclable/biodegradable materials during construction to the extent possible
- Store waste in designated areas to prevent soil degradation.
- Ensure stored wastes are regularly removed from site and not allowed to build up in excess quantities.
- Separate waste containers (drums, bins, skips or bags) will be provided for different types of waste; prevent the commingling or contact between incompatible wastes and allow for inspection between containers to monitor leaks or spills
- Sensitize workers on good housekeeping and the environmentally sound storage and disposal of construction and wastes, and importantly not to leave garbage lying around, provide regular toolbox talks and arrange color marked garbage bins to collect these different wastes so they are not thrown on the floor. Develop a procedure/system to penalize through escalating fines or similar any construction workers who breach these requirements.
- Collect and segregate construction wastes including scrap metal, oil, and solid waste; ensure all workers are familiar with this segregation and arrange garbage bins to collect these wastes so they are not thrown on the floor
- Clearly identifying (label) and demarcating the waste storage area(s) on a site plan
- Store all the wastes produced in an environmentally sound manner in designated, labelled area with separate waste containers (drums, bins, skips or bags) for each distinct type of waste.
- Store solid waste in enclosed bins to contain leachate and avoid vermin.
- Store hazardous waste to prevent accidental releases to air, soil, and water resources in closed containers away from direct sunlight and rain
- Limiting access to hazardous waste storage areas to workers who have received proper training
- Secondary containment systems to be constructed using materials appropriate for the wastes being contained

- Provide adequate ventilation where volatile wastes are stored
- Conducting periodic inspections of waste storage areas and documenting the findings
- Encourage recovery of recyclable wastes that could be reused or sold to licensed recyclers, rather than disposing of it.
- Prohibit use of waste (e.g., empty cement bags and containers, plastic, wooden planks) for backfilling – only inert spoil may be used for backfilling to avoid need for off-site disposal (any excess inert spoil is to be disposed of at suitably licensed waste facilities).
- Prohibit burning of construction wastes.
- Prohibit burying or dumping of construction wastes on-site, outside the site boundary, along access roads, into streams, in agricultural fields, at open municipal dump sites, allowing the waste to build up in storage areas etc.
- Composting of biodegradable food waste may be permitted on-site if small-scale enclosed composting facilities located away from staff accommodation are available– resulting compost to be used in landscaping areas
- Provide weekly toolbox talk to remind of the importance of waste disposal, prohibition of disposal on the road, in drains etc., prohibition on burning of wastes, and open defecation and urination.
- Develop a procedure/system to penalize through escalating fines or similar any construction workers who breach these requirements.
- Document all wastes removed off site (including excavated soil, solid and hazardous waste) using transfer notes, to be taken by licensed waste contractors who should reuse/recycle or dispose of the waste to suitably licensed and engineered waste management facilities according to type
- Excavated spoil that cannot be reused to a licensed disposal site as suitable for accepting inert wastes ensuring no solid or hazardous wastes are comingled with the inert excavated spoil
- Collect solid waste and dispose of it to suitably engineered and licensed sanitary waste facilities
- Ensure any hazardous waste such as oily rags or old drums disposed of in suitably licensed hazardous waste facilities
- Waste containers designated for off-site shipment to be secured and labelled with the contents and associated hazards, be properly loaded on the transport vehicles before leaving the site, and be accompanied by a shipping paper, that describes the load and its associated hazards

Emergency Preparedness and Response Planning

3. For spills and leaks an emergency preparedness and response plan tailored to the hazards associated with the project, should include:

- SOP for the management of containment structures, specifically the removal of any accumulated fluid, such as rainfall, to ensure that the intent of the system is not accidentally or willfully defeated
- Implementation of inspection programs to ensure containment structures are physically intact and being well managed
- Identification of locations of hazardous materials and associated activities on an emergency plan
- Documentation of availability of specific personal protective equipment and training needed to respond to an emergency

- Documentation of availability of spill response equipment sufficient to handle at least initial stages of a spill and a list of external resources for equipment and personnel, if necessary, to supplement internal resources
- Description of response activities in the event of a leak, spill, release, or other emergency including internal and external notification procedures, specific responsibilities of individuals, decision process for assessing severity of the incident and determining appropriate action, first aid and emergency medical treatment, evacuation routes, post-event activities such as clean-up and disposal, incident investigation, worker re-entry, and replenishment of used PPE and spill response equipment
- Inspecting, testing, and maintaining the emergency response equipment
- Training of workers on release prevention, including drills specific to hazardous materials stored on site

SF6 Management

4. Sulfur hexafluoride (SF₆) gas is widely used in circuit breakers and RMU but its use presents safety and environmental challenges when maintenance is needed. Although pure SF₆ is chemically inert and safe to handle, many of its decomposition products are corrosive and toxic. SF₆ has properties that may impact the environment. The Kyoto Accord identified it as a greenhouse gas (GHG) whose emissions should be reduced to combat global warming. The recommended management practices to be followed include:

- The type of SF₆ equipment and its operating environment determine the level of risks, handling procedures, and protection to be taken. Equipment types may be either switching, such as circuit breakers, or no switching, such as gas-insulated transmission lines or bus ducts.
- Risks of handling SF₆ gas may be categorized as low, medium, or high. A low-risk situation would include working around new or existing equipment that has been problem free. In these cases, the harmful SF₆ breakdown products are not expected to be present.
- Safe working practices include working only in well-ventilated areas, refraining from smoking in designated areas, and controlling arc welding. An intermediate risk situation would include routine maintenance when a switching device is opened for inspection. In these cases, by-products of SF₆ gas may pose hazards. Safe working practices include wearing protective clothing. A high-risk situation would include cleanup after an arcing fault. In these events, decomposition products that are highly toxic may be released, and work areas should be evacuated if the SF₆ alarm is activated.
- Warning signs should be posted at strategic locations and should carry emergency instructions, identify vital control and equipment locations, and display evacuation maps and plans. Written instructions should be developed for abnormal operating conditions, including response to gas pressure and density alarms, response to detection of SF₆ and decomposition products, and re-entry following an evacuation order.
- Normal, safe handling procedures include not dropping or rolling cylinders, not applying heat, not storing in sunlight, and not allowing cylinder temperature to exceed 50°C. Procedures for commissioning of equipment include use of a gas cart that meets performance factors and is equipped with a storage vessel, compressor, vacuum pump, and filtering system.

- Safety procedures must be followed for filling or topping up cylinders with SF₆. Normal equipment maintenance practices include periodic measurement of pressure, moisture content, and leakage. Test procedures and recommendations have been developed for these measurements and for detection of SF₆ decomposition products. Equipment failures include ruptures of pressure relief devices and burn-through of the enclosure. Following an equipment failure, procedures should be followed for cleanup of indoor or outdoor areas.
- Workers exposed to gaseous and/or solid SF₆ decomposition products should wear clothing and devices for protection from these contaminants. Protective clothing should be worn by all personnel removing or handling solid SF₆ by-products, entering a building where a fault has occurred, and working with solvent cleaning. Clothing includes overalls, footwear, rubber gloves, and goggles. Respiratory devices include dust masks, cartridge filter masks, supplied air respirators.
- During cylinder transport, precautions should be observed, including not lifting by the protective cap, storing away from heat, and storing in upright and secured position.
- During cylinder storage, procedures should be followed, including storing cylinders in a safe, well-vented location, and storing away from flammable substances and heat sources.

B. Health and Safety

5. Preventive and protective measures should be introduced according to the following order of priority:

- Eliminating the hazard by removing the activity from the work process.
- Controlling the hazard at its source through use of engineering controls.
- Minimizing the hazard through design of safe work systems and administrative or institutional control measures.
- Providing appropriate personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE.

OHS Training:

- Provisions to be made to provide OHS orientation training to all new workers to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow workers.
- Training should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Site-specific hazard or color coding in use should be thoroughly reviewed as part of orientation training.
- Specialty courses should be provided, as needed, to ensure that workers are oriented to the specific hazards of individual work assignments.
- Training to be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards.
- Workers with rescue and first-aid duties should receive dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co-workers.

Good H&S Practices:

- Always ensure good housekeeping in the premises, including on construction site, workers camps, storage areas, etc.

- Perimeter is to be kept neat and tidy, with no trip hazards on the ground e.g., open channels, materials, equipment, trash laying around.
- Do not leave hazardous conditions (e.g., unlit open excavations without means of escape) overnight
- Drums/containers/tanks that may contain substances that are hazardous because of chemical or toxicological properties, or temperature or pressure, to be labelled as to the contents and hazard, or appropriately color coded.
- Check the load of the vehicles before use, all drivers, and passengers to fasten seatbelt and comply with all transportation-related H&S laws and regulations
- Examination of all equipment and tools' quality and the presence of operational safety features before use
- Checking all electrical cords, cables, and hand power tools for frayed or exposed cords and following manufacturer recommendations for maximum permitted operating voltage of the portable hand tools
- Untrained workers will not be permitted to work with live electricity or at height.
- Observe IFC EHS Guideline on Electric Power Transmission and Distribution requirements for working with live electricity - only allow suitably trained workers that meet the requirements set out in above-referred IFC guideline to work with live electricity with strict adherence to safety standards including those listed in said guidelines; these workers must have training record of attending suitable training course on electrical safety and be provided with and wear the appropriate PPE for their role.
- Ensure proper grounding and deactivation of any live electricity during construction work or before any work near power lines and that this has been checked and certified by the H&S Officer in advance.
- Measure exposure levels to electromagnetic fields (EMF) and provide workers working in zones where EMF levels are above reference levels with personal EMF monitoring device to be attached onto their PPE.
- Require workers to observe the minimum approach distances for excavations, tools, vehicles, pruning, and other activities when working around power lines.
- Double insulating/grounding all electrical equipment used in environments that are, or may become, wet; using equipment with ground fault interrupter protected circuits
- Marking all energized electrical devices and lines with warning signs
- Labelling of service rooms housing high voltage equipment (electrical hazard) and where entry is controlled or prohibited conducting detailed identification and marking of all buried electrical wiring prior to any excavation work
- Fall prevention and protection measures should be implemented whenever a worker is exposed to the hazard of falling >2m:
- Observe IFC EHS Guideline on Electric Power Transmission and Distribution requirements for working at height; only allow suitably trained and qualified workers to work at height, these workers must have training record of attending suitable training course and be provided with and wear the appropriate PPE for their role.
- Require workers to test the structural integrity of towers prior to proceeding with the work.
- Proper use of ladders and scaffolds by trained workers
- Installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area
- Use fall protection measures when working on towers, i.e., mobile elevated working platform, and all workers at height are required to wear body harness. Safety belt

and lanyard travel limiting devices to prevent access to fall hazard area, or fall protection devices such as full body harnesses used in conjunction with shock absorbing lanyards or self-retracting inertial fall arrest devices attached to fixed anchor point or horizontal lifelines

- Ensure sufficient harnesses and gear are available on site for all workers, that workers are trained to use such harness and are obligated to always use the latter when working at height.
- Inclusion of rescue and/or recovery plans, and equipment to respond to workers after an arrested fall
- Implementation of safety measures while excavating to avoid collapse e.g., shoring if soil unstable
- PPE to be provided for all workers (regardless formal and informal, directly contracted or subcontracted) in accordance with Table 2.7.1. Summary of Recommended Personal Protective Equipment According to Hazard in IFC EHS Guidelines on OHS.
- Enforce disciplinary system (e.g., immediate removal from site) for non-compliance with PPE requirements and other H&S measures (e.g., social distancing for COVID-19).
- Eye wash station and water supply to shower to be provided during works due to risk of fuel, oil, or chemical encountering skin.
- During construction works, ensure qualified first aider and trained fire marshal is always available on-site with an appropriately equipped first aid kit and appropriate fire extinguisher and other firefighting equipment immediately available for use.
- Provide an ambulance for more serious cases to transport the patient to the hospital for treatment
- Prepare signboards reminding of health and safety measures and procedures to follow in case of accident, including key contact details (ambulance, doctor, hospital, etc.)
- Keep a log of all incidents, near-misses and accidents and include these in monthly monitoring reports
- Check health condition of workers on daily basis, for example, use of self-certification forms and temperature checks before being allowed on the construction site with more thorough monthly health checks by qualified medical professional.
- Temporary construction camps will include proper sanitation, alternative fuel to firewood, clean eating area, water supply, and secure storage of domestic solid wastes for disposal off site to suitably licensed waste management facilities.
- Pit latrines prohibited, and adequate number (about 1 toilet per 6 workers, can refer to ILO and EBRD guidance notes on workers' accommodation) of toilets and washing facility with hot and cold running water.
- Toilets to be equipped with soap and hand sanitizer.
- There should be an indication of whether toilet and washing facility is "in use" or "vacant" if not gender segregated
- Toilets should be cleaned at least twice daily to ensure they are kept in a hygienic condition.
- Prevent standing water as it may become a breeding habitat for mosquitoes etc.
- Provide workers with access to a shaded rest area on-site.
- Provide workers with a clean eating area for breaks and lunchtime.
- Provide all construction workers will an adequate supply of potable drinking water meeting national standards.

- If ground or surface water is used for drinking water, it must first be tested to confirm it meets drinking water standards and continue to be regularly tested. If drinking water standards are not met, potable water shall be imported to site.
- If workers are not local to the area use may be made of existing accommodation facilities but if a construction camp is provided it must be adequately equipped with sufficient toilets (about 1 toilet per 6 workers; proportional to the number of workers being accommodated), hand washing facilities, showers or baths, food preparation and clean eating area, beds, beddings, mosquito nets, potable drinking water, etc.
- Installation of barriers (a temporary fence ideally solid fence) at construction areas with hazard warning signs to deter people from accessing the construction site
- Require all project drivers to always abide by GoI road safety regulations.
- Road safety and warning signs must be posted at 500m, 100m, and immediately in advance of the works at least two weeks prior to the works commencing to inform the public of the temporary blockage.
- Access to the construction site will be under traffic controls when trucks enter and exit.
- Establishing rights-of-way, site speed limits, vehicle inspection requirements, operating rules and procedures, and control of traffic patterns or direction
- Ensuring drivers undergo medical surveillance
- Ensuring moving equipment with restricted rear visibility is outfitted with audible back-up alarms
- Construction workers including subcontractors will be given awareness raising in HIV/AIDS, other communicable diseases including COVID-19, and sexual, exploitation, abuse, and harassment with strict penalties (e.g., immediate removal from site) for any non-compliance of workers to an agreed code of practice
- Avoid ponding of water during construction to avoid habitat creation of vector borne diseases e.g., malaria.
- Working schedule to be developed to allow enough breaks and enough rest time in-between the shifts.
- No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
- Use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB(A).
- Hearing protection is preferred for any period of noise exposure more than 85 dB(A) an equivalent level of protection can be obtained, but less easily managed, by limiting the duration of noise exposure. For every 3 dB(A) increase in sound levels, the allowed exposure period or duration should be reduced by 50 percent.
- Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible

6. Fires and or explosions resulting from ignition of flammable materials or gases can lead to loss of property as well as possible injury or fatalities to project workers. Prevention and control strategies include:

- Storing flammables away from ignition sources and oxidizing materials.

- Defining and labelling fire hazards areas to warn of special rules (e.g., prohibition in use of smoking materials, cellular phones, or other potential spark generating equipment)
- Providing specific worker training in handling of flammable materials, and in fire prevention or suppression
- Oxyacetylene burning equipment will not be permitted in any confined space.
- Burning equipment of the oxy-propane type shall be used.

Occupational Health and Safety Plan for Construction

7. Occupational Health and Safety Plan will aim to ensure that the workplace is safe and healthy by addressing the hazards and risks at the workplace; outlining the procedures and responsibilities for preventing, eliminating, and minimizing the effects of those hazards and risks; identifying the emergency management plans for the workplace or workplaces; and specifying how consultation, training and information are to be provided to employees at various workplaces.

Steps to Ensure Maximizing of Safety at Construction Site

8. The contactor will be responsible for implementation of the following:
- (i) Installation of signboards and symbols in risky and hazardous areas, to inform workers to be careful.
 - (ii) Ensuring that materials are all stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling, or collapse.
 - (iii) Vehicles will be moved only along pre-assigned routes and have well-functioning horns, reverse light and buzzer, rear view mirrors, etc.
 - (iv) Removing all scrap and waste material from the immediate work area as the work progresses.
 - (v) Use only trained staff to construct, install, handle, and repair all electrical equipment to prevent risks of electrical shocks and electrocution.
 - (vi) Install fire extinguishers and/or other fire-fighting equipment at every work site to prepare for any accidental fire hazards.
 - (vii) First aid kits shall be always made available throughout the entire construction period. Arrangement shall be made to ensure medical attention for workers who have met with an accident or sudden illness at any time during the construction period.
 - (viii) Fire protection: the employer shall be responsible for a fire protection and prevention throughout all phases.
 - (ix) Hand and power tools: Conditions of all hand and power tools or other reciprocating, rotating, or moving parts of equipment shall be maintained by the employer in a safe condition to prevent any accidents.
 - (x) Aisles and passageways shall be kept clear to provide for free and safe movement of material handling equipment and workers. Material if stored/stacked at roadside must not hinder free movement of vehicles and persons.
 - (xi) The areas used for construction shall be kept in good repair to ensure safe movement of vehicle or person.

9. **Personnel Protective Equipment.** Risks to the health and safety of workers can be prevented by provision of Personal Protective Equipment (PPEs) to all workers. Personal protective equipment like safety gloves, helmet, mufflers etc. will be provided during the construction period and during the maintenance work. Depending on the nature of work and the risks involved, contractors must provide without any cost to the workers, the following protective equipment.

- (i) Helmet shall be provided to all workers, or visitors visiting the site, for protection of the head against impact or penetration of falling or flying objects.
- (ii) All PPE must be of good quality with mark of quality standard certification.
- (iii) Safety belt shall be provided to workers working at heights for bridge construction, etc.
- (iv) Safety boots shall be provided to all workers for protection of feet from impact or penetration of falling objects on feet.
- (v) Ear protecting/ earmuffs/plugs shall be provided to all workers in high noise zones.
- (vi) Eye and face protection equipment shall be provided to all welders to protect against sparks.
- (vii) Respiratory protection devices shall be provided to all workers during occurrence of fumes, dusts, or toxic gas/vapor.
- (viii) The supervisor must ensure that appropriate personal protective equipment is available to workers; properly worn when required and properly cleaned, inspected, maintained, and stored.
- (ix) A worker shall be responsible for using the items of personal protective equipment provided by the employer.
- (x) A worker who is required to use personal protective equipment must-
 - Use the equipment in accordance with training and instruction.
 - Inspect the equipment before use.
 - Refrain from wearing protective equipment outside of the work area which if done so would constitute a hazard; and
 - Report any equipment malfunction to the supervisor or employer.
- (xi) A worker who is assigned responsibility for cleaning, maintaining, or storing personal protective equipment must do so in accordance with training and instruction provided.
- (xii) The safety and emergency procedures manual will be kept. Necessary training regarding the safety aspects of the personnel working at the project site will be provided.
- (xiii) First aid facilities will be made available, and doctors called in from nearby village/towns when necessary.

Personal Protective Equipment for Safety of Different Body Parts

Sr. No.	Body Part to be protected	Personal Protective Equipment
1	Head	Safety helmet, hard hat, Crash helmets
2	Eye	Eye protectors, eye protectors for radiations, shield and helmet, zero power goggles
3	Ear	Earplug, earmuffs
4	Noise-Mouth	Du respirator, gas mask, self-contained breathing apparatus, dust masks
5	Hand	Standard work gloves, cutting gloves, leather work gloves, heat protective gloves, anti-vibration gloves
6	Foot	Industrial safety boots, chemical-proof boots
7	Body	Standard work clothing, chemical-proof clothing, heat protective clothing, leather apron
8	Others	Safety belts, personal protective equipment for radiation protection, back support belts
9	COVID-19	Sanitizer, masks, etc.

Contents of First-Aid Box

Sr. No.	Description	Quantity
1	First aid leaflet	1 copy
2	Sterilized finger dressing	10 nos.
3	Sterilized hand or foot dressing	10 nos.
4	Sterilized body or large dressing	6 nos.
5	Sterilized burns dressing - small	4 nos.
6	Sterilized burns dressing - large	2 nos.
7	Sterilized burns dressing – extra large	6 nos.
8	Sterilized cotton wool (25 gms)	2 tubes
9	Cetavolon	2 tubes
10	Eye pads	6 nos.
11	Adhesive plaster	1 spool
12	Assorted roller bandage	6 nos.
13	Triangular bandages	6 nos.
14	Safety pins	6 nos.
15	Scissors, ordinary, 12.7cms, both sides sharp	1 pair
16	Antiseptic liquid, 150 ml, or equivalent	2 nos.
17	Cotton wool for padding, 100 gms	2 packets
18	Eye Ointment of sulphacetamide preparation	1 tube
19	Loose woven gauze (28"x8"), compressed pack	1 packet
20	Aspirin, 300 mg (10 tablets)	5 strips
21	Note Pad, with a pencil in a plastic cover	1 no.
22	Adhesive dressing strips	10 strips
23	Field dressing of modified army pattern	3 nos.
24	Record cards in a plastic cover	1 set
25	Torch, medium size	1 no.
26	Eye wash	1 no.
27	Wooden splints, small	1 set
28	Wooden splints, big	1 set
29	Disinfectant, Spirt, 100ml	1 bottle

10. **Health Management Plan.** Full-fledged hospital facilities should be made available round the clock for attending emergency arising out of accidents, if any. All working personnel should be medically examined at least once in every six month and at the end of his/her term of employment. This is in addition to the pre-employment medical examination. Contractor will implement the following:

- (i) Medical Emergency Response Planning for Disaster Management Plan.
- (ii) Control of vectors in the project site; stagnant water to be drained off, raise awareness among the workers to combat spread of vector borne diseases, self-hygiene.
- (iii) Screening Programs for Diabetes, Hypertension, COVID-19, AIDS, and Occupational Diseases etc.
- (iv) Preventive Health Examinations e.g., Pre-employment, Periodic (Annual) health examinations.
- (v) Medical Surveillance Program for health impacts of hazards.
- (vi) Workers Immunization against Tetanus, Hepatitis, COVID-19 etc.

11. **Records and Documentation.** Contractor will document and keep record making them available for review. Reports prepared by the contractor shall include information on the place, date and time of the incident, name of persons involved, cause of incident, witnesses present and their statements. Based on such reports, the management can jointly identify any unsafe conditions, acts or procedures and recommend for the contractor to undertake certain mitigative actions to change any unsafe or harmful conditions.

12. **Accidents and Diseases Monitoring:** Establish procedures and systems for reporting and recording:

- (i) Occupational accidents and diseases
- (ii) Dangerous occurrences and incidents
- (iii) These systems should enable workers to report immediately to their immediate supervisor any situation they believe presents a danger to life or health.
- (iv) The systems and the employer should further enable and encourage workers to report to management all:
 - Occupational injuries and near misses
 - Suspected cases of occupational disease
 - Dangerous occurrences and incidents

13. All reported occupational accidents, occupational diseases, dangerous occurrences, and incidents together with near misses should be investigated with the assistance of a person knowledgeable/competent in occupational safety. The investigation should: Establish what happened; Determine the cause of what happened, identify measures necessary to prevent a recurrence, Distinction is made between fatal and non-fatal injuries. The two main categories are divided into three sub-categories according to time of death or duration of the incapacity to work. The total work hours during the specified reporting period should be reported to the appropriate regulatory agency.

14. **Compensation for Injuries and Death.** Any casualty or injury resulting from occupational activities should be compensated as per Gol regulations. Where compensation is sought by the injured party, proper procedures for documentation of the case will be followed, including a detailed report on the accident, written reports from witnesses, report of the examining doctor and his/her recommendation for treatment. Each individual contractor will be responsible for ensuring compensation for the respective workers.

15. **Offences.** Workers should abide by the following regulations also, which are to be supervised by the Contractor:

- (i) No gambling is to be in project site area, either construction site or camps, which may lead to conflicts
- (ii) No drugs or alcohol abuse to be tolerated in the project site area
- (iii) Workers should not be minor (below 18 years age)

16. Restriction on keeping any dangerous arms or equipment (licensed or not) when in the project area, except for security personals.

Structural Safety of Project Infrastructure

- (i) Inclusion of buffer strips or other methods of physical separation around project sites to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odors, or other emissions
- (ii) Incorporation of siting and safety engineering criteria to prevent failures due to natural risks posed by earthquakes, cyclone, cloud burst, flooding, landslides, and fire. To this end, all project structures should be designed in accordance with engineering and design criteria mandated by site-specific risks, including but not limited to seismic activity, slope stability, wind loading, and other dynamic loads
- (iii) Application of locally regulated or internationally recognized building codes to ensure structures are designed and constructed in accordance with sound architectural and engineering practice, including aspects of fire prevention and response
- (iv) Engineers and architects responsible for designing and constructing facilities, building, plants, and other structures should certify the applicability and appropriateness of the structural criteria employed.

17. **Fire Prevention.** Fire prevention addresses the identification of fire risks and ignition sources, and measures needed to limit fast fire and smoke development. These issues include:

- (i) Fuel load and control of combustibles
- (ii) Ignition sources
- (iii) Interior finish flame spread characteristics
- (iv) Interior finish smoke production characteristics
- (v) Human acts, and housekeeping and maintenance

18. **Fire Suppression and Control.** Fire suppression and control includes all automatic and manual fire protection installations, such as:

- (i) Automatic sprinkler systems
- (ii) Manual portable extinguishers
- (iii) Fire hose reels

19. **Emergency Response Plan:** An Emergency Response Plan is a set of scenarios-based procedures to assist staff and emergency response teams during real life emergency and training exercises. This chapter of the Fire and Life Safety Master Plan should include an assessment of local fire prevention and suppression capabilities.

20. **Traffic Safety:** Traffic safety should be promoted by all project personnel during displacement to and from the workplace, and during operation of project equipment on private or public roads. Prevention and control of traffic related injuries and fatalities should include the adoption of safety measures that are protective of project workers and of road users, including those who are most vulnerable to road traffic accidents. Road safety initiatives proportional to the scope and nature of project activities should include:

- (i) Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. Measures should include:
 - (ii) Emphasizing safety aspects among drivers
 - (iii) Improving driving skills and requiring licensing of drivers
 - (iv) Adopting limits for trip duration and arranging driver rosters to avoid overtiredness
 - (v) Avoiding dangerous routes and times of day to reduce the risk of accidents
 - (vi) Use of speed control devices (governors) on trucks, and remote monitoring of driver actions
 - (vii) Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.
 - (viii) The procedures for transportation of hazardous materials should include:
 - Proper labelling of containers, including the identify and quantity of the contents, hazards, and shipper contact information
 - Providing a shipping document (e.g. shipping manifest) that describes the contents of the load and its associated hazards in addition to the labelling of the containers. The shipping document should establish a chain-of-custody using multiple signed copies to show that the waste was properly shipped, transported and received by the recycling or treatment/disposal facility
 - Ensuring that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved
 - Ensuring adequate transport vehicle specifications
 - o Training employees involved in the transportation of hazardous materials regarding proper shipping procedures and emergency procedures using labelling and placarding (external signs on transport vehicles), as required
 - Providing the necessary means for emergency response on call 24 hours/day

APPENDIX 16: DISTRIBUTION LINE SPECIFIC ASSESSMENT FORMS, CONSULTATION PROFORMA, AND IEE UPDATE TEMPLATE

Distribution Line Specific Assessment Forms

1. One consolidated set of distribution line specific assessment forms (Form A1 or A2, B, and C) is to be completed for each distribution line/electrical subdivision for LT lines with the consolidated forms to be submitted to ADB for clearance prior to the commencement of any works associated with the distribution line covered by them. An orientation program is proposed for TSECL and their contractors on how to complete the assessment forms at the start of project.

Form A. Project description

- 33kv or 11kV UG or new 33kV or 11kV overhead CC distribution lines, complete Form A1
- Conversion of distribution line to CC or LT to ABC on existing alignment, complete Form A2

Form B. Baseline setting

- 33kV or 11kV UG, complete all items of the form
- New 33kV or 11kV overhead CC, complete all items of the form
- Conversion to CC or LT to ABC following existing alignment with no diversion, complete bold items of form only
- Conversion to CC or LT to ABC with minor diversion of route, complete all items of the form

Form C. Environment assessment checklist – provide for all distribution lines/subdivisions

2. Provide requested maps and photographs as separate files using clear naming protocol to identify them.

A. PROJECT DESCRIPTION

Form A1.

Items	Details
Distribution Line Name/kV	
Electrical Circuit/Division/Subdivision	
Administrative District/Division/Subdivision	
Names of Settlements Served	
Contract Package/Lot	
Contractor	
Construction timeline	
Start Point Coordinate	

Starting Substation (if applicable)	Photo of the substation (if available)
End Point Coordinate	
Ending Substation (if applicable)	Photo of the substation (if available)
Length (km)	
Type (UG or CC)	
Elevation	
Topography (flat land/rolling/complex)	
Ground Conditions (stable/unstable)	
Map of final route alignment (map(s) to be provided for entire route)	Insert or provide as a separate file map showing the line alignment at readable scale (use GPS to map during site visit walkover)
Number of railway crossings (type used)	
Existing transformers distribution line is connected to: (details provided for all transformers; photo(s) of transformers provided as a separate file)	Type: ground mounted/pole mounted Model and date of manufacture: Date of last oil change or maintenance, if known: Evidence of oil leak: none/minor/major Existing safety features: fence/warning sign/climb deterrent Pollution prevention features for ground mounted transformers: none/concrete platform/bund Photo of the transformer (if available)
Temporary facilities, location/size, if any (may be used for multiple components)	
Temporary workers camp location/size (may be used for multiple components)	

Form A2.

Items	Details
Distribution Line (Subdivision) Name	
Electrical Circuit/Division/Subdivision	
Administrative District/Division/Subdivision	
Contract Package/Lot	
Contractor	
Construction timeline	
Start Point Coordinate	
Starting Substation (if applicable)	Photo of the substation (if available)
End Point Coordinate	
Ending Substation (if applicable)	Photo of the substation (if available)
Length (km)	
Type (CC or ABC)	
Topography (flat land/rolling/complex)	
Ground Conditions (stable/unstable)	
Topography (flat land/rolling/complex)	
Map of final route alignment(s) (map(s) to be provided for entire route)	Insert or provide as a separate file map showing the line alignment(s) at readable scale, including details of any minor diversion (use GPS to map during site visit walkover)
Number of railway crossings (type used)	
Existing transformers distribution line is connected to: (details provided for all transformers; photo(s) of transformers provided as a separate file)	Type: ground mounted/pole mounted Model and date of manufacture: Date of last oil change or maintenance, if known: Evidence of oil leak: none/minor/major Existing safety features: fence/warning sign/climb deterrent Pollution prevention features for ground mounted transformers:

	none/concrete platform/bund Photo of the transformer (if available)
New poles on existing alignments	Number of poles:
New poles on diverted routes, required in order to meet conductor clearances (maps to show details of any diversions)	Number of poles:
Temporary facilities, location/size, if any (may be used for multiple components)	
Temporary workers camp location/size (may be used for multiple components)	

B. BASELINE SETTING⁴⁵

Land Use and Sensitive Receptors	Details
Land use setting (dense urban/semi urban/rural settlement/rural)	
TTAADC area/minority dominated communities (details)	yes/no
ROW following existing road reserve in habitation	km of line:
ROW on existing road reserve outside habitation	km of line:
ROW crossing of roads	Number of roads crossed:
ROW with agricultural land traversed	km of line: number of poles:
ROW with plantation land traversed (detail type)	km of line: number of poles:
ROW with other land type traversed: (detail land types)	km of line:
Other land types within 50m of the ROW: (detail land types)	
ROW crossing of waterbodies e.g., rivers, streams, drains, ponds etc.	Number and types of waterbody crossed: Insert of provide as a separate file a

⁴⁵ Route surveyors who should include environmental/ecological experts can use the checklists similar to those used during the IEE preparation (Annexure 4) to obtain sufficient information from the field to inform the baseline setting

	clear photo of each waterbody to cross
Other waterbodies within 50m of the distribution line route e.g., rivers, streams, drains, ponds etc.	Number and types of waterbody:
Presence of international border in subdivision	yes/no If yes, specify the minimum distance to the distribution line
Presence of internationally or nationally important biodiversity sites in subdivision or within 10km, to be informed by IEE. Including National Park, Wildlife Sanctuary, ESZ, Ramsar, notified forest land, KBA, IBA, etc.	yes/no If yes, list together with minimum distance to the distribution line route⁴⁶
Risk of state-wide critical habitat species being found within 50m of the distribution line route; informed by the IEE, findings of ecology walkover surveys, and confirmed in consultation with forest officials and local community etc. Note: in Kanchanpur subdivision of North Tripura district especially in Jampui Hills block (near to Vangmung), particular attention to be paid to CR, endemic <i>Cyrtodactylus montanus</i>	yes/no
Presence of other CR/EN/VU species being found within 50m of the distribution line route; informed by the IEE, findings of ecology walkover surveys, and confirmed in consultation with forest officials and local community etc. Note: special attention to be paid for distribution lines crossing through elephant movement areas in Khowai and Gomoti districts	yes/no
Habitat types found within 50m of the ROW: (detail habitat types)	modified/natural
Presence of internationally or nationally important physical cultural resources in subdivision, informed by IEE.	yes/no If yes, list together with minimum distance to distribution line route
Locally important physical cultural resources in 50m of	yes/no

⁴⁶ IBAT to be run for a wider study area of 10km around distribution line to identify the presence of legally protected areas, important bird areas etc. IBAT report to be attached to confirm search undertaken. However, it is to be noted that certain legally protected areas in Tripura and notified forest land are not included in IBAT so this will also need to be manually checked. Given the setting of Tripura the presence of biodiversity sites in neighboring states and Bangladesh are to be checked.

the distribution line route e.g., shrines, trees etc.	If yes, provide details of these physical cultural resources including photos as separate files
Private / public trees located within the safety clearance and requiring to be cut	Numbers to be cut: Numbers saved by local realignments: Confirm species to be felled do not include CR, EN, VU species, notably Agar Wood: yes/no
Buildings located within the (i) ROW (ii) safety clearances	(i) yes/no (ii) yes/no If yes, provide photos clearly showing baseline situation (attach as separate files) with a map clearly showing details of the line alignment, and how safety clearances will be achieved
School compounds or playgrounds located within (i) ROW (ii) safety clearances⁴⁷	(i) yes/no (ii) yes/no If yes, provide photos clearly showing baseline situation (attach as separate files) with a map clearly showing details of the route alignment, and how safety clearances will be achieved
School compounds and/or playgrounds situated within 50m of the route alignment	yes/no If yes, provide photos clearly showing baseline situation (attach as separate files)
Other public/private buildings that are situated within 50m of the route alignment	yes/no If yes, provide photos clearly showing baseline situation (attach as separate files)

⁴⁷ For new lines with such facilities in the ROW the detailed arrangement plan will be attached, following detailed route surveys being completed during detailed design. Existing distribution lines being reconducted which cross school compounds or playgrounds and other similar community facilities will be marginally realigned to ensure that the same requirements as for new lines are met, arrangements plan for any existing lines with such facilities in the ROW including realignments required will be attached following detailed route surveys being completed by the contractor.

C. ENVIRONMENT ASSESSMENT CHECKLIST

3. Potential environmental impacts have already been identified at the project level and mitigation for these impacts has been identified in the project-level EMP so only locational issues need further consideration. If the answer to any of the assessment questions below is a yes or not known, then as part of updating the IEE a site-specific assessment might be required for any components/activities of concern to determine the significance of potential impacts and any site-specific mitigation measures required. Further consultation should be undertaken with ADB environment safeguards specialist if the answer to any of these questions is identified to be a yes.

Distribution Line Specific Assessment	Yes	No	Not Known	Remarks
A. Distribution Line Siting				
Is any distribution line ROW adjacent to (e.g., within 50m) or in any of the following? Informed by Environment Baseline Form/IBAT Check				
▪ National Park				
▪ Wildlife Sanctuary				
▪ Ecologically Sensitive Zone (ESZ)				
▪ Ramsar Site				
▪ Important Bird Area				
▪ Key Biodiversity Area				
▪ Reserve Forest				
▪ Proposed Reserve Forest				
▪ Protected Forest				
▪ Other Notified Forest Area				
Is any distribution line ROW adjacent to (e.g., within 50m) or in the prohibited or regulatory zone (300m) of any of the following? Informed by Environment Baseline Form				
▪ ASI protected monument				
▪ GoT protected monument				
B. Potential Environmental Impacts				
Does the distribution line have the potential to...				
▪ cause significant adverse environmental impacts that are irreversible, diverse, or unprecedented				
▪ result in the conversion or degradation of natural habitat because the ROW passes through or adjacent forest habitat, wetland area etc.?				
▪ be routed within critical habitat for those species that the state supports critical habitat for?				
▪ encroach directly or indirectly (e.g., worker disturbance) on any internationally or nationally important biodiversity areas as per Section A?				If yes, please attach original wildlife and/or forest clearances that were obtained by TSECL for any existing line being reconducted
▪ result in damage to locally important				

physical cultural resources?				
▪ require the removal of physical cultural resources from their current location?				
▪ encroach directly or indirectly (e.g., worker disturbance) on the prohibited or regulatory zone of ASI or GoT protected monuments as per Section A?				
▪ encroach on or be within the safety clearances for buildings?				
▪ encroach on or be within the safety clearances for school compounds or playgrounds?				
▪ require works beyond the international border fencing				If yes, please attach permission from Border Security Force and follow safety measures advised
▪ cause damage to public utility services (water or gas pipelines, telephone lines etc.)				
C. Other Impacts				
Will the distribution line route cause any additional site-specific impacts to those detailed in the IEE and covered by the project-level EMP...				
▪ <i>[insert details]</i>				
▪ <i>[insert details]</i>				
▪ <i>[insert details]</i>				
▪				

Submitted by:
 Name and signature:
 Position:
 Date:

Reviewed by:
 Name and signature:
 Position:
 Date:

Note from the Reviewer, if any:

CONSULTATION PROFORMA RECORD

4. Meaningful environmental consultations must be conducted for each substation, the test laboratory and distribution line/electrical subdivision for LT with one consultation proforma record to be completed for each. The meaningful consultation during the IEE update will be carried out by the route surveyors with the support of TSECL. The consultation material will use photographs to help explain the scope of work and convey the findings of the IEE to disseminate information on the potential impacts and their management, as well as informing of the works. An orientation program is proposed for TSECL and their contractors on how to conduct meaningful public consultations. TSECL and the contractor are also responsible for completing all other consultations during subproject implementation in accordance with the EMP.

5. For environment the following government or civil society representatives should be met for each substation, the test laboratory and distribution lines as part of the IEE update; these consultations can however be conducted at electrical division level or based on works under each contract package/lot. Identification of key stakeholders will be done by the contractors in due consultation with officials of TSECL and Tripura Tribal Areas Autonomous District Council (TTAADC).

- TPCB Officers (Assistant Environmental Engineers)
- Forest Officers (Subdivision, Range and Beat Officers)
- Chief Wildlife Officer and District Forest Officers for any internationally or nationally important biodiversity areas or critical habitat species within subdivision
- Department of Archaeology for any internationally or nationally important physical cultural resources within subdivision
- Tribal/TTAADC village council head/Village Headman/Panchayat Pradhan/Ward Councilor from villages and towns within 500m for each substation and the test laboratory and from villages and municipal areas within 50m for distribution lines
- Temple/mosque/church head or similar for any physical cultural resources within 500m of each substation and the test laboratory and for any physical cultural resources within 50m of distribution lines
- School/college/university head for all education facilities within 500m of each substation and the test laboratory and for any education facilities within 50m of the distribution lines

Table 1: Summary Record of Subproject Environment Meetings and Discussions with Government and Civil Society Representatives*

Date	Location	Name of the Person	Position or Title, Agency	Topics Discussed	Suggestions for Alignment and Mitigation	Contact Number	Signature

* Provide photograph of the meeting in progress

6. The contractors concerned with guidance from TSECL (PIC) will identify appropriate methods for public consultation at each location and suitable dissemination platforms for broader reach. The contractors with guidance from TSECL (PIC) will develop appropriate communication

materials in local language for the purposes of consultation especially where affected people include scheduled tribes/indigenous peoples. For disclosure purposes, the communication materials will include the positive and negative impacts, mitigation measures, grievance redress mechanism, construction schedule etc. Consultation process will be utilized to address the concerns and project implementation issues raised by the affected people during the consultation.

7. Applicable COVID-19 guidelines of Government of India/Government of Tripura will be followed during the consultation as well as Appendix 11 of the IEE. Consultations should also convey how the TSECL and contractor will ensure community health and safety during construction.

8. The contractors will give advance notice about the consultations or other engagement and will disseminate properly for wider participation of beneficiaries or affected people especially women and the scheduled tribes/indigenous peoples.

9. Public meetings are to be attended by at least 10% of the affected population and have at least 30% representation of women excluding TSECL and contractor representatives. If it is not possible at the public consultation to achieve these levels of female participation a separate gender focus group must be held to ensure the concerns of women and vulnerable groups are heard. If public meetings are still not possible to convene due to COVID-19 restrictions, then the same representation should be achieved through door-to-door consultations within communities.⁴⁸

Table 2: Summary Record of Public Consultations and Focus Groups^{*49}

Substation/Test Laboratory/Distribution Line Name		
District/Division/Subdivision		
Village(s)		
Date and Time		
Total Population of Affected Persons within 50m of ROW (estimate)		
Total Number of Participants	Male:	Female:
Number of Participants from Vulnerable Groups	ST:	SC:
Names and Designations of Key Participants		
TSECL		
Contractor		
District administration/village representatives		
Topics Discussed and Findings		
Presence of internationally and nationally important biodiversity sites and physical cultural resources in the area		
Presence of the seven critical habitat species in the area		
Presence of elephants and other threatened species in the area		

⁴⁸ If travel within state is not possible due to COVID-19 then it will be for site-level representatives of TSECL and the contractors to facilitate the ongoing consultations.

⁴⁹ Those undertaking the consultations can use checklists similar to those used during the IEE preparation (Annexure 12) to obtain sufficient information to be able to complete the summary record. Photographs and attendance sheet to be attached with the consultation proforma.

Presence of trees along alignment and if require cutting	
Presence of physical cultural resources along alignment	
Presence of buildings along alignment and if conductor clearances are met	
Presence of school compounds, playgrounds or other community facilities along alignment and if conductor clearances are met	
Existing community H&S incidents and/or concerns with existing distribution lines	
Existing community H&S incidents or pollution (oil leak) and/or concerns with existing transformers	
Concerns of community related to H&S of new distribution lines	
Concerns of community related to pollution and waste management during the works	
Concerns of community related to noise, vibration, dust, air pollution during the construction	
Concerns of community related to disturbance to agricultural activities during works	
Concerns of community related to disturbance to ongoing access and traffic management issues during works	
Concerns of community related to incoming skilled workers and their accommodation during the works	
Concerns of community related to local employment (jobs created for unskilled workers by construction are very minimal if any)	
GRM and types of grievances related to environment, health and safety that could be raised	
Suggestions for Alignment and Mitigation	

* Provide photographs of the public meeting and/or focus groups in progress and copy of sign in sheet

Submitted by:

Name and signature:

Position:

Date:

Reviewed by:

Name and signature:

Position:

Date:

Note from the Reviewer, if any:

IEE UPDATE OUTLINE

10. TSECL will determine if the IEE will be updated with respect to all works under each electrical division or all works under each contract package/lot. For the substations and test laboratory only the consultation section may need to be updated assuming there is no change in the scope of works from that described in the IEE. For the distribution lines all sections need to be updated.

11. Unless site-specific assessment and management planning is required for a distribution line based on the final route alignment the site-specific assessment forms and consultation proformas consolidated by TSECL for all works under each electrical division or contract package/lot will comprise the basis for the IEE update. The IEE update will be attached to the IEE in the form of an annex. If a site-specific assessment is required, then a detailed assessment of the potential impacts and risks is to be included in the update annex, together with a site-specific EMP to accompany the project-level EMP for implementation by the contractor.

- **Description of the Project**, attach project description section based on completed project description forms for all the distribution lines under the electrical division or contract package/lot.
- **Description of the Environment**, attach the baseline setting section based on completed baseline forms for all the distribution lines under the electrical division or contract package/lot.
- **Site-Specific Environmental Impacts and Mitigation Measures** required only when TSECL/ADB identifies a site-specific assessment and management planning is required due to the presence of any sensitive receptors or unanticipated impacts being identified.
- **Information Disclosure, Consultation, and Participation**, for each electrical division/contract lot provide summary per below table and attach copies of completed consultation proformas.

Consultation Activities	Yes	No	
Meaningful consultations with community were conducted before finalizing the alignment			Details of consultations undertaken, Table 1 and 2
Suggestions received in finalizing the alignment			Suggestions provided, Table 3
If suggestions received, are they incorporated into design			

- **Site-Specific EMP**, not required unless site-specific EMP is required by TSECL/ADB based on site-specific assessment.

APPENDIX 17: ENVIRONMENTAL MONITORING PLAN

Table 1: General

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
Health and Safety – incidents	Pre-Construction Enabling Works, Construction, and Commissioning	Records of health and safety incidents	Keep records of near miss, minor, lost time, and fatal health and safety incidents related to the project, compile records from construction sites	Monthly	Construction sites, including temporary construction facilities	Zero lost time incidents or fatalities (among workers and community) For 100% lost time incidents or fatalities	EPC contractor to undertake monitoring and report to TSECL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
	Operational and Maintenance		Carry out interviews with workers and the community to identify if any unrecorded incidents occurred. During the COVID-19 pandemic, temperature checks to be carried out at entrance of the work site at start of shift	Monthly	All substations, test laboratory and distribution lines	/confirmed COVID-19 cases immediate action taken to avoid repeat or escalation of situation All incidents including minor and near miss dealt with in accordance with EMP with lessons learnt for future 100% lost time and fatalities /confirmed COVID-19 cases reported to TSECL within 24	TSECL	TSECL

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
						hours and ADB within 48 hours		
Drinking water supplies	Pre-construction preparations	ISO 10500 drinking water parameters (full suite)	APHA and BIS Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	One time for baseline establishment to ensure source of water suitable as drinking water	Sources of drinking water for construction/ operation of project for which supplier is unable to provide copies of drinking water tests to confirm compliance.	ISO 10500 drinking water parameters	EPC contractor to undertake monitoring and report to TSECL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
	Pre-Construction Enabling Works, Construction, and Commissioning			Six monthly				
Water resources	Pre-Construction Enabling Works, Construction, and Commissioning	Water volume used and source	Keep records of all water used and source.	Ongoing	Construction sites, including temporary construction facilities	No grievance received during construction or operation regarding conflict with other water users	EPC contractor to undertake monitoring and report to TSECL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Soil (earthworks)	Pre-Construction Enabling Works, Construction, and Commissioning	Volume of soil disturbed during construction	Keep records of earthworks involved, including total volume in m3 of soil excavated and reused (any disposed of as spoil off site to licensed waste disposal facilities recorded as per waste	Monthly	Construction sites involving earthworks/cut and fill activities	Earthworks documented, and all excavated and cut and fill volumes accounted for, either reused on-site or disposed of off-site to	EPC contractor to undertake monitoring and report to TSECL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
			generation)			licensed waste disposal facilities		
Hazardous materials - PCBs	Pre-construction preparations	Transformer oil for PCB content	Testing of transformer oil should follow UNEP Guidelines for PCB-testing	Once at the onset of the project, no additional impact as all equipment and oil procured by the project will be PCB-free.	All existing transformers at substations and along the distribution network to which project distribution lines connect or the EPC contractor will replace or remove for which documentation confirming PCB-status is not available from TSECL	All existing substation transformers and transformers to which project distribution lines are connected PCB-free by project close.	EPC contractor to undertake monitoring and report to TSECL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Hazardous materials– incidents	Pre-Construction Enabling Works, Construction, and Commissioning	Pollution incidents	Records of pollution incidents (e.g., type of material spilled, amount in kg or m ³ , and action taken to clean up) Carry out visual inspection and interviews with workers and the community to identify if any unrecorded incidents occurred	Monthly	Construction sites, including temporary construction facilities	Zero major incidents occurred. Minor incidents responded to in accordance with EMP with lessons learnt for future.	EPC contractor to undertake monitoring and report to TSECL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Natural Resource Use	Pre-Construction	Volume of construction	Keep records of all types of materials	Monthly	Construction sites, including	Transfer of 100% of construction	EPC contractor to undertake	Check monitoring

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
(Construction Materials) and Waste Generation	Enabling Works, Construction, and Commissioning	materials used, and waste generated, and disposal route	used and wastes produced by type, volume/ weight. Document waste disposal through transfer notes including type, volume/ weight, transport provider, intermediaries if any and final treatment or disposal facility (with its license and capacity)		temporary construction facilities	wastes documented, and all wastes disposed of in an environmentally safe and sound manner in accordance with IFC General EHS Guidelines	monitoring and report to TSECL in monthly and quarterly progress reports.	being undertaken and document compliance in EMR

Table 2: Substations Including RMU

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
Climate Change: SF6 Leakage	Operational and Maintenance	SF6 total volume used and leakage rates	Record SF6 total volume used and leakage rates. Daily check using SF6 leakage detection kits provided at substations and pressure loss data.	Ongoing	SF6 based equipment at all new and existing substations and RMUs	Significantly less than 0.1% leakage rate per substation/RMU during operation	TSECL	TSECL
Air Quality	Pre-Construction Enabling Works, Construction, and Commissioning	PM10, PM2.5, to be measured as 24hrs average over a fortnight along with meteorological data- temperature, humidity, wind speed, and wind direction.	Measurement professional, calibrated portable monitoring devices by accredited service provider (record 24-hour data over a fortnight)	One time during active earthworks (at substations with site levelling/ foundation/cable trench work in their scope) As requested by PIU/PMU in event excessive dust or grievance received during construction.	Same locations as baseline to be monitored (Table 4.27 of IEE) Undertake additional locations at site boundary/ receptors in 50m at request TSECL in event excessive dust experienced or grievance received	National air quality standards of CPCB complied with no increase in baseline levels at sensitive receptors as WHO PM10 and PM2.5 guidelines already exceeded	EPC contractor to undertake monitoring and report to TSECL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Noise	Pre-Construction Enabling Works, Construction,	LAeq 1hr day and night for representative 48hr period (ideally 24hr weekday +	Measurement professional, calibrated portable monitoring devices by accredited service provider	Monitor at least once every 6 months during active construction	Site boundary and 1m from noisy equipment within substation in	CPCB standards and WHO Guidelines for ambient noise at site boundary and sensitive	EPC contractor to undertake monitoring and report to TSECL in monthly and	Check monitoring being undertaken and document

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
	and Commissioning	24hr weekend and avoid holidays, festivities, strong wind, rain etc.)		works (at substations) One time during commissioning (at substations) Then as requested by PIU/PMU in event excessive noise heard or grievance received during construction.	respect of commissioning Same locations as baseline to be monitored (Table 4.29 of IEE) Undertake additional locations at site boundary/ receptors <50m from boundary at request TSECL in event excessive noise heard or grievance received	receptors (or less than 3dBA increase if ambient already exceeded) GoI and IFC General EHS Guidelines for occupational noise exposure not exceeded at 1m from noisy equipment	quarterly progress reports.	compliance in EMR
Water Quality	Pre-Construction Enabling Works, Construction, and Commissioning	pH, EC, temperature, TDS, turbidity, color, TSS, DO, BOD5, COD, oil and grease, total and faecal coliform bacteria If used by local community as a source of drinking water	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	Monitor at least once every 6 months during active construction involving earthworks, one time during commissioning (at substations) and then as	Same locations as baseline (Table 4.23) Undertake additional locations at waterbodies within 50m at request TSECL in event potential pollution seen or grievance	GOI guidelines for surface water/drinking water for groundwater	EPC contractor to undertake monitoring and report to TSECL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
		to also test against GOI drinking water standards (full suite of parameters)		requested by TSECL in event of visible water pollution or grievance received during construction	received			
EMF	Pre-Construction Enabling Works, Construction, and Commissioning	EMF exposure levels	EMF meter	One time during commissioning	Substation equipment and boundary and RMUs	ICNIRP public exposure limits for EMF complied with	EPC contractor to undertake monitoring and report to TSECL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Drinking water supplies	Operational and Maintenance	ISO 10500 drinking water parameters (full suite)	APHA and BIS Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	6 monthly (minimum)	Substations with borewell supply	ISO 10500 drinking water parameters	By external accredited organization employed by SS/Electrical Division, SS management to undertake monitoring and report to headquarters	Check monitoring being undertaken and document compliance in EMR
Water resources	Operational and Maintenance	Water volume used and source	Keep records of all water used and source.	Ongoing	Substations with borewell supply	No grievance received during construction or operation regarding conflict with other water users	SS management to undertake monitoring and report to headquarters	Check monitoring being undertaken and document compliance in EMR

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
Hazardous materials– incidents	Operational and Maintenance	Pollution incidents	Records of pollution incidents (e.g., type of material spilled, amount in kg or m ³ , and action taken to clean up) Carry out visual inspection and interviews with workers and the community to identify if any unrecorded incidents occurred	Ongoing for record keeping Monthly visual inspection	All substations	Zero major incidents occurred. Minor incidents responded to in accordance with EMP with lessons learnt for future.	SS management to undertake monitoring and report to headquarters	Check monitoring being undertaken and document compliance in EMR
Waste Generation	Operational and Maintenance	Volume of waste generated, and disposal route	Keep records of all types of materials used and wastes produced by type, volume/ weight. Document waste disposal through transfer notes including type, volume/ weight, transport provider, intermediaries if any and final treatment or disposal facility (with its license and capacity)	Ongoing	All substations	Transfer of 100% of operational wastes documented, and all wastes disposed of in an environmentally safe and sound manner in accordance with IFC General EHS Guidelines	SS management to undertake monitoring and report to headquarters	Check monitoring being undertaken and document compliance in EMR

Table 3: Distribution Lines Including HVDS Pilot

Project Activity or Environment Impacts/Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
Property Damage	Pre-construction preparations	Surveys of existing property condition including structures, physical cultural resources, roads, canals, rail, utilities, etc.	Photographic and/or structural pre-condition surveys of existing property condition	One time for baseline establishment prior to the start of any activity on site	Properties along transmission lines requiring condition survey (see EMP)	Damages avoided but if caused paid for by contractor	EPC contractor to undertake monitoring and report to TSECL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Vegetation and Tree Loss / Wildlife Disturbance	Pre-construction preparations	Habitats, presence of notable flora and fauna pre-construction	Habitat walkover survey by field ecologist	One time for baseline establishment prior to the start of any activity on site	Construction sites, including temporary construction facilities	Only types of habitats and number of trees documented in IEE are lost, including no natural habitat and minimum number of trees through appropriate detailed design.	EPC contractor to undertake monitoring and report to TSECL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
		Number of trees to be removed by EPC Contractor	Record all trees to be felled or lopped during construction, and replacements planted (including species, size, and economic value)					
	Pre-Construction Enabling Works, Construction, and Commissioning	Restoration of habitats, presence of notable flora and fauna post-construction	Habitat walkover survey by field ecologist to compare to baseline situation	One-time during commissioning once construction completed and temporary construction facilities restored	No damage to other habitats/trees/vegetation outside the RoWs Zero biodiversity incidents occurred.	PIU/Electrical Division to obtain		
Undertaking of compensatory	TSECL with support of PIC to	Monthly	Compensatory plantation sites	No loss of CR/EN/VU				

Project Activity or Environment Impacts/Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
		plantation by Forest Department as funded by TSECL	<p>monitor compensatory plantation progress by Forest Department</p> <p>Signing of MoU (agreement) between TSECL and the Forest Department wherein the Forest Department will agree to monthly monitoring by TSECL with support of PIC and provide the records required to monitor progress to TSECL</p> <p>Signed and stamped records of all saplings (species and location) planted and maintained by Forest Department using TSECL funds and survival records to be obtained by TSECL on a six-monthly basis from</p>		of Forest Department	<p>species of flora and fauna including critical habitat species.</p> <p>Temporarily disturbed areas restored to at least pre-project construction condition.</p> <p>100% of trees removed compensated for with 1:10 replacement with native tree species in suitable alternative location to achieve “no net loss” biodiversity on project completion.</p> <p>100% survival of compensatory reforestation trees, or continual replacement of those that did not survive</p>	records from Forest Department and report to headquarters.	

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
			<p>Forest Department</p> <p>Annual End User Utilisation certificate of compensatory fund in the CAG / Audit general approved format to be obtained by TSECL before the end of each financial year</p> <p>Periodic audit reports of the planting locations and utilization of funds by approved third party (central and state government auditors) – at least one audit will be completed to inform the project completion report</p>					

Table 4: Test Laboratory

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
Air Quality	Pre-construction preparations	PM10, PM2.5, to be measured as 24hrs average over a fortnight along with meteorological data- temperature, humidity, wind speed, and wind direction.	Measurement professional, calibrated portable monitoring devices by accredited service provider (record 24-hour data over a fortnight)	One time for baseline establishment prior to the start of any activity on site (during dry season/non-monsoon)	Nearest sensitive receptor to test laboratory e.g., 23°42'34.30"N 91°15'43.66"E	National air quality standards of CPCB complied with no increase in baseline levels at sensitive receptors as WHO PM10 and PM2.5 guidelines already exceeded	EPC contractor to undertake monitoring and report to TSECL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
	Pre-Construction Enabling Works, Construction, and Commissioning			One time during active earthworks (at test laboratory)				
Noise	Pre-construction preparations	LAeq 1hr day and night for representative 48hr period (ideally 24hr weekday + 24hr weekend and avoid holidays,	Measurement professional, calibrated portable monitoring devices by accredited service provider	One time for baseline establishment prior to the start of any activity on site	Site boundary and nearest sensitive receptor to test laboratory e.g., 23°42'34.30"N 91°15'43.66"E	CPCB standards and WHO Guidelines for ambient noise at site boundary and sensitive receptors (or less than 3dBA increase if	EPC contractor to undertake monitoring and report to TSECL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
	Pre-Construction			Monitor at least once				

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
	Enabling Works, Construction, and Commissioning	festivities, strong wind, rain etc.)		every 6 months during active construction works (at test laboratory) Then as requested by PIU/PMU in event excessive noise heard or grievance received during construction.	laboratory, same location as baseline Undertake additional locations at request TSECL in event excessive noise heard or grievance received	ambient already exceeded) GoI and IFC General EHS Guidelines for occupational noise exposure not exceeded at 1m from noisy equipment		
Water Quality	Pre-construction preparations	pH, EC, temperature, TDS, turbidity, color, TSS, DO, BOD5, COD, oil and grease, total and faecal coliform bacteria	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	One time for baseline establishment prior to the start of any activity on site	Groundwater wells within 500m -- at least one groundwater sample from nearest groundwater well (e.g., in the market area) to be sampled	GOI guidelines for surface water/drinking water for groundwater	EPC contractor to undertake monitoring and report to TSECL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Pre-Construction Enabling Works, Construction, and Commissioning	If used by local community as a source of drinking water to also test against GOI drinking water standards (full	Monitor at least once every 6 months during active construction involving		Groundwater wells within 500m of test laboratory, same locations as baseline.				

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
		suite of parameters)		earthworks (at test laboratory) and then as requested by TSECL in event of visible water pollution or grievance received during construction	Undertake additional locations at request TSECL in event excessive noise heard or grievance received			
Drinking water supplies	Operational and Maintenance	ISO 10500 drinking water parameters (full suite)	APHA and BIS Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	6 monthly (minimum)	Test laboratory borewell supply	ISO 10500 drinking water parameters	By external accredited organization employed by Test Laboratory/Electrical Division, test laboratory management to undertake monitoring and report to headquarters	Check monitoring being undertaken and document compliance in EMR
Water resources	Operational and Maintenance	Water volume used and source	Keep records of all water used and source.	Ongoing	Test laboratory borewell supply	No grievance received during construction or operation regarding conflict with other water users	Test laboratory management to undertake monitoring and report to headquarters	Check monitoring being undertaken and document compliance in EMR
Hazardous materials - PCBs	Operational and Maintenance	Transformer oil for PCB content	Testing of transformer oil should follow UNEP Guidelines for PCB-	If transformers are received for testing that	All existing transformers received at test	Transformers that are received by test	By external accredited organization	Check monitoring being

Project Activity or Environment Impacts/ Risks	Project Stage	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation (TSECL PIU/Electrical Divisions)	Supervision (TSECL PMU/PIC)
			testing	do not have PCB-free certification	laboratory for which documentation confirming PCB-status is not available from TSECL	laboratory are inventoried and confirmed PCB-free with safety label attached before being authorized for use on site	employed by Test Laboratory/Electrical Division, test laboratory management to undertake monitoring and report to headquarters	undertaken and document compliance in EMR
Waste Generation	Operational and Maintenance	Volume of waste generated, and disposal route	Keep records of all types of materials used and wastes produced by type, volume/ weight. Document waste disposal through transfer notes including type, volume/ weight, transport provider, intermediaries if any and final treatment or disposal facility (with its license and capacity)	Ongoing	Test laboratory	Transfer of 100% of operational wastes including mineral oil documented, and all wastes disposed of in an environmentally safe and sound manner in accordance with IFC General EHS Guidelines	Test laboratory management to undertake monitoring and report to headquarters	Check monitoring being undertaken and document compliance in EMR

APPENDIX 18: EMR TEMPLATE
(CONTRACTOR'S MONTHLY REPORT AND SEMIANNUAL EMR)

Contractor's Monthly Environmental Monitoring Report

Reporting Period {Month Year}
Submission Date {Day Month Year}

{Project Name, Contract Package/Lot}

Prepared by {Contractor} for TSECL

Details of Temporary Facilities Established as on Month Year

Sl. No.	Type e.g., stores	Name	Location	Landowner	Details e.g., capacity	CTE Date	CTO Date	Remarks on Status
1								
2								

Details of Temporary Labour Camps Established as on Month Year

Sl. No.	Camp Name	Camp Location	Occupants (No.)	Grade	Facilities
1					<ul style="list-style-type: none"> Toilets: XX No. Lodging: XX No. Kitchen XX No.
2					<ul style="list-style-type: none"> Toilets: XX No. Lodging: XX No. Kitchen XX No.
3					<ul style="list-style-type: none"> Toilets: XX No. Lodging: XX No. Kitchen XX No.
4					<ul style="list-style-type: none"> Toilets: XX No. Lodging: XX No. Kitchen XX No.
5					<ul style="list-style-type: none"> Toilets: XX No. Lodging: XX No. Kitchen XX No.

2.0 Compliance to National Regulations and International Agreements

{Status of compliance and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required. Provide explanations of any instances where the requirements of regulations or agreements were breached along with details of responses taken to rectify the breach once identified. Include all the applicable National Regulations and International Agreements following the sample table below attaching copy of the consents/license in the period they were obtained}

Status of Legal Compliance as of Month Year

Sl. No.	Activities	Statutory Authority	Status (Yes, No or Partial only)		Expiry Date	Remarks
			Applied	Obtained		
1	NOC for Change of Land Use	District Land Reform Dept.			-	
2	Consent to Establishment (CTE) for xxx Plant	State Pollution Control Board			-	Consent No. xxx dated xxx
3	Consent to Establishment (CTE) for xxx Plant	State Pollution Control Board			-	Consent No. xxx dated xxx

Sl. No.	Activities	Statutory Authority	Status (Yes, No or Partial only)		Expiry Date	Remarks
			Applied	Obtained		
4	Consent to Establishment (CTE) for xxx Plant	State Pollution Control Board			-	Consent No. xxx dated xxx
5	Consent to Operate (CTO) for xxx plant	State Pollution Control Board				Consent No. xxx dated xxx
6	Consent to Operate (CTO) for xxx plant	State Pollution Control Board				Consent No. xxx dated xxx
7	Consent to Operate (CTO) for xxx plant					
8	Labour License	Labour Commissioner				License No. xxx dated xxx
9	Registration of Vehicles/ Pollution Under Control Certificates	Motor Vehicles Department				
10	Other...					

3.0 Compliance to Environmental Management Plan

{With reference to the EMP of the project, include a table following sample table below with the compliance status during the reporting period, with sufficient details (evidence) to show how compliance was achieved, or corrective action to be taken if there was non-compliance including timeline and budget}

{Flag if previous environmental monitoring report(s) included corrective action plan, if it did details of that corrective action plan should be incorporated into the EMP table and compliance status reported}

{Provide explanations of any instances where performance standards were temporarily exceeded during the reporting period, along with details of any response taken to rectify the exceedance once identified, even if at the end of the reporting period the project is deemed as being compliant}

{Copies of clearances, CEMP, construction method statements, and other documentation produced in accordance with EMP during the reporting period should be included as an appendix}

Item #	Requirement	Prior Corrective Action	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide sufficient details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non-compliance including timeline and budget}

4.0 Environmental Supervision and Monitoring Results

{With reference to the contract budget earmarked for EMP (if any) summarize details of budget allocated and the current spend profile}

Activity	Allocated Budget	% Spent	Remarks
TOTAL			

{With reference to the EMP capacity development plan summarize trainings for staff and subcontractors, and other activities completed. Include as appendices the training agenda, attendance sheets, and photos. If no trainings or other activities in reporting period, please confirm. Copies of training records related to EMP during the reporting period should be included as an appendix}

Trainings	Number and Position of Participant/s	Location/s and Date/s	Remarks

{Site inspections and audits completed – summarize the number and type of site visits, persons involved, the issues covered, and status of compliance with them, the number of non-compliance notices given out to your own staff or sub-contractors because of the site visit, and the checklists/reporting format used (sample of checklists and reports to be included as an appendix)}

Date	Type and Purpose of Visit	Location/s Visited	EA, IA, Consultant Staff Participating	Remarks

4.2 Quantitative Environmental Monitoring

{Environmental monitoring results – summarize in a table the reporting period's quantitative monitoring activities and data obtained in accordance with the Environmental Monitoring Plan (EMoP) of the project. Provide explanations of any instances where performance standards were exceeded along with details of responses taken to rectify the exceedance once identified. Attach survey reports}

Typically, this section will include the results of:

- Flora and fauna surveys
- Air quality surveys
- Noise and vibration surveys
- Water quality surveys

{Indicate monitoring locations using a map or plan with grid coordinates, dates, times, duration of samples as applicable, weather conditions as applicable, parameters measured, equipment used, standards, tests, and limits used etc.}

{Corrective actions with timeline and budget are required to ensure any exceedances will be prevented in the future}

{Calibration and QA certifications of monitoring equipment and laboratories analyzing samples should be included as an appendix}

Ambient Air Quality Monitoring Results

Name of sampling site	Geo-Coordinates	Parameters					
		PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	Lead
Location xx							
Location xx							
Stack emission of DG Location xx (xx KVA)							
Stack emission of DG Location xx (xx KVA)							
National Ambient Air Quality Standards⁵⁰		100	60	80	80	4	1
Emission Limits for Diesel generator set up to 800 kW⁵¹		0.2		-	4	3.5	-

Ambient Noise Quality Monitoring Results

Name of sampling site	Geo Coordinates	Parameters		National Standards		Remarks
		Leq (Day)	Leq (Night)	Day time	Nighttime	
Location xx						
Location xx						
DG at Location xx						
DG at Location xx						

Drinking Water Quality Monitoring Results

Parameters	Location					National Standards (IS 10500:2012)	
	Location xx	Acceptable Limit	Permissible Limit				
Color						5 max.	15 max.
Odor						Agreeable	Agreeable
Taste						Agreeable	Agreeable
Turbidity						1 max.	5 max.
pH						6.5 – 8.5	No Relaxation

⁵⁰ National Ambient Air Quality Standards, Notification dated 16th November 2009

⁵¹ Environment (Protection) (Third Amendment) Rules, 2013 dated 11th December 2013, G.S.R. 771(E)

Parameters	Location					National Standards (IS 10500:2012)	
	Location xx	Location xx	Location xx	Location xx	Location xx	Acceptable Limit	Permissible Limit
Total Hardness (as CaCO ₃)						300 max.	600 max.
Iron (as Fe)						0.3 max.	No Relaxation
Chloride (as Cl)						250 max.	1000 max.
Residual free chlorine						0.2 max.	1 max.
Dissolved Solids						500 max.	2000 max.
Calcium (as Ca)						75 max.	200 max.
Magnesium (as Mg)						30 max.	100 max.
Copper (as Cu)						0.05 max.	1.5 max.
Manganese (as Mn)						0.1 max.	0.3 max.
Sulphate (as SO ₄)						200 max.	400 max.
Nitrate (as NO ₃)						45 max.	No Relaxation
Fluoride (as F)						1.0 max.	1.5 max.
Phenolic compounds						0.001 max.	0.002 max.
Mercury						0.001 max.	No Relaxation
Cadmium.						0.003 max.	No Relaxation
Selenium						0.01 max.	No Relaxation
Arsenic						0.01 max.	0.05 max.
Cyanide						0.05 max.	No relaxation
Lead (as Pb)						0.01 max.	No Relaxation
Zinc (as Zn)						5 max.	15 max.
Chromium (as Cr)						0.05 max.	No Relaxation
PAH						0.0001 max.	No relaxation.
Mineral oil						0.5 max.	0.03 max.

Parameters	Location					National Standards (IS 10500:2012)	
	Location xx	Acceptable Limit	Permissible Limit				
Total Alkalinity (as CaCO ₃)						200 max.	600 max.
Total Coliform						Should be absent	No Relaxation
Fecal Coliform						Should be absent	No Relaxation

4.3 Pollution Control Monitoring

{Pollution control monitoring results – summarize any pollution incidents during the reporting period in accordance with the Environmental Monitoring Plan (EMoP) of the project. Provide explanations of any instances where performance standards were exceeded along with details of responses taken to rectify the exceedance once identified}

{Corrective actions with timeline and budget are required to ensure any exceedances will be prevented in the future}

{Include the pollution control trainings/drills/inspections conducted during the reporting period following the sample table below. Include as appendices the training/drill/inspection agenda, attendance sheets, and photos. If no trainings/drills/inspections, please confirm}

Trainings/Drills/ Inspections	Number and Position of Participant/s	Location/s and Date/s	Remarks
Example: Oil Spill Drill	50 Laborers	Substation, 15 Aug 2018	Participants safely controlled simulated spill...

{If there were any materials used, solid or hazardous waste, or wastewater generated in the reporting period report following the sample table below. If no materials used or waste generated, please confirm}

Type of Materials/Waste	Approximate Volume (units)	Source or Destination	Remarks
Material examples: Transformer Oil Sand for Fill			
Waste examples: Sanitary Wastewater Spoil from Earthworks Old Transformers Hazardous Waste			

4.4 Occupational and Community Health and Safety Monitoring

Type	Number Worker				Employment Type		
	Local	Migrant (State)	Migrant (Out of State)	Total	Casual	Contracted (outsourced)	Permanent
Unskilled							
Semi-skilled							
Skilled							
Total							

Status of PPEs on Month Year

Sl. No	PPE	Opening Stock	Distributed	Closing Stock	Ordered
	Helmets – Labourers (Yellow)				
	Helmets – Supervisors (colour)				
	Helmets – Engineers (colour)				
	Helmets – EHS (Green)				
	Helmets – Visitors (colour)				
	Helmets – Others (colour)				
	Gloves				
	Masks				
	Goggles				
	Safety Shoes				
	Gum boots				
	Safety Tackles				
	Safety Jacket – Labourers (colour)				
	Safety Jacket - Engineers (colour)				
	Safety Jacket – Others (colour)				
	Others, please specify				

Details of First Aider as on Month Year

Name	Qualification	Years of Experience	Deployment Date	Employment Status

Details of Hospitals and Doctors Tied Up With

Name	Location	Distance from Site	MoU Number	Date of MoU	Facilities offered	Expiry Date

Details of First Aid Boxes and Fire Extinguishers in Project Site

Location	Size of Box	Date of last Inspection	Inspected by (Name and Designation)	Status of Inspection

Details of Ambulances in Project Site

Location	Vehicle Type	Vehicle Number	Date of last Inspection	Inspected by (Name and Designation)	Status of Inspection	Fitness Certificate Status

{Health and safety monitoring results – summarize the reporting period’s health and safety activities and data obtained in accordance with the Environmental Monitoring Plan (EMoP) of the project. Provide explanations of any instances where performance standards were exceeded along with details of responses taken to rectify the exceedance once identified}

{Corrective actions with timeline and budget are required to ensure any exceedances will be prevented in the future}

{Include the occupational and community trainings/drills/inspections conducted during the reporting period following the sample table below. Include as appendices the training/drill/inspection agenda, attendance sheets, and photos. If no trainings/drills/inspections, please confirm}

Trainings/Drills/Inspections	Number and Position of Participant/s	Location/s and Date/s	Remarks
Example: Fire Drill	50 Laborers	Construction Camp, 15 Aug 2018	Participants safely evacuated the site...

Health and Safety Statistics to Month End	Total to Date	For Month	Preceding Month (Comparator)
Person-hours worked			
Person-days lost			
Safe person hours			
Fatality			
Non-fatal Injury (Lost Time)			
Non-fatal Injury (Minor)			
Near-miss			
Illness			
Other Incidents e.g., any dangerous occurrences or unsafe acts observed			

{If there was any near-miss or accident, illness, or other occupational or community health and safety related incident during the reporting period (or a previously reported incident with ongoing rectification) report following the sample table below. Include as appendices work safety checklists, incident reports, and other relevant supporting documents. If no incidents, please confirm}

	Number and Position of Person/s Involved	Location/s and Date/s of Incident	Detailed Description of Incident	Time-bound Corrective Action
Fatality				
Non-fatal Injury (Lost Time)				
Non-fatal Injury (Minor)				
Near-miss				
Illness				
Other Incidents e.g., any dangerous occurrences or unsafe acts observed				

Meaningful Consultation and Grievance Redress

{Meaningful consultation – report on any ongoing consultation undertaken, and main issues raised by consultees; detailed consultation records should be included as an appendix. If no ongoing consultation, please confirm}

Date	Format/Venue	Participants (Occupation, M/F)	Main Issues Raised

Grievances Received		Grievances Status of Month		Total till Date Grievances Status	
In Month	Total till Date	Open	Closed	Open	Closed

{If there was any grievance or complaint, regardless informal or minor, during the reporting period (or previously reported complaint with ongoing rectification) provide the corrective action taken following the sample table below. Detailed grievance records and response reports should be included as an appendix}

Complainant/s or Affected Persons	Location/s and Date/s of Complaint	Description of Grievance/Complaint	Timeline*	Time-bound Corrective Action

* To be solved within 2 weeks

8.0 Conclusions and Recommendations

{Summarize the contract's environmental performance during the reporting period based on the previous sections and, if any non-compliance identified, provide detailed recommendations including responsibilities, timeliness and budget for the preparation and completion of corrective action}

{If non-compliance is major or not readily addressed then a separate corrective action plan may need to be prepared. For minor and readily addressed non-compliances the corrective action plan can be incorporated into this final section of the environmental monitoring report following the sample table below}

Non-compliance	Corrective Action to be Taken	Responsibility	Timeline	Budget

APPENDICES

Photographs {Include relevant photographs of the project site and project area of influence taken during the reporting period to provide evidence of compliance and/or non-compliance. For each photo, provide a caption with description of what it illustrates, accurate location, and date taken}

Supporting Documents

{E.g., Maps and plans
 Sample checklists and reports
 Clearances and documentation
 Training records
 Detailed monitoring data, laboratory results etc.
 Calibration and QA certificates
 Consultation records
 Meeting agendas and attendance records
 Grievance records
 Environment, health and safety reports}

Environmental Safeguards Monitoring Report

Reporting Period {From Month Year to Month Year}
Date {Month Year}

{Country: Project Name}

Prepared by the {Executing Agency} for the Asian Development Bank

(This environmental safeguard monitoring report is a document of the borrower and made publicly available in accordance with ADB's Access to Information Policy 2018 and the Safeguard Policy Statement 2009. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff).

Environmental Safeguards Monitoring Report – Updated Format (as of Jan 2020)

{Red text serves as guide for report preparation, please delete it when the report is finalized}

TITLE PAGE

LIST OF ABBREVIATIONS {All abbreviations used in the report should be listed here as well as being spelt out in full the first time they appear in the report}

TABLE OF CONTENTS

EXECUTIVE SUMMARY {Maximum two-page summary following table like the sample below, if necessary cross reference the relevant section of the main report for details to keep summary succinct}

Project Name	
Executing Agency	
Implementing Agency	
Environment Safeguards Categorization	
Environment Safeguards Documentation	EARF/EIA/IEE/Existing Facilities CAP/EMP
Project Stage Obtained	Design/Pre-Construction/Construction/Commissioning/O&M
Detailed Design Required Post-Approval	Yes/No – if yes include remarks on status of design progress (%) and if more than one design package, provide details if any differences between the status
Contract(s) Awarded	Yes/No – if more than one contract package, provide details
Bidding Document(s) Include EMP Cleared by ADB	Yes/No – if more than one contract package, provide details if any difference between the status
Contract(s) Awarded Include EMP Cleared by ADB	Yes/No – if more than one contract package, provide details if any difference between the status
National Environment, Health and Safety Clearance(s) Obtained	Yes/No/NA – provide details if any clearances are outstanding or there is any difference between the status of contract packages, use NA if any clearances not yet required
Contractor(s) Given Access to Site	Yes/No – if more than one contract package, provide details if any difference between the status
Construction Progress (%)	If more than one contract package, provide details if any difference between the status
Unanticipated Impacts including Change of Scope or Design	Yes/No – if yes, provide brief details with how the IEE and EMP updated as required
Number of Site Inspections and Audits Undertaken by Environment Safeguards Staff in Reporting Period	
Corrective Action Required from Previous Reporting Period	Yes/No/NA – use NA if this is the first project reporting period
Outstanding Corrective Action this Reporting Period	Yes/No/NA – if yes, provide bulleted summary of the key actions still required, use NA if the response to above is No or NA
Non-Compliances Recorded this Reporting Period	Yes/No – if yes, provide bulleted summary of the key non-compliances recorded
Corrective Action Required	Yes/No – if yes, provide bulleted summary of the key actions to be taken in response to non-compliances including timeline and budget
Number of Health and Safety Incidents	Provide brief details including how they were responded to

GRM Functional	Yes/No – briefly elaborate on set up if differs to description in IEE/EMP
Number of Unresolved Grievances from Prior Reporting Period	
Number of Grievances Received in Reporting Period	
Number of Grievances Resolved this Reporting Period	
Number of Grievances Still Outstanding	Provide brief details with timeline for resolution
Number of Grievances referred to Court of Law	Provide brief details
Number of Grievances referred to the Accountability Mechanism	Provide brief details

2.0 Introduction

1.1 Brief Project Description

{Maximum two pages to succinctly convey who the executing and implementing agencies are, the project outputs, construction works involved, details of contract packages, details of construction camps and other related facilities, national and ADB environmental safeguards project categorizations, and the environment safeguard documents (dates) applicable to the project}

{Include maps and plans showing the project site locations and project area of influence}

{Include table and/or organogram of environmental safeguards staffing and relationships between executing and implementing agencies, consultants, contractors, subcontractors, lenders, etc.}

1.2 Project Progress Status and Implementation Schedule

{Describe the implementation stage reached (design, pre-construction, construction, commissioning or O&M) and the % progress, main project activities and milestones achieved during the reporting period, including bidding documents issued and contracts awarded during the reporting period etc. No need to repeat progress information included in previous monitoring reports if no change, cross reference the previous monitoring reports if needed}

{Highlight any unanticipated impacts in relation to change in the project scope, locations or alignments of components, construction methods, and/or implementation schedule during the reporting period, if none confirm this.}

{Highlight any changes in the project organization and environmental safeguards staffing during the reporting period, if none confirm this}

{Report on any unanticipated impacts and updates to IEE/EMP that were required during the reporting period, status of delivery of documents, required amendments, consultation and disclosure undertaken etc.}

{The project Gantt chart may be included}

{Include a simplified table like the sample below to report progress}

Project Component/Stage	Target Completion Date {Revised Target Date, if delayed}	Progress Status {not yet started; ongoing; completed}	Percent Completed	Remarks
<i>Example for reporting period Jul-Dec 2018</i>				
Power Plant Component (construction phase) <ul style="list-style-type: none"> • Contract award • Construction (site clearance, earthworks, civil works, installation of equipment, ...) 	31 Jan 2018	Completed	100%	Contract awarded to XYZ contractor, copy of EMP included
	31 Mar 2019 (original target completion was 31 Dec 2018)	Ongoing	85%	There was a delay in the delivery of equipment...

2.0 Compliance to National Regulations and International Agreements

{Status of compliance and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required. Provide explanations of any instances where the requirements of regulations or agreements were breached along with details of responses taken to rectify the breach once identified. Include all the applicable National Regulations and International Agreements following the sample table below}

National Regulation or International Agreement	Compliance Requirements under the Regulation or Agreement including any Environmental Clearances Required	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non-compliance including timeline and budget}

3.0 Compliance to Environmental Covenants from the ADB Loan Agreement

{Status of compliance and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required. Provide explanations of any instances where covenants were breached along with details of responses taken to rectify the breach once identified. Include all the applicable Loan Agreement covenants on environment following the sample table below}

Schedule #, Para. #	Covenant	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non-compliance including timeline and budget}

4.0 Compliance to Project Administration Manual (PAM)

{Status of compliance and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required. Provide explanations of any instances where tasks allocated to the executing or implementing agency and any consultants have not been undertaken along with details of responses taken to rectify the situation once identified. Include all applicable organizations with responsibility for environmental safeguards following the sample table below}

Organization	Tasks	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non-compliance including timeline and budget}
Executing Agency			
Implementing Agency			
Consultants...			

5.0 Compliance to Contract

{Status of compliance and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required. Provide explanations of any instances where tasks allocated to the contractor have not been undertaken along with details of responses taken to rectify the situation once identified. Include all contract packages and provisions relating to environment, health and safety management following the sample table below}

Contract Package	Contract Provisions	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide sufficient details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non- compliance including timeline and budget}
Package 1			
Package 2			
Package 3...			

6.0 Compliance to Environmental Management Plan

{With reference to the EMP of the project, include a table following sample table below with the compliance status during the reporting period, with sufficient details (evidence) to show how compliance was achieved, or corrective action to be taken if there was non-compliance including timeline and budget}

{Flag if previous environmental monitoring report(s) included corrective action plan, if it did details of that corrective action plan should be incorporated into the EMP table and compliance status reported}

{Provide explanations of any instances where performance standards were temporarily exceeded during the reporting period, along with details of any response taken to rectify the exceedance once identified, even if at the end of the reporting period the project is deemed as being compliant}

{Copies of clearances, CEMP, construction method statements, and other documentation produced in accordance with EMP during the reporting period should be included as an appendix}

Item #	Requirement	Prior Corrective Action	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide sufficient details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non-compliance including timeline and budget}

7.0 Environmental Supervision and Monitoring Results

7.1 Environmental Supervision

{With reference to the EMP capacity development plan summarize trainings for the executing and implementing agencies, contractors, and subcontractors, and other activities completed. Include as appendices the training agenda, attendance sheets, and photos. If no trainings or other activities in reporting period, please confirm. Copies of training records related to EMP during the reporting period should be included as an appendix}

Trainings	Number and Position of Participant/s	Location/s and Date/s	Remarks

{With reference to the EMP budget table summarize details of budget allocated for EMP implementation and the current spend profile}

Activity	Allocated Budget	% Spent	Remarks
TOTAL			

{Site inspections and audits completed – summarize the number and type of site visits, persons involved, the issues covered, and status of compliance with them, the number of non-compliance notices given out to the contractor as a result of the site visit, and the checklists/reporting format used (sample of checklists and reports to be included as an appendix)}

Date	Type and Purpose of Visit	Location/s Visited	EA, IA, Consultant Staff Participating	Remarks

7.2 Quantitative Environmental Monitoring

{Environmental monitoring results – summarize in a table the reporting period’s quantitative monitoring activities and data obtained in accordance with the Environmental Monitoring Plan (EMoP) of the project. Provide explanations of any instances where performance standards were exceeded along with details of responses taken to rectify the exceedance once identified}

Typically, this section will include the results of:

- Noise and vibration surveys
- Water quality surveys
- Air quality surveys
- Flora and fauna surveys

{Indicate the monitoring locations using a map or plan, dates, times, duration of samples as applicable, weather conditions as applicable, parameters measured, equipment used, standards, tests, and limits used etc.}

{Corrective actions with timeline and budget are required to ensure any exceedances will be prevented in the future}

{Graphs can be used in this section to show trends; however, large tables of data or multiple graphs should be attached as an appendix.

{Calibration and QA certifications of monitoring equipment and laboratories analyzing samples should be included as an appendix}

7.3 Pollution Control Monitoring

{Pollution control monitoring results – summarize any pollution incidents during the reporting period in accordance with the Environmental Monitoring Plan (EMoP) of the project. Provide explanations of any instances where performance standards were exceeded along with details of responses taken to rectify the exceedance once identified}

{Corrective actions with timeline and budget are required to ensure any exceedances will be prevented in the future}

{Include the pollution control trainings/drills/inspections conducted during the reporting period following the sample table below. Include as appendices the training/drill/inspection agenda, attendance sheets, and photos. If no trainings/drills/inspections, please confirm}

Trainings/Drills/Inspections	Number and Position of Participant/s	Location/s and Date/s	Remarks
Example: Oil Spill Drill	50 Laborers	Substation, 15 Aug 2018	Participants safely controlled simulated spill...

{If there were any materials used, solid or hazardous waste, or wastewater generated in the reporting period report following the sample table below. If no materials used or waste generated, please confirm}

Type of Materials/Waste	Approximate Volume (units)	Source or Destination	Remarks
Material examples: Transformer Oil Sand for Fill			
Waste examples: Sanitary Wastewater Spoil from Earthworks Old Transformers Hazardous Waste			

7.4 Occupational and Community Health and Safety Monitoring

{Health and safety monitoring results – summarize the reporting period’s health and safety activities and data obtained in accordance with the Environmental Monitoring Plan (EMoP) of the project. Provide explanations of any instances where performance standards were exceeded along with details of responses taken to rectify the exceedance once identified}

{Corrective actions with timeline and budget are required to ensure any exceedances will be prevented in the future}

{Include the occupational and community trainings/drills/inspections conducted during the reporting period following the sample table below. Include as appendices the training/drill/inspection agenda, attendance sheets, and photos. If no trainings/drills/inspections, please confirm}

Trainings/Drills/Inspections	Number and Position of Participant/s	Location/s and Date/s	Remarks
Example: Fire Drill	50 Laborers	Construction Camp, 15 Aug 2018	Participants safely evacuated the site...

{If there was any near-miss or accident, illness, or other occupational or community health and safety related incident during the reporting period (or a previously reported incident with ongoing rectification) report following the sample table below. Include as appendices work

safety checklists, incident reports, and other relevant supporting documents. If no incidents, please confirm}

	Number and Position of Person/s Involved	Location/s and Date/s of Incident	Detailed Description of Incident	Time-bound Corrective Action
Fatality				
Non-fatal Injury (Lost Time)				
Non-fatal Injury (Minor)				
Near-miss				
Illness				
Other Incidents				

8.0 Meaningful Consultation and Grievance Redress

{Meaningful consultation – report on any ongoing consultation undertaken, and main issues raised by consultees; detailed consultation records should be included as an appendix. If no ongoing consultation, please confirm}

Date	Format/Venue	Participants (Occupation, M/F)	Main Issues Raised

{Include a brief description of the GRM, provide a flowchart, list of grievance redress committee members and any trainings they have received}

{If there was any grievance or complaint, regardless informal or minor, during the reporting period (or previously reported complaint with ongoing rectification) provide the corrective action taken following the sample table below. Detailed grievance records and response reports should be included as an appendix}

Complainant/s or Affected Persons	Location/s and Date/s of Complaint	Description of Grievance/Complaint	Timeline*	Time-bound Corrective Action

* To be solved within 2 weeks

8.0 Conclusions and Recommendations

{Summarize the project's environmental performance during the reporting period based on the previous sections and, if any non-compliance identified, provide detailed recommendations including responsibilities, timeliness and budget for the preparation and completion of corrective action}

{If non-compliance is major or not readily addressed then a separate corrective action plan may need to be prepared. For minor and readily addressed non-compliances the corrective action plan can be

incorporated into this final section of the environmental monitoring report following the sample table below}

Non-compliance	Corrective Action to be Taken	Responsibility	Timeline	Budget

APPENDICES

Photographs {Include relevant photographs of the project site and project area of influence taken during the reporting period to provide evidence of compliance and/or non-compliance. For each photo, provide a caption with description of what it illustrates, accurate location, and date taken}

Supporting Documents

{E.g. Maps and plans
 Sample checklists and reports
 Clearances and documentation
 Training records
 Detailed monitoring data, laboratory results etc.

CALIBRATION AND QA CERTIFICATES

Consultation records
 Meeting agendas and attendance records
 Grievance records
 Environment, health and safety reports}