

# Environment and Social Compliance Audit Report

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October 2022

## Pakistan: Second Power Transmission Enhancement Investment Program (Tranche 4)

Subproject 3. Procurement of goods for the addition and augmentation of the six existing grid stations (EGS) to remove NTDC system constraints (500kV Dadu EGS, 500kV Faisalabad West EGS, 500kV Lahore (Sheikhpura) EGS, 500kV New Multan EGS, 500kV Rahim Yar, 220kV Guddu EGS)

Subproject 6: Procurement of goods for operation and maintenance of NTDC assets to reduce the grid stations breakouts (550kV, 245kV, and 145kV circuit breakers and replacement of one 500/220 kV, 450 MVA Auto Transformer Bank (ATB) at the existing 500 kV Rawat Grid Station

Prepared by the Environment & Social Impact Cell of the National Transmission and Despatch Company (NTDC) for the Asian Development Bank.

# Environmental Audit Report

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Project Number: 48078-066

Date: October 2022

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Subproject 6: procurement of goods for operation and maintenance of NTDC assets to reduce the grid stations breakouts (550kV, 245kV, and 145kV circuit breakers and replacement of one 500/220 kV, 450 MVA Auto Transformer Bank (ATB) at the existing 500 kV Rawat Grid Station.

Prepared by Aziz Karim (Environmental Specialist under ADB TA 9756-PAK: Preparing Sustainable Energy Projects<sup>1</sup>) for the National Transmission and Despatch Company Limited (NTDC) and the Asian Development Bank.

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<sup>1</sup> <https://www.adb.org/projects/53058-001/main>.

## CURRENCY EQUIVALENTS

As of 1 October 2022

Currency Unit – Pak Rupees (Pak Rs.)

Pak Rs 1.00 = \$ 0.0044

US\$1.00 = Pak Rs. 228.08

## ABBREVIATIONS

ADB	Asian Development Bank
CAP	Corrective Action Plan
DISCO	Distribution Company
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EGS	Electricity Grid Station
EPA	Environment Protection Agency
ESIC	Environment and Social Impact Cell
GoP	Government of Pakistan
GRM	Grievance Redress Mechanism
IEE	Initial Environmental Examination
MFF	Multi-tranche Financing Facility
MSDS	Material Safety Data Sheet
MVA	Megavolt Amperes
NEQS	National Environmental Quality Standards
NTDC	National Transmission and Despatch Company
OHS	Occupational Health and Safety
PAK	Pakistan
PEPA	Pakistan Environmental Protection Act (1997)
PTEIP	Power Transmission Enhancement Investment Program
RoW	Right of Way
SEP	Stakeholders Engagement Plan
SPS	Safeguards Policy Statement (2009)
WAPDA	Water & Power Development Authority

## WEIGHTS AND MEASURES

kV	Kilovolt
km	Kilometer
km <sup>2</sup>	Square kilometer
MW	Megawatt
m	Meter

## GLOSSARY

EIA	Environmental Impact Assessment is a process of evaluating the likely environmental impacts of a proposed project or development, considering inter-related socio-economic, cultural, and human-health impacts, both beneficial and adverse. EIA is an anticipatory tool, that is, it takes place before an action is carried out.
IEE	Initial Environmental Examination is a preliminary small study to see project impacts, both beneficial and adverse to the environment while the EIA is a full assessment of the effects.
NOC	No Objection Certificate is the clearance or certificate given by the authority (EPA) for the specific project after evaluation of IEE/EIA. NOC is granted with or without conditions.
Environmental Audit	Environmental auditing is essentially an environmental management tool for measuring the effects of certain activities on the environment against set criteria or standards. Environmental auditing is carried out when development is already in place and is used to check on existing practices, assessing the environmental effects of current activities.

## NOTE{S}

1. The fiscal year (FY) 2022 of the Government of Pakistan ends on 30 June.
2. In this report, "\$" refers to United States dollars unless otherwise stated.

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## 1. Introduction

1 National Transmission & Despatch Company (NTDC) owns all the properties, rights, and assets as well as the obligations and liabilities of the 220 kV and 500 kV Grid Stations and Transmission Lines/Networks in Pakistan.

2 The Government of Pakistan (GoP) signed a loan agreement with the Asian Development Bank (ADB) for financial support for the construction of the Power Enhancement Projects in Pakistan. The multi-tranche financing facility for the Second Power Transmission Enhancement Investment Program (MFF II or the Program)<sup>2</sup> will expand and reinforce Pakistan's power transmission system, enabling the system to provide a reliable and quality service capable of meeting increasing customer demand and supporting economic growth.

3 The investment program consists of staged physical investments in the high-voltage transmission system, including the rehabilitation, augmentation and expansion of transmission lines, substations and supporting infrastructure.

4 MFF II comprises four tranches and Projects located in different areas of the country.

5 **Tranche 1** focuses on the rehabilitation and augmentation of 500-kilovolt (kV) transmission systems in Punjab and Sindh provinces. Through its concessional loan from the ADB, Tranche 1 provides capacity development to support the NTDC's organizational restructuring and to enhance its capacity to plan, design, operate, and manage assets throughout the second MFF. **Tranche 2** will expand the 220 kV transmission systems in the provinces of Sindh and Balochistan. It will also upgrade the supervisory control and data acquisition system across the national grid to enable the NTDC to monitor and control the grid in real-time, and to prevent network outages or reduce their duration, thereby increasing grid stability, reliability, and resilience to accommodate more intermittent renewable energy. **Tranche 3** will expand the 500 kV and 220 kV transmission systems to meet demand at load centers in Punjab province. **Tranche 4** The proposed project will help enhance the transmission grid system to make it climate and disasters resilient. Tranche 4 cover the subprojects in the geographical regions affected by the recent floods and will contribute to post-calamity restoration of infrastructure (subprojects in Sindh province, south Punjab and Peshawar region). The "loose" procurement approach applied under the project will allow NTDC fast-tracking procurement of the grid stations and transmission lines equipment that may be required for the post-flood recovery of the power supply. The project will reduce constraints in the transmission network enabling Pakistan increase electrification and improving systems reliability through construction of the transmission network and augmentation of the existing grid stations. An additional electricity sale of 13,481 GWh and a transmission network loss reduction of 135 GWh are expected due to the project upon commissioning in 2026. The alternative transmission lines supported by the project will allow for transmission of electricity when the 500 kV transmission system is out of service. Additionally, the project will strengthen NTDC's assets operation, maintenance, and management.

### 1.1 Brief Program Background

6 Under Tranche 4 Readiness, NTDC is planning to construct new 220 kV transmission lines, construction of a grid station, argumentation of 10 existing grid stations and procurement of substation equipment. Scopes of these subprojects are listed hereunder.

- 1) Subproject 1 is the turnkey contract for design, supply, installation, testing and commissioning of approximately 70 km of 220kV double circuit transmission line for looping in/out of the proposed Hala Road-Jamshoro single circuit transmission line at 220kV Mirpur Khas New Grid Station;
- 2) Subproject 2 is the turnkey contract for design, manufacture, supply, installation, testing and commissioning of approximately 20 km of 220kV double circuit

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<sup>2</sup> [48078-002: Second Power Transmission Enhancement Investment Program | Asian Development Bank \(adb.org\)](#)

transmission line for looping in/out one circuit of the existing 220kV Jamshoro – T.M. Khan double circuit transmission line at Hala Road 220kV Grid Station.

- 3) Subproject 3 involves procurement of goods for the addition and augmentation of the six existing grid stations (GS) to remove NTDC system constraints (500kV Dadu GS, 500kV Faisalabad West GS, 500kV Lahore (Sheikhpura) GS, 500kV New Multan GS, 500kV Rahim Yar, 220kV Guddu GS);
- 4) Subproject 4 involves procurement of goods for the construction of a new 220kV Jamrud grid station and approximately 20 km of the associated 220V Jamrud-Sheikh Muhammadi transmission line in the south-western area of Pakistan.
- 5) Subproject 5 involves procurement of goods for the construction of about 105 km of 220kV Daharki – Rahim Yar and about 150 km of 220kV Rahim Yar – Bahawalpur transmission lines and extension of 220kV Daharki and 220kV Bahawalpur grid stations for interlinking of 220kV Daharki – Rahim Yar Khan and Bahawalpur grid stations in the south-eastern area of Pakistan;
- 6) Subproject 6 involves procurement of goods for operation and maintenance of NTDC assets to reduce the grid stations breakouts (550kV, 245kV, and 145kV circuit breakers and replacement of one 500/220 kV, 450 MVA Auto Transformer Bank (ATB) at the existing 500 kV Rawat Grid Station.

7 The subproject 3 and Subproject 6 will be carried out within an existing operational EGSs which are considered as “existing facilities” under ADB Safeguards Policy Statement (SPS) (2009). Environmental audit was conducted to evaluate the existing conditions of the EGS’s and to describe if the operational facility compliance to environmental safeguards requirements based on ADB Safeguards Policy Statement (2009) and to include conclusions and recommendations. Corrective action plans (CAPs) have also been prepared to address the environmental, health and safety non-compliances as observed during the audits.

## **1.2 Subprojects Background**

8 The increased power demand of power distribution companies (DISCOs) during the recent years, existing 500/220 kV and 220/132 kV transformers of NTDC system become overloaded. In view of the present loading position and the increasing trend of the power demand in near future, the requirement to enhance the capacity of the existing NTDC system has been established.

9 For this purpose, a proposed scheme for the addition and augmentation of ten (10) existing grid stations (hereafter, collectively called Subprojects) has been planned which will provide immediate relief to the overall NTDC system to meet the power demand of distribution companies. The addition and augmentation work scope includes replacement of low-capacity transformers with improved capacity transformers and addition of line bays at identified EGSs.

10 This report provides the environmental health and safety findings at the existing operational grid stations (EGSs) under Subprojects 3 and 6.

## **1.3 Subproject Locations**

11 The names and location coordinates of the subprojects are listed in Table 1-1. The subproject locations in Sindh, Khyber Pakhtunkhwa and Punjab are shown in Figure 1-1: **The Subproject Locations on Pakistan Map.**

## **1.4 Environmental Health and Safety Audit Objectives**

12 The objectives of the audit were to provide high-level information on the status of implementation of environmental safeguards and good practices, identify issues, and recommend corrective actions in achieving compliance with the safeguards.

13 The audit was designed to help the executing agency and implementing agency in achieving compliance with their obligations under all the applicable national, provincial, and local laws and regulations.

## 1.5 Audit Activities

14 The environmental audit was conducted by Aziz Karim (Environmental Specialist under ADB TA 9756-PAK: Preparing Sustainable Energy Projects<sup>3</sup>) between July and September 2022. The general activities carried out during all the audit visits included,

- Opening meeting with the management of EGS.
- Walk through the subproject sites and facilities.
- General review of the existing site conditions and Occupational Health and Safety (OHS) practices including staff health screening and records.
- Meeting with the management of EGS to review the available environmental documents and discuss the preliminary outcome of the audit.

**Table 1-1: Names, Location and Geographic Coordinates of the Grid Stations**

No.	Grid Station Name	Northings	Eastings
1	500 kV Sheikhpura EGS, Sheikhpura, Punjab Province	31°39'23.16"N	74° 2'8.43"E
2	500 kV Faisalabad West EGS, Faisalabad, Punjab Province	31°24'9.68"N	72°46'17.26"E
3	500 kV New Multan EGS, Multan, Punjab Province	30°14'50.17"N	71°36'48.29"E
4	500 kV Rahimyar Khan EGS, Rahimyar Khan, Punjab Province	28°44'56.27"N	70°27'56.36"E
5	500 kV Guddu EGS, Guddu, Sindh Province	28°25'51.53"N	69°41'37.45"E
6	500 kV Dadu EGS, Dadu, Sindh Province	26°43'2.77"N	67°44'38.49"E
7	220 kV Bahawalpur EGS, Bahawalpur	29°18'48.50"N	71°34'52.91"E
8	220 kV Daharki EGS, Daharki	27°58'41.87"N	69°40'24.41"E
9	500 kV Muhammadi EGS, Peshawar	33°55'53.89"N	71°32'40.82"E
10	500 kV Rawat EGS, Rawat, District Rawalpindi	33°28'42.33"N	73°11'33.10"E

<sup>3</sup> <https://www.adb.org/projects/53058-001/main>.



**Figure 1-1: The Subproject Locations on Pakistan Map**

## 2. Details of the Subprojects Visited and Observations

15 This section discusses the observations made at subprojects listed in Table 1-1: **Names, Location and Geographic Coordinates of the Grid Stations** during the environmental, health and safety audits. The observations of each visited subproject site were recorded as follow:

### 2.1 500 kV Sheikhpura EGS, Sheikhpura, Punjab Province

16 The EGS is located on Sherqpur Road, near Sheikhpura town in Punjab province. The EGS has been established in 1990 at a land parcel of about 100 Acres. The EGS is surrounded by agricultural land. The nearest settlement to the EGS is at about 250 meters in southwest direction. The layout of EGS and surrounding land use is shown in Figure 2-1: **500 kV Sheikhpura EGS Layout**.

17 The EGS is consisted of four (04) 600MVA-500/220KV autotransformers, three (03) 160MVA-220/132kV autotransformers and one (01) 20MVA-220/11kV power transformer that are owned and maintained by NTDC. Four (04) 500kV, eight (08) 220kV and eight (08) 132kV transmission lines link this station to others.<sup>4</sup>

18 There is a 500 kV and 220 kV switchyard one and half breaker scheme whereas for 132kV switchyard double bus single breaker scheme is used.<sup>5</sup>

19 The EGS has about 150 staff. There is housing colony for staff with all facilities such as food item stores, dispensary, and a school.

20 The visit of the EGS was carried out on 27-June-2022 by TA Environment Consultant.,

21 Mr. Izat Ali is Resident Engineer at the subproject and the auditor was facilitated by Hafiz Wasim Sajid, Assistant Manager Maintenance.

22 The subproject is located on Sharqpur Road, Sheikhpura, Punjab.

23 As per the site management, the EGS was constructed between 1990 and 1992. The operations commenced in 1992.

24 Before the construction of the subproject, the land was used for agricultural purposes.

25 The EGS has about 150 staff for the operations in three shifts. Most of them are residing in the residential colony of the EGS.

26 The water requirements of the EGS as well as in the residential area of the EGS are met from on-site tube wells. As per the anecdotal information, the depth of the groundwater is at 18 to 20 meters.

The environmental issues observed during the audit visit are presented in Table 2-1 and pictorial evidence are provided in Photo 2-1. Figure 2-1: **500 kV Sheikhpura EGS Layout**

Table 2-1: **Site Visit Observations / Findings for Sheikhpura Electricity Grid Station**

No.	Observation Type	Description
1	Regulatory Compliance	- The EGS was constructed before the enact of Pakistan Environmental Protection Act (PEPA) in 1997. Therefore, no EIA or IEE was undertaken before the construction of the EGS.

<sup>4</sup> [https://pdf.usaid.gov/pdf\\_docs/PA00KX3J.pdf](https://pdf.usaid.gov/pdf_docs/PA00KX3J.pdf).

<sup>5</sup> [https://pdf.usaid.gov/pdf\\_docs/PA00KX3J.pdf](https://pdf.usaid.gov/pdf_docs/PA00KX3J.pdf).



No.	Observation Type	Description
		- As per the site management, a team from EPA Punjab had visited the EGS in 2020 and they found the EGS in compliance to National Environmental Quality Standards (NEQS) for noise, air quality and water quality, although no evidence (such as a letter from EPA or analysis reports) was available with EGS against the claim.
2	Environmental Staff	- There is no designated team for taking environmental and OHS compliance measures. NTDC is managing occupational safety, health, environment and community issues through their Environment and Social Safeguards Cell (ESIC) by assigning additional responsibility to Resident Engineer.
3	Environmental Monitoring and Testing	- Drinking water is available from local Reverse Osmosis Plant but water was not tested ever to see if the plant is working well.
4	Environment and OHS	<ul style="list-style-type: none"> <li>- No EMP was available at the subproject.</li> <li>- No OHS policy or procedures are available at the EGS.</li> <li>- No operating procedures found for maintenance and routine operations.</li> <li>- No warning signs and awareness sign boards on environment and OHS were found.</li> <li>- No traffic management signs, or speed limit signs found on the internal roads of EGS.</li> <li>- Workers found at jobs having no proper PPE.</li> <li>- It was revealed during staff interview that health screening of the staff has not been conducted.</li> </ul>
5	Housekeeping	<ul style="list-style-type: none"> <li>- Solid waste was found scattered at construction sites and in residential colony.</li> <li>- No separate bins for plastic, paper, iron, and contaminated waste were seen anywhere at the EGS.</li> <li>- Spare or unused materials (such as wires and tower equipment) were found at EGS without barricading and marking.</li> </ul>
6	Hazardous Material Handling	<ul style="list-style-type: none"> <li>- The EGS stored transformer oil in large steel tanks kept on ground. No secondary containment was built in case of spill and leakages, while no stains were found around the tanks at the time of visit.</li> <li>- No material safety data sheet (MSDS) was found or affix with the tanks used for transformer oil storage.</li> <li>- Few spare and abandoned transformers were found on unsealed surfaces.</li> <li>- As per the staff, the transformer oil is still in the tank of the abandoned and spare transformers. However, no spills or leak signs found around the equipment and surface soil.</li> <li>- No asbestos material has been observed at the EGS.</li> </ul>
7	Sewerage Waste Management	<ul style="list-style-type: none"> <li>- Sewerage waste from offices of the EGS and colony has been routed to an underground pit in northeast side of EGS premises through buried concrete pipes.</li> <li>- The liquid/sewerage waste from the pit is being pumped out and dumped in open land of the EGS.</li> </ul>



No.	Observation Type	Description
		- Solid waste/sludge from the pit is being taken out and dumped in municipal dumping site of Sheikhpura city through contractors.
8	Climate Change and Green House Gases Emissions Ozone Depleting Substances	- The EGS still uses old window air conditioning units. The units may be contained gases fall under Ozone Depleting Substances.
9	Emergency Response	- There is no emergency response plan at the EGS. However, emergency telephone numbers were found displaced in offices.
10	Grievance Address Mechanism (GRM) and Stakeholders Engagement Plan (SEP)	- No GRM mechanism and procedure is available at the EGS to address the grievances of employees or community around. - No SEP was available at the EGS.

EIA = environmental impact assessment, EGS = Electricity Grid Station, EMP = environmental management plan, EPA = Environment Protection Agency, GRM = grievance redress mechanism, IEE = initial environmental examination, MSDS = material safety data sheet, NEQS = National Environmental Quality Standards, OHS = Occupational Health and Safety, SEP = Stakeholders Engagement Plan, PEPA = Pakistan Environmental Protection Act (1997), PPE = personal protective equipment



Entrance to Sheikhpura EGS



Access Road from Sharqpura Road



220 kV Transformer Bay at the EGS



A Spare 220 kV Transformer at the EGS



Scattered Wire Wheels at within the Switchyard Premises



Under-construction New Bays for new Transformer



Fire Extinguishers at the EGS



Outdated Fire Extinguisher





Secondary Containment for Existing Transformers



Under-construction Switchyard at the EGS. Men at work without PPE



A Spare Transformer Kept on Unsealed Surface



An Abandoned Transformer Kept on Unsealed Surface



Men at work without PPE



Groundwater Extraction Well at EGS



Transformer Oil Storage Steel Tanks at EGS



Scattered Solid Waste at EGS Colony



Window Air Conditioning Units Still in Use at EGS



EGS Administrative Block





Technical Building at EGS



Reverse Osmosis Water Filtration Plant at EGS



Sewerage Water Dumping Pump in Colony



Sewerage Water Being Dumped in Open Land



Staff Bus Owned by EGS



Market in EGS Colony

**Photo 2-1: Photographs from the Site Visit to Sheikhpura EGS (July 2022)**

## **2.2 500 kV Faisalabad West EGS, Faisalabad, Punjab Province**

27 The visit of the EGS was carried out on 28-June-2022 by TA Environmental Consultant.

28 Mr. Ehsan Elahi is Resident Engineer at the subproject and the auditor was facilitated by Waqar Baloch, SDO, EHV Construction through Supervision Consultant (Mr. Haq Nawaz, Senior Construction Engineer, NESPAK).

29 The EGS is located at Bhowana – Painsara Road, district Chiniot of Punjab province on a land parcel of about 20 acres.

30 The EGS was constructed in 2020-2021 and operations commenced in February 2022. Before the construction of the subproject, the land was used as construction camp for 500 kV Faisalabad West Transmission Line and before the camp it was used for agricultural purposes.

31 The EGS is surrounded by agricultural land. There sparsely located residential houses in 50 – 100 meters from the EGS boundary in east and south.

32 The layout of EGS and surrounding land use is shown in Figure 2-2.

33 The EGS has two 500/220kV, 750MVA and three 220/132kV, 250MVA transformers along with allied equipment and accessories. 500 kV double circuit transmission line on quad bundled drake conductor for looping in/out of existing 500 kV Muzaffargarh-Gatti Transmission Line, 220 kV double circuit transmission line on twin bundled rail conductor to Tobatek Singh and other accessories. There is a newly constructed office and control building with the contractor temporary office building of the construction contractor. <sup>6</sup>

34 The EGS has about 150 staff (both, NTDC and construction contractors (CC)' staff) for the. The EGS has no residential colony and NTDC has plans to develop in future.

35 The water requirements of the EGS are met from the on-site wells installed at various points within EGS premises. As per the anecdotal information, the depth of the groundwater is at 10 to 12 meters.

36 The environmental issues observed during the audit visit are presented in Table 2-2 and pictorial evidence are provided in Photo 2-2.

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<sup>6</sup><https://epd.punjab.gov.pk/system/files/2%29EIA%20Faisalabad%20West%20EGS%2526TL%20%28Final%29.pdf>.



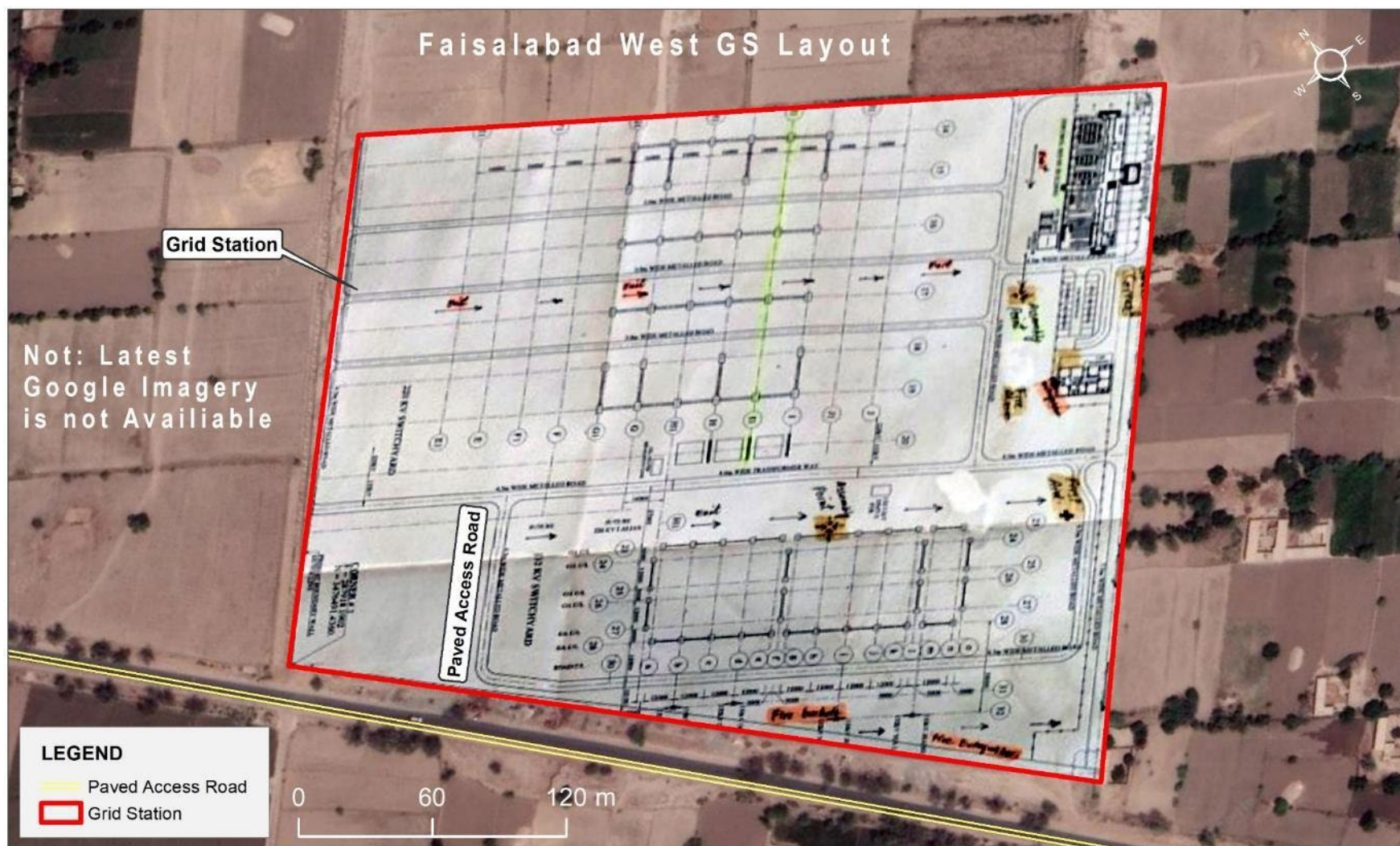


Table 2-2: **Observations from the Site Visit to Faisalabad West EGS**

No.	Observation Type	Description
1	Regulatory Compliance	<ul style="list-style-type: none"> <li>An EIA was prepared by NTDC along with associated transmission line (ADB-105 Lot-I) and submitted to Punjab EPA on 14-January 2020 for getting No Objection Certificate (NOC). Punjab EPA has not granted the NOC as yet</li> <li>An environmental management plan was provided in EIA of the subproject.</li> <li>As per the site management, a team from EPA Punjab had visited the EGS multiple times and they found the EGS in compliance to National Environmental Quality Standards (NEQS) for noise, air quality and water quality. However, no evidence (such as a letter from EPA or analysis reports) was available with EGS against the claim.</li> <li>NOC for operational phase of the EGS is also not available yet.</li> </ul>
2	Environmental Staff	<ul style="list-style-type: none"> <li>There is no designated team for taking environmental and OHS compliance measures from NTDC side. NTDC is managing occupational safety, health, environment and community issues through their Environment and Social Safeguards Cell (ESIC) by assigning additional responsibility to Resident Engineer.</li> <li>The CC has a designated EHS manager and staff available responsible for taking care of environment and OSH issues of the ongoing construction activities.</li> </ul>
3	Environmental Monitoring and Testing	<ul style="list-style-type: none"> <li>Drinking water is provided from the filtration plant installed in a nearby settlement.</li> </ul>
4	Environment and OHS	<ul style="list-style-type: none"> <li>No environmental management plan was available at the subproject.</li> <li>NTDC side, OHS Policy or procedures are available at the EGS.</li> <li>The CC has showed a signed environment and OHS Policy.</li> <li>NTDC side, no operating procedures found for maintenance and routine operations.</li> <li>CC operates a Permit to Work System and with a daily toolbox talk (TBT) meeting.</li> <li>No warning signs and awareness sign boards on environment and OHS were found in areas where operations of the EGS are started.</li> <li>No traffic management signs, or speed limit signs found on the internal roads of EGS.</li> <li>CC workers found at jobs without personal protective equipment (PPE).</li> <li>No health screening of the workers is carried out.</li> </ul>
5	Housekeeping	<ul style="list-style-type: none"> <li>Solid waste was found scattered and unsegregated at construction sites in EGS premises.</li> </ul>

No.	Observation Type	Description
		<ul style="list-style-type: none"> <li>No separate bins for plastic, paper, iron, and contaminated waste was seen anywhere at the EGS.</li> <li>Spare or Unused material (such as wires and iron bars) found at EGS without barricading and marking.</li> </ul>
6	Hazardous Material Handling	<ul style="list-style-type: none"> <li>Secondary containment was built in case of spill and leakages for transformers at EGS.</li> <li>No material safety data sheet (MSDS) was found or affix with the tanks used for transformer oil storage.</li> <li>No asbestos material observed at the G.S.</li> </ul>
7	Sewerage Waste Management	<ul style="list-style-type: none"> <li>Sewerage waste from offices of the EGS has been routed to an underground pit with open mouth at EGS premises through buried concrete pipes.</li> <li>There is no lining of the pit walls and base. The liquid waste from the pit is seeping to underground soil.</li> <li>Solid waste/sludge from the pit is taken out and dumped in municipal dumping site of nearby city through contractors.</li> </ul>
8	Climate Change and Green House Gases Emissions Ozone Depleting Substances	<ul style="list-style-type: none"> <li>The EGS uses brand-new air-conditioning units. It is unlikely that the units may be contained gases that fall under Ozone Depleting Substances.</li> </ul>
9	Emergency Response	<ul style="list-style-type: none"> <li>There is no emergency response plan at the EGS. However, emergency telephone numbers were found displaced in CC offices.</li> </ul>
10	Grievance Address Mechanism (GRM) and Stakeholders Engagement Plan (SEP)	<ul style="list-style-type: none"> <li>No GRM mechanism and procedure is available at the EGS to address the grievances of employees or the community around.</li> <li>No SEP was available at the EGS.</li> </ul>

EIA = environmental impact assessment, EGS = Electricity Grid Station, EMP = environmental management plan, EPA = Environment Protection Agency, GRM = grievance redress mechanism, IEE = initial environmental examination, MSDS = material safety data sheet, NEQS = National Environmental Quality Standards, OHS = Occupational Health and Safety, SEP = Stakeholders Engagement Plan, PEPA = Pakistan Environmental Protection Act (1997), PPE = personal protective equipment





View of Transformer Bay and Switchyard



EGS Office Building



Contractor's Office



Under Construction Cable Line Trenches



Leftover Material from EGS Construction



Leftover Material from EGS Construction



Unsegregated Solid Waste at the EGS



Newly Installed Standing Air Conditioning Units



Men at Work without Proper PPE



Men at Work without Proper PPE



Underground Steel Fuel Tank Area in Contractor Yard



Open Mouth Sewerage Disposal Pit with Unhygienic Toilets at Contractor Yard



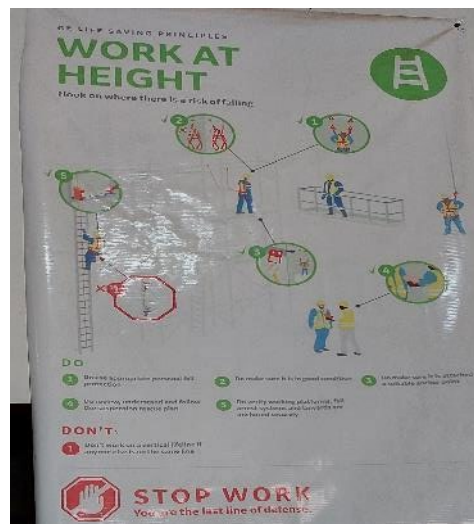
OHS Awareness Posters Displayed in Contractor Office



Group Photographs with Contractor Management Team at the EGS



OHS Awareness Posters Displayed in Contractor Office



OHS Awareness Posters Displayed in Contractor Office

**Photo 2-2: Photographs from the Site Visit to Faisalabad West EGS (July 2022)**



### **2.3 500 kV New Multan EGS, Multan, Punjab Province**

37 The visit of the EGS was carried out on 29-June-2022 by TA Environmental Consultant.

38 Mr. Mohsin Raza is Resident Engineer at the subproject and the auditor was facilitated by Mr. Waleed, Assistant Manager Protection and Instrumentation.

39 The subproject is located in Sadiqabad Area in Multan city along National Highway, N-5.

40 As per the site management, the EGS was constructed in 1982 as 220 kV grid later in 1986 it was upgraded to 500 kV EGS. The operations are continued since then.

41 Before the construction of the subproject, the land was used for agricultural purposes.

42 The land area is about 115 acres. The EGS is surrounded by agricultural land. The nearest settlement to the EGS is at about 250 meters in north. The layout of EGS and surrounding land use is shown in Figure 2-3.

43 The major equipment includes, 2x450MVA, 500/220KV Auto Transformer Banks commissioned in 1986. 500kV Grid station was further extended to 220/132kV Grid Station in 2010 and there are 03 nos of 160MVA Auto transformers with 04 nos of 132kV Circuits.<sup>7</sup>

44 There are 06 No's of 550kV circuits, 14 No's of 220kV circuits and 04 No's of 132kV circuits at 500kV Grid Station Multan. For 500KV bays one & half breaker scheme with double bus bar and for 220 KV system one and a half breaker scheme with double bus bar is used. In 132kV system single breaker double bus bar is used.

45 The EGS has about 250 staff for the operations in three shifts. Out of 70% are residing in the residential colony of the EGS.

46 The water requirements of the EGS as well as in the residential area of the EGS are met from on-site tube wells. As per the anecdotal information, the depth of the groundwater is at 8 to 10 meters.

47 The environmental issues observed during the audit visit are presented in Table 2-3 and pictorial evidence are provided in Photo 2-3.

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<sup>7</sup> <https://ntdc.gov.pk/220kv-grid-station>.



Figure 2-3: 500 kV New Multan EGS Layout

Table 2-3: Observations from the Site Visit to New Multan EGS

No.	Observation Type	Description
1	Regulatory Compliance	<ul style="list-style-type: none"> <li>The EGS was constructed before the enactment of Pakistan Environmental Protection Act (PEPA Act) in 1997. Therefore, no EIA or IEE was undertaken before the construction of the EGS.</li> </ul>
2	Environmental Staff	<ul style="list-style-type: none"> <li>There is no designated team for taking environmental and OHS compliance measures. NTDC is managing occupational safety, health, environment and community issues through their Environment and Social Safeguards Cell (ESIC) by assigning additional responsibility to Resident Engineer.</li> </ul>
3	Environmental Monitoring and Testing	<ul style="list-style-type: none"> <li>Drinking water is available from local filtration plant but water was not tested ever to see if the plant is working well.</li> </ul>
4	Environment and OHS	<ul style="list-style-type: none"> <li>No environmental management plan was available at the subproject.</li> <li>No environmental and OHS policy or procedures are available at the EGS.</li> <li>No operating procedures found for maintenance and routine operations.</li> <li>No warning signs and awareness sign boards on environment and OHS were found.</li> <li>No traffic management signs, or speed limit signs found on the internal roads of EGS.</li> <li>Workers found at jobs having no proper personal protective equipment (PPE).</li> <li>No health screening of the workers is carried out.</li> </ul>
5	Housekeeping	<ul style="list-style-type: none"> <li>Solid waste was found scattered at construction sites and in residential colony.</li> </ul>

No.	Observation Type	Description
		<ul style="list-style-type: none"> <li>• No separate bins for plastic, paper, iron, and contaminated waste was seen anywhere at the EGS.</li> <li>• Spare or Unused material (such as wires and tower equipment) found at EGS without barricading and marking.</li> </ul>
6	Hazardous Material Handling	<ul style="list-style-type: none"> <li>• The EGS stored transformer oil at the EGS in large steel tanks kept on ground. No secondary containment was built in case of spill and leakages.</li> <li>• Spills and stains were found around and under the tanks at the time of visit.</li> <li>• No material safety data sheet (MSDS) was found or affixed with the tanks used for transformer oil storage.</li> <li>• Few spare and abandoned transformers were found on unsealed surfaces.</li> <li>• Oil spills found at various locations at the on-going construction sites of the EGS</li> </ul>
7	Sewerage Waste Management	<ul style="list-style-type: none"> <li>• Sewerage waste from offices of the EGS and colony has been routed to an underground pit in west side of EGS premises through buried concrete pipes.</li> <li>• The liquid waste from the pit is pumped out and dumped in open land of the EGS.</li> <li>• Solid waste/sludge from the pit is taken out and dumped in municipal dumping site of Multan city through contractors.</li> </ul>
8	Climate Change and Green House Gases Emissions	<ul style="list-style-type: none"> <li>• The EGS still uses old window air conditioning units. The units may be contained gases that fall under Ozone Depleting Substances.</li> </ul>

No.	Observation Type	Description
	Ozone Depleting Substances	
9	Emergency Response	<ul style="list-style-type: none"> <li>There is no emergency response plan at the EGS. However, emergency telephone numbers were found displaced in offices.</li> </ul>
10	Grievance Address Mechanism (GRM) and Stakeholders Engagement Plan (SEP)	<ul style="list-style-type: none"> <li>No GRM mechanism and procedure is available at the EGS to address the grievances of employees or the community around.</li> <li>No SEP was available at the EGS.</li> </ul>

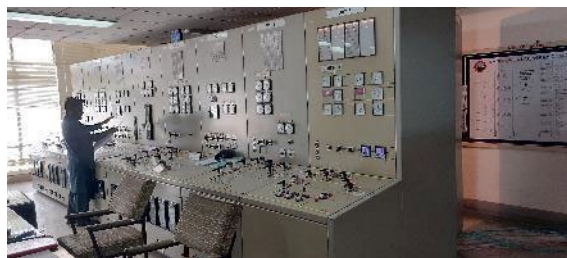
EIA = environmental impact assessment, EGS = Electricity Grid Station, EMP = environmental management plan, EPA = Environment Protection Agency, GRM = grievance redress mechanism, IEE = initial environmental examination, MSDS = material safety data sheet, NEQS = National Environmental Quality Standards, OHS = Occupational Health and Safety, SEP = Stakeholders Engagement Plan, PEPA = Pakistan Environmental Protection Act (1997), PPE = personal protective equipment



Main Office Building of EGS



Under Construction New Building at EGS



Control Room and Panel at EGS



New Under Construction Control Room at EGS





220 kV/ 132kV Switchyard at EGS



Under-construction New Bays for new Transformer



Abandoned Transformer Placed at Unsealed Surface near Transformer Bay



Men at work without PPE



Transformer Oil Tankers Placed at Unsealed Surface without Secondary Containment



Scattered Wire Wheels and Equipment Packaging within the Switchyard Premises





Fuel Oil Spill near a Diesel Generator under Use of Contractor



Fuel Oil Spill and Unattended Lube Oil Drum near Construction Site at EGS



Fuel Oil Spill and Unattended Lube Oil Drum near Construction Site at EGS



Transformer Oil Spills Under Storage Tanks at EGS



Spare Tower Material at EGS



View of Overhead Water Tank and Mosque at EGS Colony



B-Type Housings for EGS Staff at Colony



Sewerage Collection Pit in EGS Colony Premises



Open Dumping of Sewerage Water from the Pit through Electric Motor



Poor Management of Solid Waste in Colony of EGS

**Photo 2-3: Photographs from the Site Visit to New Multan EGS (July 2022)**

## **2.4 500 kV Rahim Yar Khan EGS, Rahim Yar Khan, Punjab Province**

48 The environmental audit visit was carried out on 30-June-2022 by TA Consultant, MMF Tranche 4 Readiness.

49 Mr. Jawad Amjad is Resident Engineer at the subproject and the auditor was facilitated by Mr. Khalil Ahmed, Assistant Manager Maintenance.

50 The subproject is located near Zahir Pir Town on National Highway, N-5 commissioned on Feb 03, 2018. Before the construction of the subproject, the land was used for agricultural purposes.

51 The land area is about 157 acres. The EGS is surrounded by agricultural land. The nearest settlement to the EGS is at about 50 meters in north-west. The layout of EGS and surrounding land use is shown in Figure 2-5.

52 This EGS serves as power hub connecting the central and Southern region of NTDC power network. 500KV RYK-Guddu 747 T/L, 500KV RYK-Multan T/L along with Two Nos. 3x37 MVAR Shunt Reactors, 500/220KV 3x200MVA Auto-Transformer ATB-2 & ATB-3, 220/132KV 250MVA Auto- Transformer T-5 & T6 and 132/11 KV 6.3MVA Power Transformer T-7 were commissioned on 03 Feb 2018 and 500KV RYK-Moro T/L along with 3x37 MVar S/Reactor was commissioned on Sep 06, 2019. This Grid station feeds six nos. 132kV circuits. 132kV Khanpur-I T/L & Khanpur-II T/L were commissioned on 10 Feb 2018 and , 132kV RYK-I T/L & RYK-II T/L were commissioned on 23 May 2018 and 132kV Feroza-I T/L and Feroza-II T/L were commissioned on July 17, 2021 and 24 July 2021 respectively.<sup>8</sup>

53 This Grid Station contains 500kV, 220kV, 132kV HV system. One & Half Breaker Scheme is used for 500kV & 220kV systems and Double Bus single Breaker scheme is used for 132kV system.

54 The EGS has about 136 staff for the operations in three shifts. About a half of them are residing in the residential colony of the EGS.

55 The water requirements of the EGS as well as in the residential area of the EGS are met from on-site tube wells. As per the anecdotal information, the depth of the groundwater is at 13 to 15 meters.

56 The environmental issues observed during the audit visit are presented in Table 2-4 and pictorial evidence are provided.

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<sup>8</sup> <https://ntdc.gov.pk/220kv-grid-station>.



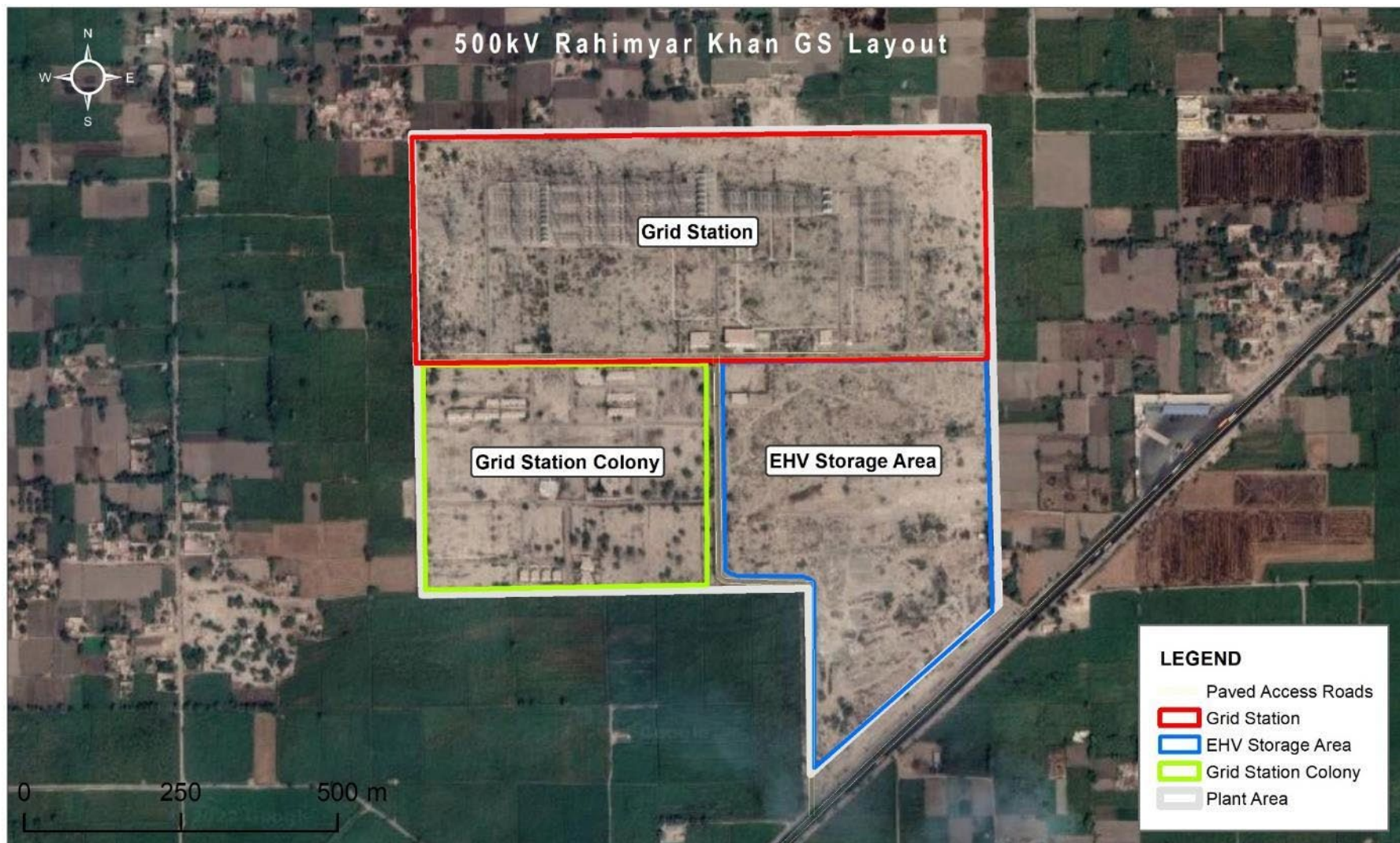


Figure 2-4: 500 kV Rahimyar Khan EGS Layout

Table 2-4: **Observations from the Site Visit to Rahimyar Khan EGS**

No.	Observation Type	Description
1	Regulatory Compliance	<ul style="list-style-type: none"> <li>EIA or IEE was not available with the site management, and they were not aware if the study has been done during the feasibility stage.</li> <li>As per the Environment and Social Impact Cell (ESIC) of NTDC, this study was not undertaken for the EGS.</li> <li>Punjab Environmental Protection Act, 1997, amended 2012, required EIA for projects having strength of 11kV or above. This means the EGS was constructed and in operation without approval from Punjab EPA.</li> </ul>
2	Environmental Staff	<ul style="list-style-type: none"> <li>There is no designated team for taking environmental and OHS compliance measures. NTDC is managing occupational safety, health, environment and community issues through their Environment and Social Safeguards Cell (ESIC) by assigning additional responsibility to Resident Engineer.</li> </ul>
3	Environmental Monitoring and Testing	<ul style="list-style-type: none"> <li>Drinking water is available from local filter plant but water was not tested ever to see if the plant is working well.</li> </ul>
4	Environment and OHS	<ul style="list-style-type: none"> <li>No environmental management plan was available at the subproject.</li> <li>No OHS policies or procedures are available at the EGS.</li> <li>No operating procedures were found for maintenance and routine operations.</li> <li>Few warning signs and awareness sign boards on the environment and OHS were found affixed inside the main office building.</li> <li>No traffic management signs or speed limit signs found on the internal roads of EGS.</li> <li>Workers found at jobs having no proper personal protective equipment (PPE).</li> <li>No health screening of the workers is carried out.</li> </ul>
5	Housekeeping	<ul style="list-style-type: none"> <li>Solid waste was found scattered at construction sites and in residential colony.</li> <li>No separate bins for plastic, paper, iron, and contaminated waste was seen anywhere at the EGS.</li> <li>Spare or Unused material (such as wires and tower equipment) found at EGS without barricading and marking.</li> </ul>
6	Hazardous Material Handling	<ul style="list-style-type: none"> <li>The EGS stored transformer oil at the EGS in large steel tanks kept on ground. No secondary containment was built in case of spill and leakages. However, no stains found around the tanks at the time of visit.</li> <li>No material safety data sheet (MSDS) was found or affix with the tanks used for transformer oil storage.</li> </ul>

No.	Observation Type	Description
		<ul style="list-style-type: none"> <li>Few spare transformers were found on unsealed surfaces.</li> </ul>
7	Sewerage Waste Management	<ul style="list-style-type: none"> <li>Sewerage waste from offices of the EGS and colony has been routed to an underground pit on the northeast side of EGS premises through buried concrete pipes.</li> <li>The liquid waste from the pit is pumped out and dumped in the open land of the EGS.</li> <li>Solid waste/sludge from the pit is taken out and dumped in the municipal dumping site.</li> </ul>
8	Climate Change and Green House Gases Emissions Ozone Depleting Substances	<ul style="list-style-type: none"> <li>The EGS still uses old window air conditioning units. The units may be contained gases that fall under Ozone Depleting Substances.</li> </ul>
9	Emergency Response	<ul style="list-style-type: none"> <li>There is no emergency response plan at the EGS. However, emergency telephone numbers were found displaced in offices.</li> </ul>
10	Grievance Address Mechanism (GRM) and Stakeholders Engagement Plan (SEP)	<ul style="list-style-type: none"> <li>No GRM mechanism and procedure is available at the EGS to address the grievances of employees or the community around.</li> <li>No SEP was available at the EGS.</li> </ul>

EIA = environmental impact assessment, EGS = Electricity Grid Station, EMP = environmental management plan, EPA = Environment Protection Agency, GRM = grievance redress mechanism, IEE = initial environmental examination, MSDS = material safety data sheet, NEQS = National Environmental Quality Standards, OHS = Occupational Health and Safety, SEP = Stakeholders Engagement Plan, PEPA = Pakistan Environmental Protection Act (1997), PPE = personal protective equipment





Entrance to Rahimyar Khan EGS



EGS Boundary Towards National Highway, N-5



View of Switchyard



View of Switchyard with Transformer Bay



Spare Transformer at Unsealed Surface near Switchyard Premises



Transformer Bay



Main Office Building at EGS



Transformer Oil Tanks Placed at Unsealed Surface without Secondary Containment



Transformer Oil Tanks Placed at Unsealed Surface without Secondary Containment



Spare Tower equipment Stored at Open Land inside EGS



Spare Tower equipment Stored at Open Land inside EGS



Fire Extinguishers at the EGS



OHS Awareness Signs in Main Building



Unsegregated Solid Waste Dump near Control Room of EGS

**Photo 2-4: Photographs from the Site Visit to Rahimyar Khan EGS (July 2022)**



## **2.5 500 kV Guddu EGS, Guddu, Sindh Province**

57 The subproject is located near Guddu Thermal Power Plant on National Highway, N-20, also, called as Guddu Barrage Road, in Guddu, Sindh.

58 The environmental audit visit was carried out on 30-June-2022 by TA Consultant, MMF Tranche 4 Readiness.

59 Mr. Ishaq Bughti is Resident Engineer (RE) at the subproject and facilitate environmental audit.

60 The land area is about 50 acres. Guddu Thermal Power Plant surrounded the EGS from southwest to southeast. National Highway, N-20 and Pat Feeder Canal is located adjacent in north of the EGS. The layout of EGS and surrounding land use is shown in Figure 2-6.

61 As per the site management, the EGS for 220kV and 132kV, was constructed in 1986 and remained under control of Generation Company (GENCO) till 2021.

62 The 220 kV and 132 kV grid were handed over to NTDC on 30-September-2021.

63 The 500kV grid was constructed in 2014 and since then it is under control of NTDC. Before the construction of the subproject, the land was thought to be an agricultural land.

64 500 kV Guddu EGS was commissioned with 1 x 450 MVA, 500/220KV. Auto T/F banks in 1986. The 2nd 450MVA, 500/220KV Auto T/F bank was commissioned in 1987 and 3rd 450MVA, 500/220KV Auto T/F bank was commissioned in 1998.<sup>9</sup>

65 The water requirements of the EGS are met from on-site wells. As per the anecdotal information, the depth of the groundwater is at 13 to 15 meters.

66 The facilities associated with 220kV and 132kV grid such as switchyard, transformer and control panel were found in very bad shape due to wear and tear over the years. The replacement parts are now not available, and the technology is now outdated.

67 The EGS has about 35 staff for the operations in three shifts. No residential facility is available at the EGS.

68 The water requirements of the EGS are met from on-site tube wells.

69 The RE said no new staff was given with the handover of the 220 kV and 132 kV grid. He is managing operations of EGS with the old staff of the 500kV grid and staff are working without breaks and longer hours.

70 The environmental issues observed during the audit visit are presented in Table 2-5 and pictorial evidence are provided in Photo 2-4.

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<sup>9</sup> <https://ntdc.gov.pk/220kv-grid-station>.



Figure 2-5: 500 kV Guddu EGS Layout

Table 2-5: **Observations from the Site Visit to Guddu EGS**

No.	Observation Type	Description
1	Regulatory Compliance	<ul style="list-style-type: none"> <li>The EGS was constructed before the enactment of Pakistan Environmental Protection Act (PEPA Act) in 1997. Therefore, no EIA or IEE was undertaken before the construction of the EGS.</li> </ul>
2	Environmental Staff	<ul style="list-style-type: none"> <li>There is no designated team for taking environmental and OHS compliance measures. NTDC is managing occupational safety, health, environment and community issues through their Environment and Social Safeguards Cell (ESIC) by assigning additional responsibility to Resident Engineer.</li> </ul>
3	Environmental Monitoring and Testing	<ul style="list-style-type: none"> <li>Filtered water is used for drinking purposes.</li> </ul>
4	Environment and OHS	<ul style="list-style-type: none"> <li>No environmental management plan was available at the subproject.</li> <li>No OHS policy or procedures are available at the EGS.</li> <li>No operating procedures found for maintenance and routine operations.</li> <li>No warning signs and awareness sign boards on environment and OHS were found.</li> <li>No traffic management signs, or speed limit signs found on the internal roads of EGS.</li> <li>Workers found at jobs having no proper personal protective equipment (PPE).</li> <li>No health screening of the workers carried out.</li> </ul>
5	Housekeeping	<ul style="list-style-type: none"> <li>Solid waste was found scattered at construction sites.</li> <li>No separate bins for plastic, paper, iron, and contaminated waste were seen anywhere at the EGS.</li> <li>Abandoned equipment (such as transformers) found at EGS without barricading and marking and stored on unsealed ground.</li> </ul>
6	Hazardous Material Handling	<ul style="list-style-type: none"> <li>The EGS stored transformer oil at the EGS in large steel tanks kept on ground. No secondary containment was built in case of spill and leakages.</li> <li>No material safety data sheet (MSDS) was found or affixed with the tanks used for transformer oil storage.</li> <li>Few spare and abandoned transformers were found on unsealed surfaces.</li> </ul>
7	Sewerage Waste Management	<ul style="list-style-type: none"> <li>Sewerage waste from offices of the EGS has been routed to GENCO facility in southwest of EGS.</li> </ul>



No.	Observation Type	Description
8	Climate Change and Green House Gases Emissions Ozone Depleting Substances	<ul style="list-style-type: none"> <li>The EGS still uses old window air conditioning units. The units may be contained gases fall under Ozone Depleting Substances.</li> </ul>
9	Emergency Response	<ul style="list-style-type: none"> <li>There is no emergency response plan at the EGS. However, emergency telephone numbers were found displaced in offices.</li> </ul>
10	Grievance Address Mechanism (GRM) and Stakeholders Engagement Plan (SEP)	<ul style="list-style-type: none"> <li>No GRM mechanism and procedure is available at the EGS to address the grievances of employees or community around.</li> <li>No SEP was available at the EGS.</li> </ul>

EIA = environmental impact assessment, EGS = Electricity Grid Station, EMP = environmental management plan, EPA = Environment Protection Agency, GRM = grievance redress mechanism, IEE = initial environmental examination, MSDS = material safety data sheet, NEQS = National Environmental Quality Standards, OHS = Occupational Health and Safety, SEP = Stakeholders Engagement Plan, PEPA = Pakistan Environmental Protection Act (1997), PPE = personal protective equipment



Main office at EGS



Access Road Guddu Barrage Road



220 kV Switchyard at the EGS



220 kV Switchyard at the EGS



Abandoned and Burnt Transformer Kept on Unsealed Surface



Rusted Transformer Oil Tanks on Unsealed Surface





Access to the Control Room Building



Outdated Control Panels



Switchyard



Transformer and Oil Tank on Unsealed Surface



Transformer Kept on Unsealed Surface



Outdated Fire Extinguishers at the EGS



Unhygienic Toilets



Unhygienic Toilets



Technical Building at EGS



Rusted Steel Pipelines





Transformer Bay



Window Air Conditioning Units Still in Use at EGS

500kV Switchyard



Meeting with Resident Engineer, Guddu EGS

**Photo 2-5: Photographs from the Site Visit to Guddu EGS (July 2022)**

## **2.6 500 kV Dadu EGS, Dadu, Sindh Province**

71 The environmental audit visit was carried out on 27-June-2022 by the representative of TA Consultant, MMF Tranche 4 Readiness.

72 Interview was conducted with Mr. Liaqat Ali Jamali, Resident Engineer, Mr. Nadeem Akhtar, Assistant RE and Mr. Asghar Ali, Maintenance.

73 The subproject is located on National Highway, N-55 near Dadu city, Sindh. As per the site management, the EGS was constructed in 1983. Before the construction of the subproject, the land was used for agricultural purposes.

74 The land area is about 100 acres. The EGS is surrounded by agricultural land. The nearest settlement to the EGS is at about 50 meters in south, and east. The layout of EGS and surrounding land use is shown in Figure 2-7.

75 The EGS has about 160 staff for the operations in three shifts. Most staff are residing in the residential colony of the EGS.

76 500KV Dadu EGS with 1X450 MVA, 500/220KV auto transformer bank with four banks of 500KV shunt reactors (2 banks of Capacity 3x37MVAR each & 2 Banks of capacity 3x22MVAR each) (was commissioned in 1993. 500KV Dadu EGS is being fed from Guddu Powerhouse through two 500 KV S/C and connected with 500 KV Jamshoro & 500 KV Guddu EGS through two 500 KV Single Circuits. The EGS is also feeding one 160 MVA, 220/132KV Power T/F installed in the EGS. For 500 KV bays as well as 220KV bays, double bus bar with one & half breaker scheme has been installed.<sup>10</sup>

77 The water requirements of the EGS as well as in the residential area of the EGS are met from on-site tube wells. As per the anecdotal information, the depth of the groundwater is 20 to 22 meters.

78 The environmental issues observed during the audit visit are presented in Table 2-6 and pictorial evidence are provided in Photo 2-5.

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<sup>10</sup> <https://ntdc.gov.pk/220kv-gird-station>.



Figure 2-6: **500 kV Dadu EGS Layout**

Table 2-6: **Observations from the Site Visit to Dadu EGS**

No.	Observation Type	Description
1	Regulatory Compliance	<ul style="list-style-type: none"> <li>The EGS was constructed before the enact of Pakistan Environmental Protection Act (PEPA Act) in 1997. Therefore, no EIA or IEE was undertaken before the construction of the EGS.</li> </ul>
2	Environmental Staff	<ul style="list-style-type: none"> <li>There is no designated team for taking environmental and OHS compliance measures. NTDC is managing occupational safety, health, environment and community issues through their Environment and Social Safeguards Cell (ESIC) by assigning additional responsibility to Resident Engineer.</li> </ul>
3	Environmental Monitoring and Testing	<ul style="list-style-type: none"> <li>Bottled Water is being used for drinking purposes.</li> </ul>
4	Environment and OHS	<ul style="list-style-type: none"> <li>No environmental management plan was available at the subproject.</li> <li>No OHS policy or procedures are available at the EGS.</li> <li>No operating procedures found for maintenance and routine operations.</li> <li>No warning signs and awareness sign boards on environment and OHS were found.</li> <li>No traffic management signs, or speed limit signs found on the internal roads of EGS.</li> <li>Workers found at jobs having no proper personal protective equipment (PPE).</li> <li>No health screening of the workers is carried out.</li> </ul>
5	Housekeeping	<ul style="list-style-type: none"> <li>Solid waste was found scattered at various sites at EGS without segregation.</li> <li>No separate bins for plastic, paper, iron, and contaminated waste was seen anywhere at the EGS.</li> <li>Spare or Unused material (such as wires and tower equipment) found at EGS without barricading and marking.</li> </ul>
6	Hazardous Material Handling	<ul style="list-style-type: none"> <li>The EGS stored transformer oil at the EGS in large steel tanks kept on ground. No secondary containment was built in case of spills and leakages.</li> <li>Spills and stains of transformer oil were found at various locations at the time of the visit.</li> <li>No material safety data sheet (MSDS) was found or affix with the tanks used for transformer oil storage.</li> <li>Few spare and abounded transformer were found on unsealed surfaces.</li> </ul>



No.	Observation Type	Description
7	Sewerage Waste Management	<ul style="list-style-type: none"> <li>Sewerage waste from offices of the EGS and colony has been routed to an underground pit at EGS premises through buried concrete pipes.</li> <li>The liquid waste from the pit is pumped out and dumped in the open land of the EGS.</li> <li>Solid waste/sludge from the pit is taken out and dumped in municipal dumping site of Dadu city through contractors.</li> </ul>
8	Climate Change and Green House Gases Emissions Ozone Depleting Substances	<ul style="list-style-type: none"> <li>The EGS still uses old window air conditioning units. The units may be contained gases fall under Ozone Depleting Substances.</li> </ul>
9	Emergency Response	<ul style="list-style-type: none"> <li>There is no emergency response plan at the EGS. However, emergency telephone numbers were found displaced in offices.</li> </ul>
10	Grievance Address Mechanism (GRM) and Stakeholders Engagement Plan (SEP)	<ul style="list-style-type: none"> <li>No GRM mechanism and procedure is available at the EGS to address the grievances of employees or community around.</li> <li>No SEP was available at the EGS.</li> </ul>

EIA = environmental impact assessment, EGS = Electricity Grid Station, EMP = environmental management plan, EPA = Environment Protection Agency, GRM = grievance redress mechanism, IEE = initial environmental examination, MSDS = material safety data sheet, NEQS = National Environmental Quality Standards, OHS = Occupational Health and Safety, SEP = Stakeholders Engagement Plan, PEPA = Pakistan Environmental Protection Act (1997), PPE = personal protective equipment



Entrance to Dadu EGS



Internal Road (Main Access)



Main Office Building at the EGS



Main Office Building at the EGS



Transformer Oil Tanks kept on Unsealed Surface



Leakage from a Transformer



Fire Extinguishers at the EGS



Transformer without Secondary Containment





Unmarked Oil Drums in Warehouse of EGS



Rusted Transformer Oil Tanks Kept on Unsealed Surface



Unsegregated Waste inside Warehouse



Unhygienic Toilets in Main Building



Abandoned Wires Dump near a Sewerage Pit



Unhygienic Toilets in Main Building



Unmarked Oil Drums in Warehouse of EGS with Oil Leakages



A Standing Air Conditioning Unit in Control Panel Room



One of the Groundwater Extraction Wells at EGS



Drinking Water Dispenser in Main Building

**Photo 2-6: Photographs from the Site Visit to Dadu EGS (July 2022)**



## **2.7 220 kV Bahawalpur EGS, Bahawalpur, Punjab Province**

79 The environmental audit visit was carried out on 31 August 2022 by TA Consultant, MMF Tranche 4 Readiness.

80 Interview was conducted with Mr. Muhammad Zubair, Deputy Manager, EGS.

81 The subproject is located on Basti Yar Muhammad Road off National Highway, N-5 near Bahawalpur city, Punjab province. As per the site management, the EGS was constructed in 2001-2002 and operations were started in 2003. Before the construction of the subproject, the land was used for agricultural purposes.

82 The land area is about 60 acres. The EGS is surrounded by agricultural land. The nearest settlement to the EGS is at about 50 meters in north. The layout of EGS and surrounding land use is shown in Figure 2-8.

83 The EGS has about 50 staff for the operations in three shifts. Most staff are residing in the residential colony of the EGS.

84 The EGS operations are continued with 1x160MVA and 2X 250 MVA Auto Transformers. This EGS is being fed from Muzaffargarh Powerhouse through 220 kV Double Circuits and Quaid-e-Azam Solar Park through 220 kV Double Circuits. This EGS is also feeding one 20/26 MVA Power Transformer for grid station auxiliary supply and 5 number 11 kV local DESCO feeders. For 220 kV system, it has 4 bays, double bus bar with one and half breaker scheme whereas for 132KV system, it has 14 bays, double bus bar with single breaker scheme. It has two auxiliary pads mounted 200 kVA transformers.<sup>11</sup>

85 The water requirements of the EGS as well as in the residential area of the EGS are met from on-site tube wells. The groundwater table in the area is at 23 to 25 meters below ground surface.

86 The environmental issues observed during the audit visit are presented in Table 2-7 and pictorial evidence are provided in Photo 2-6.

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<sup>11</sup> <https://ntdc.gov.pk/220kv-gird-station>.



Figure 2-7: 220 kV Bahawalpur EGS Layout

Table 2-7: **Observations from the Site Visit to Bahawalpur EGS**

No.	Observation Type	Description
1	Regulatory Compliance	<ul style="list-style-type: none"> <li>EIA or IEE was not available with the site management, and they were not aware if the study has been done during the feasibility stage.</li> <li>As per the Environment and Social Impact Cell (ESIC) of NTDC, this study was not undertaken for the EGS.</li> <li>Punjab Environmental Protection Act, 1997, amended 2012, required EIA for projects having strength of 11kV or above. This means the EGS was constructed and in operation without approval from Punjab EPA.</li> </ul>
2	Environmental Staff	<ul style="list-style-type: none"> <li>There is no designated team for taking environmental and OHS compliance measures. NTDC is managing occupational safety, health, environment and community issues through their Environment and Social Safeguards Cell (ESIC) by assigning additional responsibility to Resident Engineer.</li> </ul>
3	Environmental Monitoring and Testing	<ul style="list-style-type: none"> <li>Drinking water is available from local filter plant but water was not tested ever to see if the plant is working well.</li> </ul>
4	Environment and OHS	<ul style="list-style-type: none"> <li>No environmental management plan was available at the subproject.</li> <li>No OHS policies or procedures are available at the EGS.</li> <li>No operating procedures were found for maintenance and routine operations.</li> <li>No traffic management signs, or speed limit signs found on the internal roads of EGS.</li> <li>NTDC workers need proper personal protective equipment (PPE).</li> <li>A contractor (Siemens) was found carrying out a civil work at the EGS. The contractor staff was executing activities in in complete PPE. The warning OHS signs displayed at workplace and campsite by the contractor.</li> <li>No health screening of the workers carried out.</li> </ul>
5	Housekeeping	<ul style="list-style-type: none"> <li>Solid waste was found scattered at construction sites and in residential colony.</li> <li>No separate bins for plastic, paper, iron, and contaminated waste was seen anywhere at the EGS.</li> <li>Spare or unused material (such as transformer, oil drums, empty transformer oil tanks) found at EGS without barricading and marking.</li> <li>The contractor follows a waste segregation mechanism at work site and camp site</li> </ul>
6	Hazardous Material Handling	<ul style="list-style-type: none"> <li>The EGS stored transformer oil at the EGS in large steel tanks kept on ground. No secondary containment was built in case of spill and leakages.</li> </ul>

No.	Observation Type	Description
		<ul style="list-style-type: none"> <li>• A drum near the transformer-oil tanks found with liquid (potentially transformer oil) on ground surface. However, no stains found around the tanks at the time of visit.</li> <li>• No material safety data sheet (MSDS) was found or affix with the tanks used for transformer oil storage.</li> <li>• Few spare transformers were found on unsealed surfaces.</li> </ul>
7	Sewerage Waste Management	<ul style="list-style-type: none"> <li>• Sewerage waste from offices of the EGS and colony has been routed to an underground pit on the northeast side of EGS premises through buried concrete pipes.</li> <li>• The liquid waste from the pit is pumped out and dumped in the open land of the EGS.</li> <li>• Solid waste/sludge from the pit is taken out and dumped in the municipal dumping site.</li> </ul>
8	Climate Change and Green House Gases Emissions Ozone Depleting Substances	<ul style="list-style-type: none"> <li>• The EGS still uses old window air conditioning units. The units may be contained gases that fall under Ozone Depleting Substances.</li> </ul>
9	Emergency Response	<ul style="list-style-type: none"> <li>• There is no emergency response plan at the EGS. However, emergency telephone numbers were found displaced in offices.</li> </ul>
10	Grievance Address Mechanism (GRM) and Stakeholders Engagement Plan (SEP)	<ul style="list-style-type: none"> <li>• No GRM mechanism and procedure is available at the EGS to address the grievances of employees or the community around.</li> <li>• No SEP was available at the EGS.</li> </ul>

EIA = environmental impact assessment, EGS = Electricity Grid Station, EMP = environmental management plan, EPA = Environment Protection Agency, GRM = grievance redress mechanism, IEE = initial environmental examination, MSDS = material safety data sheet, NEQS = National Environmental Quality Standards, OHS = Occupational Health and Safety, SEP = Stakeholders Engagement Plan, PEPA = Pakistan Environmental Protection Act (1997), PPE = personal protective equipment



Entrance to Bahawalpur EGS



EGS Main Building with Control Room





Internal Access Road at the EGS



132 kV Switch Yard at EGS



220 kV Switch Yard at EGS



Transformers at EGS



Empty Drums of Transformer Oil on Unpaved Surface. Residual Oil can be Seen in a Bowl



Unmarked Empty Drums of Transformer Oil on Unpaved Surface



Contractor Men at Work at EGS



Contractor Men at Work at EGS



Fire Extinguisher at the EGS



On-Site Tube Well



Abandoned Window AC in RE Office



Outer Boundary in West of EGS

**Photo 2-7: Photographs from the Site Visit to Bahawalpur EGS (Aug 2022)**

## **2.8 220 kV Daharki EGS, Daharki, Sindh Province**

87 The environmental audit visit was carried out on 30 September 2022 by TA Consultant, MMF Tranche 4 Readiness.

88 Interview was conducted with Mr. Saeed Ahmed, Resident Engineer, EGS.

89 The subproject is located on Dad Laghari Road, about 8 km off National Highway, N-5 near Daharki city, Sindh province.

90 As per the site management, the EGS was constructed in 2007-2008 and operations were started in 2008. Before the construction of the subproject, the land was used for agricultural purposes.

91 The EGS was constructed temporarily in a limited space for the local industry in a remote area having unsealed access road but later is functioning as full EGS without improvement in plant equipment a space.

92 The land area is about 2 acres. The EGS is surrounded by agricultural land. The nearest settlement to the EGS is at about 250 meters in west. The layout of EGS and surrounding land use is shown in Figure 2-9.

93 The EGS is operated with 220 kV Switchyard, 1 x 250MVA Transformer and 1x 150 MVA Transformer.

94 The EGS operations are continued with 6 staff for the operations in three shifts and 13 security staff. Residence available for only security staff.

95 The water requirements of the EGS as well as in the residential area of the EGS are met from on-site tube wells. The groundwater table in the area is at about 8 meters below ground surface.

The environmental issues observed during the audit visit are presented in Table 2-8 and pictorial evidence are provided in Photo 2-7.





Figure 2-8: 220 kV Daharki EGS Layout

Table 2-8: **Observations from the Site Visit to Daharki EGS**

No.	Observation Type	Description
1	Regulatory Compliance	<ul style="list-style-type: none"> <li>EIA or IEE was not available with the site management, and they were not aware if the study has been done during the feasibility stage.</li> <li>As per the Environment and Social Impact Cell (ESIC) of NTDC, this study was not undertaken for the EGS.</li> <li>Sindh Environmental Protection Act, 2014, required EIA for projects having strength of 11kV or above. This means the EGS was constructed and in operation continue without approval from Sindh EPA.</li> </ul>
2	Environmental Staff	<ul style="list-style-type: none"> <li>There is no designated team for taking environmental and OHS compliance measures. NTDC is managing occupational safety, health, environment and community issues through their Environment and Social Safeguards Cell (ESIC) by assigning additional responsibility to Resident Engineer.</li> </ul>
3	Environmental Monitoring and Testing	<ul style="list-style-type: none"> <li>Drinking water is available from local filter plant but water was not tested ever to see if the plant is working well.</li> </ul>
4	Environment and OHS	<ul style="list-style-type: none"> <li>No environmental management plan was available at the subproject.</li> <li>No OHS policies or procedures are available at the EGS.</li> <li>No operating procedures were found for maintenance and routine operations.</li> <li>No traffic management signs, or speed limit signs found on the internal roads of EGS.</li> <li>NTDC workers need proper personal protective equipment (PPE).</li> <li>A contractor (Siemens) was found carrying out a civil work at the EGS. The contractor staff was executing activities in in complete PPE. The warning OHS signs displayed at workplace and campsite by the contractor.</li> <li>No health screening of the workers carried out.</li> </ul>
5	Housekeeping	<ul style="list-style-type: none"> <li>No separate bins for plastic, paper, iron, and contaminated waste was seen anywhere at the EGS.</li> <li>Spare or unused material (such as transformer, oil drums, empty transformer oil tanks) found at EGS without barricading and marking.</li> <li>The contractor follows a waste segregation mechanism at work site and camp site</li> </ul>
6	Hazardous Material Handling	<ul style="list-style-type: none"> <li>The EGS stored transformer oil at the EGS in large steel tanks kept on ground. No secondary containment was bult in case of spill and leakages.</li> <li>No material safety data sheet (MSDS) was found or affix with the tanks used for transformer oil storage.</li> </ul>

No.	Observation Type	Description
		<ul style="list-style-type: none"> <li>Few spare transformers were found on unsealed surfaces.</li> </ul>
7	Sewerage Waste Management	<ul style="list-style-type: none"> <li>Sewerage waste from offices of the EGS and colony has been routed to an underground pit on the northeast side of EGS premises through buried concrete pipes.</li> <li>The liquid waste from the pit is pumped out and dumped in the open land of the EGS.</li> <li>Solid waste/sludge from the pit is taken out and dumped in the municipal dumping site nearby.</li> </ul>
8	Climate Change and Green House Gases Emissions Ozone Depleting Substances	<ul style="list-style-type: none"> <li>No such equipment or agent found at EGS</li> </ul>
9	Emergency Response	<ul style="list-style-type: none"> <li>There is no emergency response plan at the EGS. However, emergency telephone numbers were found displaced in offices.</li> </ul>
10	Grievance Address Mechanism (GRM) and Stakeholders Engagement Plan (SEP)	<ul style="list-style-type: none"> <li>No GRM mechanism and procedure is available at the EGS to address the grievances of employees or the community around.</li> <li>No SEP was available at the EGS.</li> </ul>

EIA = environmental impact assessment, EGS = Electricity Grid Station, EMP = environmental management plan, EPA = Environment Protection Agency, GRM = grievance redress mechanism, IEE = initial environmental examination, MSDS = material safety data sheet, NEQS = National Environmental Quality Standards, OHS = Occupational Health and Safety, SEP = Stakeholders Engagement Plan, PEPA = Pakistan Environmental Protection Act (1997), PPE = personal protective equipment



Entrance to Daharki EGS with Control Room



EGS Switchyard



Transformer Bay at EGS



Civil Work was Underway at 150 MVA Transformer Bay at EGS





Firefighting Equipment. Buckets were found with Rainwater



Category C Quarters for Security and RE Office



Empty Drums of Transformer Oil on Unpaved Surface



Contractor Material on Accumulated Rainwater



Contractor Men at Work at EGS



Access Road to the EGS from Dad Laghari Road



Solid Waste Segregation by Contractor



On-Site Groundwater Extraction Bore



Sewage Duct Leads to Open Land in South at EGS



Abandoned RE Office due to Leaking Roof

**Photo 2-8: Photographs from the Site Visit to Daharki EGS (Aug 2022)**



## **2.9 500 kV Muhammadi EGS, Peshawar, Khyber Pakhtunkhwa Province**

96 The environmental audit visit was carried out on 29-June-2022 by TA Consultant, MMF Tranche 4 Readiness.

97 Mr. Fakhir Alam is Resident Engineer at the subproject and Engineer Mian Tanveer Ahmed is Deputy Manager who had facilitated the environmental auditor.

98 The subproject is located on Sarband Road, 1 km off Indus Highway, N-55, in Sheikh Muhammadi on the outskirts of Peshawar. The EGS was constructed in 1995. Before the construction of the EGS, the land was used for agricultural purposes.

99 The land area is about 100 acres. There are residential adjacent to the EGS in east and south and north. There is agricultural land in west of the EGS. The layout of EGS and surrounding land use is shown in Figure 2-10.

100 The EGS was commissioned in 1995 with 1x450MVA, 500/220KV Auto T/F Banks and Second 1x450MVA, 500/220 KV Auto T/F Bank energized on 28.02.1996. The EGS is connected with Tarbela Hydropower Project through 500 kV S/C four bundled T/Line completed in 1992. The EGS is feeding 3x160 MVA, 220/132 KV power T/Fs.

101 A terror attack in 2013 caused multiple casualties at EGS. Many transformers were also burnt during the event as a result transformer oil was spilled.

102 The EGS has about 250 staff. There is housing colony for staff with all facilities such as food item stores, dispensary, and a school.

103 The water requirements of the EGS as well as in the residential area of the EGS are met from on-site tube wells. As per the anecdotal information, the depth of the groundwater is at 23 to 25 meters.

104 The environmental issues observed during the audit visit are presented in Table 2-9 and pictorial evidence are provided in Photo 2-8.



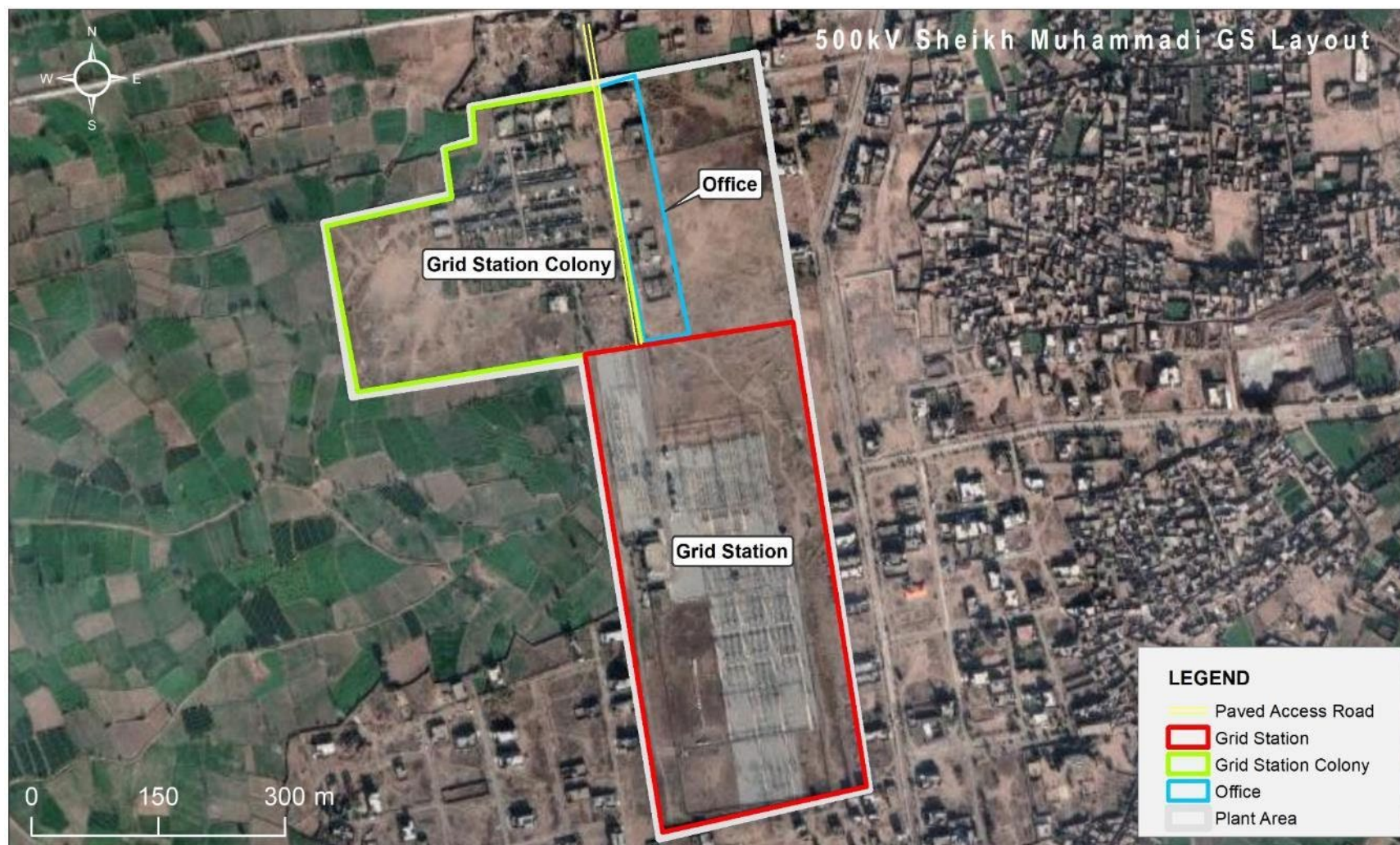


Figure 2-9: 500 kV Muhammadi EGS Layout

Table 2-9: **Observations from the Site Visit to Muhammadi EGS**

No.	Observation Type	Description
1	Regulatory Compliance	<ul style="list-style-type: none"> <li>The EGS was constructed before the enact of Pakistan Environmental Protection Act (PEPA Act) in 1997. Therefore, no EIA or IEE was undertaken before the construction of the EGS.</li> </ul>
2	Environmental Staff	<ul style="list-style-type: none"> <li>There is no designated team for taking environmental and OHS compliance measures. NTDC is managing occupational safety, health, environment and community issues through their Environment and Social Safeguards Cell (ESIC) by assigning additional responsibility to Resident Engineer.</li> </ul>
3	Environmental Monitoring and Testing	<ul style="list-style-type: none"> <li>Drinking water is available from local filtration plant but water was not tested ever to see if the plant is working well.</li> </ul>
4	Environment and OHS	<ul style="list-style-type: none"> <li>No environmental management plan was available at the subproject.</li> <li>No environmental and OHS policy or procedures are available at the EGS.</li> <li>No operating procedures found for maintenance and routine operations.</li> <li>No warning signs and awareness sign boards on environment and OHS were found.</li> <li>No traffic management signs, or speed limit signs found on the internal roads of EGS.</li> <li>Workers found at jobs having no proper personal protective equipment (PPE).</li> <li>No health screening of the workers carried out.</li> </ul>
5	Housekeeping	<ul style="list-style-type: none"> <li>No separate bins for plastic, paper, iron, and contaminated waste was seen anywhere at the EGS.</li> <li>Spare or unused material (such as construction material near construction site of new office building) found at EGS without barricading and marking.</li> </ul>
6	Hazardous Material Handling	<ul style="list-style-type: none"> <li>The EGS stored transformer oil at the EGS in large steel tanks kept on ground. No secondary containment was built in case of spill and leakages. The Deputy Manager has informed that the tanks are empty.</li> <li>No material safety data sheet (MSDS) was found or affix with the tanks used for transformer oil storage.</li> <li>As mentioned above, an unaccounted transformer oil was spilled because of blasts near the bays during a terror attack in 2013.</li> </ul>
7	Sewerage Waste Management	<ul style="list-style-type: none"> <li>Sewerage waste from offices of the EGS and colony has been routed to an underground pit in east side of EGS premises through buried concrete pipes.</li> </ul>



No.	Observation Type	Description
		<ul style="list-style-type: none"> <li>The liquid waste from the pit is pumped out and dumped in the sewerage drains of a housing society in east of the EGS.</li> <li>Solid waste/sludge from the pit is taken out and dumped in municipal dumping site of Peshawar city through contractors.</li> </ul>
8	Climate Change and Green House Gases Emissions Ozone Depleting Substances	<ul style="list-style-type: none"> <li>No such equipment or substances found</li> </ul>
9	Emergency Response	<ul style="list-style-type: none"> <li>There is no emergency response plan at the EGS. However, emergency telephone numbers were found displaced in offices.</li> </ul>
10	Grievance Address Mechanism (GRM) and Stakeholders Engagement Plan (SEP)	<ul style="list-style-type: none"> <li>No GRM mechanism and procedure is available at the EGS to address the grievances of employees or the community around.</li> <li>No SEP was available at the EGS.</li> </ul>

EIA = environmental impact assessment, EGS = Electricity Grid Station, EMP = environmental management plan, EPA = Environment Protection Agency, GRM = grievance redress mechanism, IEE = initial environmental examination, MSDS = material safety data sheet, NEQS = National Environmental Quality Standards, OHS = Occupational Health and Safety, SEP = Stakeholders Engagement Plan, PEPA = Pakistan Environmental Protection Act (1997), PPE = personal protective equipment



Main Entrance to the EGS



Office Building of the EGS



Housing Colony of the EGS



Entrance to Operational Area of the EGS





Switch yard



Transformer Bay



Oil Stains at Base of Auxiliary Transformer at EGS



Empty Transformer Oil Tanks



Control Building



Fuel Tank for Backup Diesel Operated Generator



Under Construction Office Building



Transformer Oil Tank



Construction Material near Under Construction Building



Deep Groundwater Extraction Bore Building



Over Head Water Supply Tank



Meeting with Deputy Manager, EGS

**Photo 2-9: Photographs from the Site Visit to Muhammadi EGS (Sep 2022)**

## **2.10 500 kV Rawat EGS, Rawat, District Rawalpindi, Punjab Province**

105 The environmental audit visit was carried out on 05 October 2022 by TA Consultant, MMF Tranche 4 Readiness.

106 Mr. Malik Nawaz is Resident Engineer at the subproject.

107 The subproject is located on Chakbeli Road, 1 km off National Highway, N-5 (Grand Truck Road), in Rawat, in outskirts of Rawalpindi. The EGS was constructed in 1990 and become in operations in 1991. Before the construction of the EGS, the land was used for agricultural purposes.

108 The land area is about 131.6 acres. There are residential adjacent to the EGS in east and south. There is agricultural land in north and northwest of the EGS. The layout of EGS and surrounding land use is shown in Figure 2-10.

109 Initially, the EGS was commissioned at 220 KV level and then 1997 it was upgraded to 500 kV with 3x450 MVA, 500/220 KV Auto T/F Banks are installed at the grid station. This G/S is also feeding 1x250MVA and 2x160MVA, 220/132 KV Auto transformers.

110 The EGS is connected to Ghazi Brotha Powerhouse for dispersal of power from Ghazi Brotha Hydro Power Project through two Brotha - Rawat 500 KV transmission lines. It also connected with 500KV Nokhar G/S through 500kv D/C and Tarbela Powerhouse through 500KV single circuit.

111 A recent fire accident in August 2022 caused damaged two transformers and transformer oil spilled at the incident site.

112 The EGS has about 250 staff. There is housing colony where 50 -60 staff and their families are living.

113 The water requirements of the EGS as well as in the residential area of the EGS are met from off-site tube wells located near Swan River, 9 km in north. As per the anecdotal information, the depth of the groundwater in the area is at 120 to 150 meters and is not fit for drinking.

114 The environmental issues observed during the audit visit are presented in Table 2-10 and pictorial evidence are provided in Photo 2-9.





Figure 2-10: **500 kV Rawat EGS Layout**

Table 2-10: **Observations from the Site Visit to Rawat EGS**

No.	Observation Type	Description
1	Regulatory Compliance	<ul style="list-style-type: none"> <li>The EGS was constructed before the enactment of Pakistan Environmental Protection Act (PEPA Act) in 1997. Therefore, no EIA or IEE was undertaken before the construction of the EGS.</li> </ul>
2	Environmental Staff	<ul style="list-style-type: none"> <li>There is no designated team for taking environmental and OHS compliance measures. NTDC is managing occupational safety, health, environment and community issues through their Environment and Social Safeguards Cell (ESIC) by assigning additional responsibility to Resident Engineer.</li> </ul>
3	Environmental Monitoring and Testing	<ul style="list-style-type: none"> <li>Drinking water is available from local filtration plant but water was not tested ever to see if the plant is working well.</li> </ul>
4	Environment and OHS	<ul style="list-style-type: none"> <li>No environmental management plan was available at the subproject.</li> <li>No environmental and OHS policy or procedures are available at the EGS.</li> <li>No operating procedures found for maintenance and routine operations.</li> <li>No warning signs and awareness sign boards on environment and OHS were found.</li> <li>No traffic management signs, or speed limit signs found on the internal roads of EGS.</li> <li>Workers found at jobs having no proper personal protective equipment (PPE).</li> <li>No health screening of the workers carried out.</li> </ul>
5	Housekeeping	<ul style="list-style-type: none"> <li>No separate bins for plastic, paper, iron, and contaminated waste was seen anywhere at the EGS.</li> </ul>
6	Hazardous Material Handling	<ul style="list-style-type: none"> <li>The EGS stored transformer oil at the EGS in large steel tanks kept on ground. No secondary containment was built in case of spill and leakages. The Deputy Manager has informed that the tanks are empty.</li> <li>No material safety data sheet (MSDS) was found or affixed with the tanks used for transformer oil storage.</li> <li>In August 2022, two transformers were caught fire and burnt. Transformer oil was found spilled on the ground at the incident sites.</li> </ul>
7	Sewerage Waste Management	<ul style="list-style-type: none"> <li>Sewerage waste from offices of the EGS and colony has been routed west side of EGS premises through buried concrete pipes and flows outside premises through a rainwater drain.</li> </ul>
8	Climate Change and Green House Gases Emissions Ozone Depleting Substances	<ul style="list-style-type: none"> <li>There are at least 02 old chillers in abandoned state at the site in abandoned form and 3-5 old type window ACs. This equipment may have greenhouse gases and need to be disposed/replaced with available best practices.</li> </ul>



No.	Observation Type	Description
9	Emergency Response	<ul style="list-style-type: none"> <li>There is no emergency response plan at the EGS. However, emergency telephone numbers were found displaced in offices.</li> </ul>
10	Grievance Address Mechanism (GRM) and Stakeholders Engagement Plan (SEP)	<ul style="list-style-type: none"> <li>No GRM mechanism and procedure is available at the EGS to address the grievances of employees or the community around.</li> <li>No SEP was available at the EGS.</li> </ul>

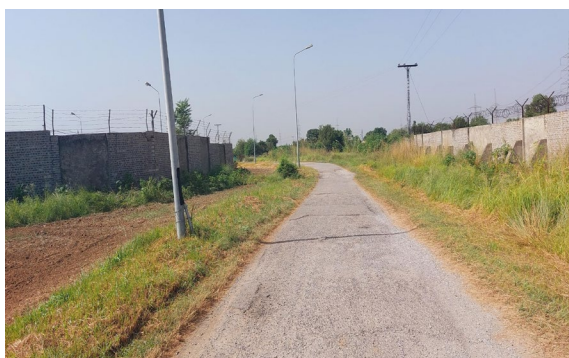
EIA = environmental impact assessment, EGS = Electricity Grid Station, EMP = environmental management plan, EPA = Environment Protection Agency, GRM = grievance redress smechanism, IEE = initial environmental examination, MSDS = material safety data sheet, NEQS = National Environmental Quality Standards, OHS = Occupational Health and Safety, SEP = Stakeholders Engagement Plan, PEPA = Pakistan Environmental Protection Act (1997), PPE = personal protective equipment



Main Entrance to the EGS



Office Building of the EGS



Internal Road of EGS



Internal Road to Housing Colony of the EGS



Central Control Room



Transformer Bay





Spare Transformer on the Unsealed Ground



Transformer Oil Tanks on the Unsealed Ground



Transformer Oil Tanks on the Unsealed Ground



Recently Burnt Transformers on the Unsealed Ground



Transformer Oil Spilled Stains on the Grounds



Original Place of One of the Burnt Transformers



Burnt Circuit Breaker near the Affected Site



Men at Work without PPE

Photo 2-10: **Photographs from the Site Visit to Rawat EGS**

### 3. Corrective Action Plan

115 A Corrective Action Plan (CAP) is presented in Table 3-1. NTDC will (i) ensure that NTDC and “environment and occupational health and safety team” at electricity grid stations (EHS Team at EGSs) implement the CAP within 3 months after the loan becomes effective; and (ii) report the CAP implementation status through semi-annual environmental monitoring reports (SAEMRs).

116 The cost required for the implementation of the corrective actions will be covered by NTDC. This has been discussed with and agreed by NTDC and ADB in October 2022.

Table 3-1: **Corrective Action Plan**

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
1. Regulatory Compliance	500kV Sheikhpura EGS, Sheikhpura	An EMP must be developed for Environmental Safeguards Monitoring of EGS Operations	October 2022	The EMP should have a monitoring and reporting mechanism and the following management plans. <ul style="list-style-type: none"> <li>• Waste Management Plan</li> <li>• COVID-19 Safety Management Plan</li> <li>• Emergency Preparedness and Response Plan</li> <li>• Resource Conservation Plan</li> <li>• Tree Plantation Plan (If any tree cutting is involved)</li> <li>• Traffic Management Plan</li> <li>• Dust Management Plan</li> <li>• Occupational Health, Safety, and Environment (OHSE) Management Plan</li> <li>• Fire Management and Protection Plan</li> <li>• Workers Accommodation Plan</li> <li>• GRM and SEP (in case of land acquisition)</li> </ul>	1.0 million (One time)	ESIC, NTDC	Within 3 months after the loan becomes effective
	500kV Faisalabad West EGS, Faisalabad	An EMP must be developed for Environmental Safeguards Monitoring of EGS Operations	October 2022	The EMP should have a monitoring and reporting mechanism and the following management plans. <ul style="list-style-type: none"> <li>• Waste Management Plan</li> <li>• COVID-19 Safety Management Plan</li> <li>• Emergency Preparedness and Response Plan</li> <li>• Resource Conservation Plan</li> <li>• Tree Plantation Plan (If any tree cutting is involved)</li> <li>• Traffic Management Plan</li> <li>• Dust Management Plan</li> <li>• Occupational Health, Safety, and Environment (OHSE) Management Plan</li> <li>• Fire Management and Protection Plan</li> <li>• Workers Accommodation Plan</li> <li>• GRM and SEP (in case of land acquisition)</li> </ul>	1.0 million (One time)	ESIC, NTDC	Same as above

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	500kV New Multan EGS, Multan	An EMP must be developed for Environmental Safeguards Monitoring of EGS Operations	October 2022	<p>The EMP should have a monitoring and reporting mechanism and the following management plans.</p> <ul style="list-style-type: none"> <li>• Waste Management Plan</li> <li>• COVID-19 Safety Management Plan</li> <li>• Emergency Preparedness and Response Plan</li> <li>• Resource Conservation Plan</li> <li>• Tree Plantation Plan (If any tree cutting is involved)</li> <li>• Traffic Management Plan</li> <li>• Dust Management Plan</li> <li>• Occupational Health, Safety, and Environment (OHSE) Management Plan</li> <li>• Fire Management and Protection Plan</li> <li>• Workers Accommodation Plan</li> <li>• GRM and SEP (in case of land acquisition)</li> </ul>	1.0 million (One time)	ESIC, NTDC	Same as above
	500kV Rahim Yar Khan EGS, Rahim Yar Khan	An EMP must be developed for Environmental Safeguards Monitoring of EGS Operations	October 2022	<p>The EMP should have a monitoring and reporting mechanism and the following management plans.</p> <ul style="list-style-type: none"> <li>• Waste Management Plan</li> <li>• COVID-19 Safety Management Plan</li> <li>• Emergency Preparedness and Response Plan</li> <li>• Resource Conservation Plan</li> <li>• Tree Plantation Plan (If any tree cutting is involved)</li> <li>• Traffic Management Plan</li> <li>• Dust Management Plan</li> <li>• Occupational Health, Safety, and Environment (OHSE) Management Plan</li> <li>• Fire Management and Protection Plan</li> <li>• Workers Accommodation Plan</li> <li>• GRM and SEP (in case of land acquisition)</li> </ul>	1.0 million (One time)	ESIC, NTDC	Same as above



Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	500kV Guddu EGS, Guddu	An EMP must be developed for Environmental Safeguards Monitoring of EGS Operations	October 2022	<p>The EMP should have a monitoring and reporting mechanism and the following management plans.</p> <ul style="list-style-type: none"> <li>• Waste Management Plan</li> <li>• COVID-19 Safety Management Plan</li> <li>• Emergency Preparedness and Response Plan</li> <li>• Resource Conservation Plan</li> <li>• Tree Plantation Plan (If any tree cutting is involved)</li> <li>• Traffic Management Plan</li> <li>• Dust Management Plan</li> <li>• Occupational Health, Safety, and Environment (OHSE) Management Plan</li> <li>• Fire Management and Protection Plan</li> <li>• Workers Accommodation Plan</li> <li>• GRM and SEP (in case of land acquisition)</li> </ul>	1.0 million (One time)	ESIC, NTDC	Same as above
	500kV Dadu EGS, Dadu	An EMP must be developed for Environmental Safeguards Monitoring of EGS Operations	October 2022	<p>The EMP should have a monitoring and reporting mechanism and the following management plans.</p> <ul style="list-style-type: none"> <li>• Waste Management Plan</li> <li>• COVID-19 Safety Management Plan</li> <li>• Emergency Preparedness and Response Plan</li> <li>• Resource Conservation Plan</li> <li>• Tree Plantation Plan (If any tree cutting is involved)</li> <li>• Traffic Management Plan</li> <li>• Dust Management Plan</li> <li>• Occupational Health, Safety, and Environment (OHSE) Management Plan</li> <li>• Fire Management and Protection Plan</li> <li>• Workers Accommodation Plan</li> <li>• GRM and SEP (in case of land acquisition)</li> </ul>	1.0 million (One time)	ESIC, NTDC	Same as above

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	Bahawalpur EGS, Bahawalpur	An EMP must be developed for Environmental Safeguards Monitoring of EGS Operations	October 2022	<p>The EMP should have a monitoring and reporting mechanism and the following management plans.</p> <ul style="list-style-type: none"> <li>• Waste Management Plan</li> <li>• COVID-19 Safety Management Plan</li> <li>• Emergency Preparedness and Response Plan</li> <li>• Resource Conservation Plan</li> <li>• Tree Plantation Plan (If any tree cutting is involved)</li> <li>• Traffic Management Plan</li> <li>• Dust Management Plan</li> <li>• Occupational Health, Safety, and Environment (OHSE) Management Plan</li> <li>• Fire Management and Protection Plan</li> <li>• Workers Accommodation Plan</li> <li>• GRM and SEP (in case of land acquisition)</li> </ul>	1.0 million (One time)	ESIC, NTDC	Same as above
	Daharki EGS, Daharki	An EMP must be developed for Environmental Safeguards Monitoring of EGS Operations	October 2022	<p>The EMP should have a monitoring and reporting mechanism and the following management plans.</p> <ul style="list-style-type: none"> <li>• Waste Management Plan</li> <li>• COVID-19 Safety Management Plan</li> <li>• Emergency Preparedness and Response Plan</li> <li>• Resource Conservation Plan</li> <li>• Tree Plantation Plan (If any tree cutting is involved)</li> <li>• Traffic Management Plan</li> <li>• Dust Management Plan</li> <li>• Occupational Health, Safety, and Environment (OHSE) Management Plan</li> <li>• Fire Management and Protection Plan</li> <li>• Workers Accommodation Plan</li> <li>• GRM and SEP (in case of land acquisition)</li> </ul>	1.0 million (One time)	ESIC, NTDC	Same as above

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	Muhammadi EGS, Peshawar	An EMP must be developed for Environmental Safeguards Monitoring of EGS Operations	2-Sep-22	The EMP should have a monitoring and reporting mechanism and the following management plans. <ul style="list-style-type: none"> <li>• Waste Management Plan</li> <li>• COVID-19 Safety Management Plan</li> <li>• Emergency Preparedness and Response Plan</li> <li>• Resource Conservation Plan</li> <li>• Tree Plantation Plan (If any tree cutting is involved)</li> <li>• Traffic Management Plan</li> <li>• Dust Management Plan</li> <li>• Occupational Health, Safety, and Environment (OHSE) Management Plan</li> <li>• Fire Management and Protection Plan</li> <li>• Workers Accommodation Plan</li> <li>• GRM and SEP (in case of land acquisition)</li> </ul>	1.0 million (One time)	ESIC, NTDC	Same as above
	Rawat EGS, Rawat	An EMP must be developed for Environmental Safeguards Monitoring of EGS Operations	2-Sep-22	The EMP should have a monitoring and reporting mechanism and the following management plans. <ul style="list-style-type: none"> <li>• Waste Management Plan</li> <li>• COVID-19 Safety Management Plan</li> <li>• Emergency Preparedness and Response Plan</li> <li>• Resource Conservation Plan</li> <li>• Tree Plantation Plan (If any tree cutting is involved)</li> <li>• Traffic Management Plan</li> <li>• Dust Management Plan</li> <li>• Occupational Health, Safety, and Environment (OHSE) Management Plan</li> <li>• Fire Management and Protection Plan</li> <li>• Workers Accommodation Plan</li> <li>• GRM and SEP (in case of land acquisition)</li> </ul>	1.0 million (One time)	ESIC, NTDC	Same as above
2. Environmental Staff	500kV Sheikhpura EGS, Sheikhpura	No designated EHS staff available at the EGS	2-Sep-22	<ul style="list-style-type: none"> <li>• An organogram showing staff name and designation with additional responsibility related to E&amp;S Safeguards should be affix at main office of the ESG and an office order letter should be circulated to all staff of ESG for their information and cooperation with the team.</li> <li>• The staffing of the team should be discussed in EMP.</li> </ul>	Nil	PMU, NTDC	Within 3 months after the loan becomes effective



Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	500kV Faisalabad West EGS, Faisalabad	No designated EHS staff available at the EGS.	2-Sep-22	<ul style="list-style-type: none"> <li>An organogram showing staff name and designation with additional responsibility related to E&amp;S Safeguards should be affix at main office of the ESG and an office order letter should be circulated to all staff of ESG for their information and cooperation with the team.</li> <li>The staffing of the team should be discussed in EMP.</li> </ul>	Nil	PMU, NTDC	Same as above
	500kV New Multan EGS, Multan	No designated EHS staff available at the EGS	2-Sep-22	<ul style="list-style-type: none"> <li>An organogram showing staff name and designation with additional responsibility related to E&amp;S Safeguards should be affix at main office of the ESG and an office order letter should be circulated to all staff of ESG for their information and cooperation with the team.</li> <li>The staffing of the team should be discussed in EMP.</li> </ul>	Nil	PMU, NTDC	Same as above
	500kV Rahim Yar Khan EGS, Rahim Yar Khan	No designated EHS staff available at the EGS	2-Sep-22	<ul style="list-style-type: none"> <li>An organogram showing staff name and designation with additional responsibility related to E&amp;S Safeguards should be affix at main office of the ESG and an office order letter should be circulated to all staff of ESG for their information and cooperation with the team.</li> <li>The staffing of the team should be discussed in EMP.</li> </ul>	Nil	PMU, NTDC	Same as above
	500kV Guddu EGS, Guddu	No designated EHS staff available at the EGS	2-Sep-22	<ul style="list-style-type: none"> <li>An organogram showing staff name and designation with additional responsibility related to E&amp;S Safeguards should be affix at main office of the ESG and an office order letter should be circulated to all staff of ESG for their information and cooperation with the team.</li> <li>The staffing of the team should be discussed in EMP.</li> </ul>	Nil	PMU, NTDC	Same as above
	500kV Dadu EGS, Dadu	No designated EHS staff available at the EGS	2-Sep-22	<ul style="list-style-type: none"> <li>An organogram showing staff name and designation with additional responsibility related to E&amp;S Safeguards should be affix at main office of the ESG and an office order letter should be circulated to all staff of ESG for their information and cooperation with the team.</li> <li>The staffing of the team should be discussed in EMP.</li> </ul>	Nil	PMU, NTDC	Same as above

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	Bahawalpur EGS, Bahawalpur	No designated EHS staff available at the EGS	2-Sep-22	<ul style="list-style-type: none"> <li>An organogram showing staff name and designation with additional responsibility related to E&amp;S Safeguards should be affix at main office of the ESG and an office order letter should be circulated to all staff of ESG for their information and cooperation with the team.</li> <li>The staffing of the team should be discussed in EMP.</li> </ul>	Nil	PMU, NTDC	Same as above
	Daharki EGS, Daharki	No designated EHS staff available at the EGS	2-Sep-22	<ul style="list-style-type: none"> <li>An organogram showing staff name and designation with additional responsibility related to E&amp;S Safeguards should be affix at main office of the ESG and an office order letter should be circulated to all staff of ESG for their information and cooperation with the team.</li> <li>The staffing of the team should be discussed in EMP.</li> </ul>	Nil	PMU, NTDC	Same as above
	Muhammadi EGS, Peshawar	No designated EHS staff available at the EGS	2-Sep-22	<ul style="list-style-type: none"> <li>An organogram showing staff name and designation with additional responsibility related to E&amp;S Safeguards should be affix at main office of the ESG and an office order letter should be circulated to all staff of ESG for their information and cooperation with the team.</li> <li>The staffing of the team should be discussed in EMP.</li> </ul>	Nil	PMU, NTDC	Same as above
	Rawat EGS, Rawat	No designated EHS staff available at the EGS	5-Oct-22	<ul style="list-style-type: none"> <li>An organogram showing staff name and designation with additional responsibility related to E&amp;S Safeguards should be affix at main office of the ESG and an office order letter should be circulated to all staff of ESG for their information and cooperation with the team.</li> <li>The staffing of the team should be discussed in EMP.</li> </ul>	Nil	PMU, NTDC	Same as above

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
3. Environment and OHS	500kV Sheikhpura EGS, Sheikhpura	Environment and OHS Plans and Procedures are Lacking	2-Sep-22	<ul style="list-style-type: none"> <li>The Environment and OHS Team (the EHS team) should prepare an environmental and OHS policy and procedures for EGS and the team will also do the following jobs. <ul style="list-style-type: none"> <li>Development of operating procedures for maintenance and routine operations.</li> <li>Development of warning signs and awareness sign boards on the environment and OHS.</li> <li>Development of traffic management signs or speed limit signs on the internal roads of EGS.</li> <li>Provision of job-specific personal protective equipment (PPE) for workers.</li> </ul> </li> </ul>	0.2 million annually	EHS Team at EGS	Within 3 months after the loan becomes effective
	500kV Faisalabad West EGS, Faisalabad	Environment and OSH Plans and Procedures are Lacking	2-Sep-22	<ul style="list-style-type: none"> <li>The Environment and OHS Team (the EHS team) should prepare an environmental and OHS policy and procedures for EGS and the team will also do the following jobs. <ul style="list-style-type: none"> <li>Development of operating procedures for maintenance and routine operations.</li> <li>Development of warning signs and awareness sign boards on the environment and OHS.</li> <li>Development of traffic management signs or speed limit signs on the internal roads of EGS.</li> </ul> </li> <li>Provision of job-specific personal protective equipment (PPE) for workers.</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above
	500kV New Multan EGS, Multan	Environment and OSH Plans and Procedures are Lacking	2-Sep-22	<ul style="list-style-type: none"> <li>The Environment and OHS Team (the EHS team) should prepare an environmental and OHS policy and procedures for EGS and the team will also do the following jobs. <ul style="list-style-type: none"> <li>Development of operating procedures for maintenance and routine operations.</li> <li>Development of warning signs and awareness sign boards on the environment and OHS.</li> <li>Development of traffic management signs or speed limit signs on the internal roads of EGS.</li> </ul> </li> <li>Provision of job-specific personal protective equipment (PPE) for workers.</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above



Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	500kV Rahim Yar Khan EGS, Rahim Yar Khan	Environment and OSH Plans and Procedures are Lacking	2-Sep-22	<ul style="list-style-type: none"> <li>The Environment and OHS Team (the EHS team) should prepare an environmental and OHS policy and procedures for EGS and the team will also do the following jobs. <ul style="list-style-type: none"> <li>Development of operating procedures for maintenance and routine operations.</li> <li>Development of warning signs and awareness sign boards on the environment and OHS.</li> <li>Development of traffic management signs or speed limit signs on the internal roads of EGS.</li> </ul> </li> <li>Provision of job-specific personal protective equipment (PPE) for workers.</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above
	500kV Guddu EGS, Guddu	Environment and OSH Plans and Procedures are Lacking	2-Sep-22	<ul style="list-style-type: none"> <li>The Environment and OHS Team (the EHS team) should prepare an environmental and OHS policy and procedures for EGS and the team will also do the following jobs. <ul style="list-style-type: none"> <li>Development of operating procedures for maintenance and routine operations.</li> <li>Development of warning signs and awareness sign boards on the environment and OHS.</li> <li>Development of traffic management signs or speed limit signs on the internal roads of EGS.</li> </ul> </li> <li>Provision of job-specific personal protective equipment (PPE) for workers.</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above
	500kV Dadu EGS, Dadu	Environment and OSH Plans and Procedures are Lacking	2-Sep-22	<ul style="list-style-type: none"> <li>The Environment and OHS Team (the EHS team) should prepare an environmental and OHS policy and procedures for EGS and the team will also do the following jobs. <ul style="list-style-type: none"> <li>Development of operating procedures for maintenance and routine operations.</li> <li>Development of warning signs and awareness sign boards on the environment and OHS.</li> <li>Development of traffic management signs or speed limit signs on the internal roads of EGS.</li> </ul> </li> <li>Provision of job-specific personal protective equipment (PPE) for workers.</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	Bahawalpur EGS, Bahawalpur	Environment and OSH Plans and Procedures are Lacking	2-Sep-22	<ul style="list-style-type: none"> <li>The Environment and OHS Team (the EHS team) should prepare an environmental and OHS policy and procedures for EGS and the team will also do the following jobs. <ul style="list-style-type: none"> <li>Development of operating procedures for maintenance and routine operations.</li> <li>Development of warning signs and awareness sign boards on the environment and OHS.</li> <li>Development of traffic management signs or speed limit signs on the internal roads of EGS.</li> </ul> </li> <li>Provision of job-specific personal protective equipment (PPE) for workers.</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above
	Daharki EGS, Daharki	Environment and OSH Plans and Procedures are Lacking	2-Sep-22	<ul style="list-style-type: none"> <li>The Environment and OHS Team (the EHS team) should prepare an environmental and OHS policy and procedures for EGS and the team will also do the following jobs. <ul style="list-style-type: none"> <li>Development of operating procedures for maintenance and routine operations.</li> <li>Development of warning signs and awareness sign boards on the environment and OHS.</li> <li>Development of traffic management signs or speed limit signs on the internal roads of EGS.</li> </ul> </li> <li>Provision of job-specific personal protective equipment (PPE) for workers.</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above
	Muhammadi EGS, Peshawar	Environment and OSH Plans and Procedures are Lacking	2-Sep-22	<ul style="list-style-type: none"> <li>The Environment and OHS Team (the EHS team) should prepare an environmental and OHS policy and procedures for EGS and the team will also do the following jobs. <ul style="list-style-type: none"> <li>Development of operating procedures for maintenance and routine operations.</li> <li>Development of warning signs and awareness sign boards on the environment and OHS.</li> <li>Development of traffic management signs or speed limit signs on the internal roads of EGS.</li> </ul> </li> <li>Provision of job-specific personal protective equipment (PPE) for workers.</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	Rawat EGS, Rawat	Environment and OSH Plans and Procedures are Lacking	5-Oct-22	<ul style="list-style-type: none"> <li>The Environment and OHS Team (the EHS team) should prepare an environmental and OHS policy and procedures for EGS and the team will also do the following jobs. <ul style="list-style-type: none"> <li>Development of operating procedures for maintenance and routine operations.</li> <li>Development of warning signs and awareness sign boards on the environment and OHS.</li> <li>Development of traffic management signs or speed limit signs on the internal roads of EGS.</li> </ul> </li> <li>Provision of job-specific personal protective equipment (PPE) for workers.</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above
4. Housekeeping	500kV Sheikhpura EGS, Sheikhpura	Poor housekeeping issues	2-Sep-22	<ul style="list-style-type: none"> <li>The team should improve the condition of housekeeping in EGS and in the residential colony.</li> <li>The team should arrange separate bins for plastic, paper, iron, and contaminated waste at the EGS.</li> <li>All spare or unused material (such as wires and tower equipment) should be kept in barricades and proper marking.</li> <li>Use recycling techniques where possible</li> <li>A waste management plan should be prepared for the EGS.</li> </ul>	0.2 million annually	EHS Team at EGS	Within 3 months after the loan becomes effective
	500kV Faisalabad West EGS, Faisalabad	Poor housekeeping issues	2-Sep-22	<ul style="list-style-type: none"> <li>The team should improve the condition of housekeeping in EGS and in the residential colony.</li> <li>The team should arrange separate bins for plastic, paper, iron, and contaminated waste at the EGS.</li> <li>All spare or unused material (such as wires and tower equipment) should be kept in barricades and proper marking.</li> <li>Use recycling techniques where possible</li> <li>A waste management plan should be prepared for the EGS</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above



Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	500kV New Multan EGS, Multan	Poor housekeeping issues	2-Sep-22	<ul style="list-style-type: none"> <li>The team should improve the condition of housekeeping in EGS and in the residential colony.</li> <li>The team should arrange separate bins for plastic, paper, iron, and contaminated waste at the EGS.</li> <li>All spare or unused material (such as wires and tower equipment) should be kept in barricades and proper marking.</li> <li>Use recycling techniques where possible.</li> <li>A waste management plan should be prepared for the EGS</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above
	500kV Rahim Yar Khan EGS, Rahim Yar Khan	Poor housekeeping issues	2-Sep-22	<ul style="list-style-type: none"> <li>The team should improve the condition of housekeeping in EGS and in the residential colony.</li> <li>The team should arrange separate bins for plastic, paper, iron, and contaminated waste at the EGS.</li> <li>All spare or unused material (such as wires and tower equipment) should be kept in barricades and proper marking.</li> <li>Use recycling techniques where possible.</li> <li>A waste management plan should be prepared for the EGS</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above
	500kV Guddu EGS, Guddu	Poor housekeeping issues	2-Sep-22	<ul style="list-style-type: none"> <li>The team should improve the condition of housekeeping in EGS and in the residential colony.</li> <li>The team should arrange separate bins for plastic, paper, iron, and contaminated waste at the EGS.</li> <li>All spare or unused material (such as wires and tower equipment) should be kept in barricades and proper marking.</li> <li>Use recycling techniques where possible.</li> <li>A waste management plan should be prepared for the EGS</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	500kV Dadu EGS, Dadu	Poor housekeeping issues	2-Sep-22	<ul style="list-style-type: none"> <li>The team should improve the condition of housekeeping in EGS and in the residential colony.</li> <li>The team should arrange separate bins for plastic, paper, iron, and contaminated waste at the EGS.</li> <li>All spare or unused material (such as wires and tower equipment) should be kept in barricades and proper marking.</li> <li>Use recycling techniques where possible.</li> <li>A waste management plan should be prepared for the EGS</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above
	Bahawalpur EGS, Bahawalpur	Poor housekeeping issues	2-Sep-22	<ul style="list-style-type: none"> <li>The team should improve the condition of housekeeping in EGS and in the residential colony.</li> <li>The team should arrange separate bins for plastic, paper, iron, and contaminated waste at the EGS.</li> <li>All spare or unused material (such as wires and tower equipment) should be kept in barricades and proper marking.</li> <li>Use recycling techniques where possible.</li> <li>A waste management plan should be prepared for the EGS</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above
	Daharki EGS, Daharki	Poor housekeeping issues	2-Sep-22	<ul style="list-style-type: none"> <li>The team should improve the condition of housekeeping in EGS and in the residential colony.</li> <li>The team should arrange separate bins for plastic, paper, iron, and contaminated waste at the EGS.</li> <li>All spare or unused material (such as wires and tower equipment) should be kept in barricades and proper marking.</li> <li>Use recycling techniques where possible.</li> <li>A waste management plan should be prepared for the EGS</li> </ul>	0.2 million annually	EHS Team at EGS	Same as above

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	Muhammadi EGS, Peshawar	Poor housekeeping issues	2-Sep-22	<ul style="list-style-type: none"> <li>The team should improve the condition of housekeeping in EGS and in the residential colony.</li> <li>The team should arrange separate bins for plastic, paper, iron, and contaminated waste at the EGS.</li> <li>All spare or unused material (such as wires and tower equipment) should be kept in barricades and proper marking.</li> <li>Use recycling techniques where possible.</li> <li>A waste management plan should be prepared for the EGS</li> </ul>	In 0.2 million annually	EHS Team at EGS	Same as above
	Rawat EGS, Peshawar	Poor housekeeping issues	5-Oct-22	<ul style="list-style-type: none"> <li>The team should improve the condition of housekeeping in EGS and in the residential colony.</li> <li>The team should arrange separate bins for plastic, paper, iron, and contaminated waste at the EGS.</li> <li>All spare or unused material (such as wires and tower equipment) should be kept in barricades and proper marking.</li> <li>Use recycling techniques where possible.</li> <li>A waste management plan should be prepared for the EGS</li> </ul>	In 0.2 million annually	EHS Team at EGS	Same as above
5. Hazardous s Material Handling and spillages	500kV Sheikhpura EGS, Sheikhpura	Hazardous materials were found unmarked with inappropriate handling such as transformer oil drums on unsealed ground	2-Sep-22	<ul style="list-style-type: none"> <li>The EHS Team should prepare proper dykes for storing transformer oil tanks having secondary containments with size of 120% of the tanks or drums.</li> <li>The material safety data sheet (MSDS) should be affixed with the tanks and all other drums having hazardous substances.</li> <li>All spare and abounded transformers should be stored on properly sealed surfaces built with a leakage collection system.</li> </ul>	1 million (one time)	EHS Team at EGS	Within 3 months after the loan becomes effective



Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	500kV Faisalabad West EGS, Faisalabad	Hazardous materials were found unmarked with inappropriate handling such as transformer oil drums on unsealed ground	2-Sep-22	<ul style="list-style-type: none"> <li>The EHS Team should prepare proper dykes for storing transformer oil tanks having secondary containments with size of 120% of the tanks or drums.</li> <li>The material safety data sheet (MSDS) should be affixed with the tanks and all other drums having hazardous substances.</li> <li>All spare and abounded transformers should be stored on properly sealed surfaces built with a leakage collection system.</li> </ul>	1 million (one time)	EHS Team at EGS	Same as above
	500kV New Multan EGS, Multan	Hazardous materials were found unmarked with inappropriate handling such as transformer oil drums on unsealed ground	2-Sep-22	<ul style="list-style-type: none"> <li>The EHS Team should prepare proper dykes for storing transformer oil tanks having secondary containments with size of 120% of the tanks or drums.</li> <li>The material safety data sheet (MSDS) should be affixed with the tanks and all other drums having hazardous substances.</li> <li>All spare and abounded transformers should be stored on properly sealed surfaces built with a leakage collection system.</li> <li>Soil contaminated by spills or leaks: The contaminated soil to be removed from the site and sent for appropriate disposal (e.g., incineration).</li> </ul>	1 million (one time)	EHS Team at EGS	Same as above
	500kV Rahim Yar Khan EGS, Rahim Yar Khan	Hazardous materials were found unmarked with inappropriate handling such as transformer oil drums on unsealed ground	2-Sep-22	<ul style="list-style-type: none"> <li>The EHS Team should prepare proper dykes for storing transformer oil tanks having secondary containments with size of 120% of the tanks or drums.</li> <li>The material safety data sheet (MSDS) should be affixed with the tanks and all other drums having hazardous substances.</li> <li>All spare and abounded transformers should be stored on properly sealed surfaces built with a leakage collection system.</li> </ul>	1 million (one time)	EHS Team at EGS	Same as above

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	500kV Guddu EGS, Guddu	Hazardous materials were found unmarked with inappropriate handling such as transformer oil drums on unsealed ground	2-Sep-22	<ul style="list-style-type: none"> <li>The EHS Team should prepare proper dykes for storing transformer oil tanks having secondary containments with size of 120% of the tanks or drums.</li> <li>The material safety data sheet (MSDS) should be affixed with the tanks and all other drums having hazardous substances.</li> <li>All spare and abounded transformers should be stored on properly sealed surfaces built with a leakage collection system.</li> </ul>	1 million (one time)	EHS Team at EGS	Same as above
	500kV Dadu EGS, Dadu	Hazardous materials were found unmarked with inappropriate handling such as transformer oil drums on unsealed ground	2-Sep-22	<ul style="list-style-type: none"> <li>The EHS Team should prepare proper dykes for storing transformer oil tanks having secondary containments with size of 120% of the tanks or drums.</li> <li>The material safety data sheet (MSDS) should be affixed with the tanks and all other drums having hazardous substances.</li> <li>All spare and abounded transformers should be stored on properly sealed surfaces built with a leakage collection system.</li> </ul>	1 million (one time)	EHS Team at EGS	Same as above
	Bahawalpur EGS, Bahawalpur	Hazardous materials were found unmarked with inappropriate handling such as transformer oil drums on unsealed ground	2-Sep-22	<ul style="list-style-type: none"> <li>The EHS Team should prepare proper dykes for storing transformer oil tanks having secondary containments with size of 120% of the tanks or drums.</li> <li>The material safety data sheet (MSDS) should be affixed with the tanks and all other drums having hazardous substances.</li> <li>All spare and abounded transformers should be stored on properly sealed surfaces built with a leakage collection system.</li> <li>Soil contaminated by spills or leaks: The contaminated soil to be removed from the site and sent for appropriate disposal (e.g., incineration).</li> </ul>	1 million (one time)	EHS Team at EGS	Same as above

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	Daharki EGS, Daharki	Hazardous materials were found unmarked with inappropriate handling such as transformer oil drums on unsealed ground	2-Sep-22	<ul style="list-style-type: none"> <li>The EHS Team should prepare proper dykes for storing transformer oil tanks having secondary containments with size of 120% of the tanks or drums.</li> <li>The material safety data sheet (MSDS) should be affixed with the tanks and all other drums having hazardous substances.</li> <li>All spare and abounded transformers should be stored on properly sealed surfaces built with a leakage collection system.</li> </ul>	1 million (one time)	EHS Team at EGS	Same as above
	Muhammadi EGS, Peshawar	Hazardous materials were found unmarked with inappropriate handling such as transformer oil drums on unsealed ground	2-Sep-22	<ul style="list-style-type: none"> <li>The EHS Team should prepare proper dykes for storing transformer oil tanks having secondary containments with size of 120% of the tanks or drums.</li> <li>The material safety data sheet (MSDS) should be affixed with the tanks and all other drums having hazardous substances.</li> <li>All spare and abandoned transformers should be stored on properly sealed surfaces built with a leakage collection system.</li> <li>Soil contaminated by spills or leaks: The contaminated soil to be removed from the site and sent for appropriate disposal (e.g., incineration).</li> </ul>	1 million (one time)	EHS Team at EGS	Same as above
	Rawat EGS, Rawat	Hazardous materials were found unmarked with inappropriate handling such as transformer oil drums on unsealed ground	2-Sep-22	<ul style="list-style-type: none"> <li>The EHS Team should prepare proper dykes for storing transformer oil tanks having secondary containments with size of 120% of the tanks or drums.</li> <li>The material safety data sheet (MSDS) should be affixed with the tanks and all other drums having hazardous substances.</li> <li>All spare and abandoned transformers should be stored on properly sealed surfaces built with a leakage collection system.</li> <li>Soil contaminated by spills or leaks: The contaminated soil to be removed from the site and sent for appropriate disposal (e.g., incineration).</li> </ul>	1 million (one time)	EHS Team at EGS	Same as above

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
6. Sewerage Waste Management	500kV Sheikhpura EGS, Sheikhpura	There is no sewerage water treatment system available on EGS and disposing off inappropriately	2-Sep-22	<ul style="list-style-type: none"> <li>Solid waste/sludge from the pits should be disposed of through best practices and in compliance with local laws.</li> <li>Install septic tank</li> </ul>	1 million	PMU, NTDC	Within 3 months after the loan becomes effective
	500kV Faisalabad West EGS, Faisalabad	There is no sewerage water treatment system available on EGS and disposing off inappropriately	2-Sep-22	<ul style="list-style-type: none"> <li>Same as above</li> </ul>	1 million	PMU, NTDC	Same as above
	500kV New Multan EGS, Multan	There is no sewerage water treatment system available on EGS and disposing off inappropriately	2-Sep-22	<ul style="list-style-type: none"> <li>Same as above</li> </ul>	1 million	PMU, NTDC	Same as above
	500kV Rahim Yar Khan EGS, Rahim Yar Khan	There is no sewerage water treatment system available on EGS and disposing off inappropriately	2-Sep-22	<ul style="list-style-type: none"> <li>Same as above</li> </ul>	1 million	PMU, NTDC	Same as above
	500kV Guddu EGS, Guddu	There is no sewerage water treatment system available on EGS and disposing off inappropriately	2-Sep-22	<ul style="list-style-type: none"> <li>Same as above</li> </ul>	1 million	PMU, NTDC	Same as above
	500kV Dadu EGS, Dadu	There is no sewerage water treatment system available on EGS and disposing off inappropriately	2-Sep-22	<ul style="list-style-type: none"> <li>Same as above</li> </ul>	1 million	PMU, NTDC	Same as above
	Bahawalpur EGS, Bahawalpur	There is no sewerage water treatment system available on EGS and disposing off inappropriately	2-Sep-22	<ul style="list-style-type: none"> <li>Same as above</li> </ul>	1 million	PMU, NTDC	Same as above
	Daharki EGS, Daharki	There is no sewerage water treatment system available on EGS and disposing off inappropriately	2-Sep-22	<ul style="list-style-type: none"> <li>Same as above</li> </ul>	1 million	PMU, NTDC	Same as above



Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	Muhammadi EGS, Peshawar	There is no sewerage water treatment system available on EGS and disposing off inappropriately	2-Sep-22	<ul style="list-style-type: none"> <li>Same as above</li> </ul>	1 million	PMU, NTDC	Same as above
	Rawat EGS, Rawat	There is no sewerage water treatment system available on EGS and disposing off inappropriately	5-Oct-22	<ul style="list-style-type: none"> <li>Same as above</li> </ul>	1 million	PMU, NTDC	Same as above
7. Climate Change and Green House Gases Emissions, Ozone Depleting Substances	500kV Sheikhpura EGS, Sheikhpura	Old A/C units still in use	2-Sep-22	The EGS where old window air conditioning units are still in service should be discontinued and to replace with new environment-friendly units.	1 million (one time)	EHS Team at EGS	Within 3 months after the loan becomes effective
	500kV New Multan EGS, Multan	Old A/C units still in use	2-Sep-22	Same as above	1 million (one time)	EHS Team at EGS	Same as above
	500kV Guddu EGS, Guddu	Old A/C units still in use	2-Sep-22	Same as above	1 million (one time)	EHS Team at EGS	Same as above
	500kV Dadu EGS, Dadu	Old A/C units still in use	2-Sep-22	Same as above	1 million (one time)	EHS Team at EGS	Same as above
	Muhammadi EGS, Peshawar	Old A/C units still in use	2-Sep-22	Same as above	1 million (one time)	EHS Team at EGS	Same as above
	Rawat EGS, Rawat	Old A/C units still in use	2-Sep-22	Same as above	1 million (one time)	EHS Team at EGS	Same as above
8. Emergency Response and Incident Response and Record-Keeping	500kV Sheikhpura EGS, Sheikhpura	No Emergency Response Plan (ERP) and Practices found	2-Sep-22	<ul style="list-style-type: none"> <li>The EHS team should implement ERP prepared under SSEMP in EGS operations</li> <li>EHS Team should maintain a record of all incidents and near misses</li> </ul>	Nil	EHS Team at EGS	Within 3 months after the loan becomes effective
	500kV Faisalabad West EGS, Faisalabad	No Emergency Response Plan (ERP) and Practices found	2-Sep-22	Same as above	Nil	EHS Team at EGS	Same as above

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	500kV New Multan EGS, Multan	No Emergency Response Plan (ERP) and Practices found	2-Sep-22	Same as above	Nil	EHS Team at EGS	Same as above
	500kV Rahim Yar Khan EGS, Rahim Yar Khan	No Emergency Response Plan (ERP) and Practices found	2-Sep-22	Same as above	Nil	EHS Team at EGS	Same as above
	500kV Guddu EGS, Guddu	No Emergency Response Plan (ERP) and Practices found	2-Sep-22	Same as above	Nil	EHS Team at EGS	Same as above
	500kV Dadu EGS, Dadu	No Emergency Response Plan (ERP) and Practices found	2-Sep-22	Same as above	Nil	EHS Team at EGS	Same as above
	Bahawalpur EGS, Bahawalpur	No Emergency Response Plan (ERP) and Practices found	2-Sep-22	Same as above	Nil	EHS Team at EGS	Same as above
	Daharki EGS, Daharki	No Emergency Response Plan (ERP) and Practices found	2-Sep-22	Same as above	Nil	EHS Team at EGS	Same as above
	Muhammadi EGS, Peshawar	No Emergency Response Plan (ERP) and Practices found	2-Sep-22	Same as above	Nil	EHS Team at EGS	Same as above
	Rawat EGS, Rawat	No Emergency Response Plan (ERP) and Practices found	5-Oct-22	Same as above	Nil	EHS Team at EGS	Same as above
9. Grievance Address Mechanism (GRM) and Stakeholders Engagement Plan (SEP)	500kV Sheikhpura EGS, Sheikhpura	No GRM and SEP were found at the EGS	2-Sep-22	<ul style="list-style-type: none"> <li>The EHS Team should implement GRM, and SEP (in case of land acquisition) prepared under EMP in EGS operations</li> </ul>	Nil	EHS Team at EGS	Within 3 months after the loan becomes effective
	500kV Faisalabad West EGS, Faisalabad	No GRM and SEP were found at the EGS	2-Sep-22	<ul style="list-style-type: none"> <li>Same as above</li> </ul>	Nil	EHS Team at EGS	Same as above
	500kV New Multan EGS, Multan	No GRM and SEP were found at the EGS	2-Sep-22	<ul style="list-style-type: none"> <li>Same as above</li> </ul>	Nil	EHS Team at EGS	Same as above

Category	EGS Name	Issue	Date issue Raised	Proposed Corrective Action	Budgetary Requirement (Million), PKR	Responsibility	Target Date
	500kV Rahim Yar Khan EGS, Rahim Yar Khan	No GRM and SEP were found at the EGS	2-Sep-22	• Same as above	Nil	EHS Team at EGS	Same as above
	500kV Guddu EGS, Guddu	No GRM and SEP were found at the EGS	2-Sep-22	• Same as above	Nil	EHS Team at EGS	Same as above
	500kV Dadu EGS, Dadu	No GRM and SEP were found at the EGS	2-Sep-22	• Same as above	Nil	EHS Team at EGS	Same as above
	Bahawalpur EGS, Bahawalpur	No GRM and SEP were found at the EGS	2-Sep-22	• Same as above	Nil	EHS Team at EGS	Same as above
	Daharki EGS, Daharki	No GRM and SEP were found at the EGS	2-Sep-22	• Same as above	Nil	EHS Team at EGS	Same as above
	Muhammadi EGS, Peshawar	No GRM and SEP were found at the EGS	2-Sep-22	• Same as above	Nil	EHS Team at EGS	Same as above
	Rawat EGS, Rawat	No GRM and SEP were found at the EGS	5-Oct-22	• Same as above	Nil	EHS Team at EGS	Same as above

EIA = environmental impact assessment, EGS = Electricity Grid Station, EHS = Environmental Health and Safety, EMP = environmental management plan, EPA = Environment Protection Agency, GRM = grievance redress mechanism, IEE = initial environmental examination, MSDS = material safety data sheet, NEQS = National Environmental Quality Standards, OHS = Occupational Health and Safety, SEP = Stakeholders Engagement Plan, PEPA = Pakistan Environmental Protection Act (1997), PPE = personal protective equipment

#### **4. Conclusion and Recommendations**

1 Generally, all ten (10) EGSs are being operated without environment and OHS plans and procedures. No environment and OHS staff are available for the development of plans and procedures, and implementation. To address this issue, NTDC to assign additional responsibilities to existing staff at each EGS and those will be supervised by ESIC from NTDC headquarters for implementation of CAP and maintaining environmental and social safeguards.

117 NTDC has agreed that the implementation cost of the CAP (estimated at 40 million Pak Rupees in total in the first year, and 4 million Pak Rupees annually after the second year: see Table 4-1) will be borne by their own resources. NTDC will (i) ensure that NTDC and “environment and occupational health and safety team” at electricity grid stations (EHS Team at EGSs) implement the CAP within 3 months after the loan becomes effective; and (ii) report the CAP implementation status through semi-annual environmental monitoring reports (SAEMRs).

118 Based on the above discussions,

- ESIC/NTDC will develop EMP for each EGS Within 3 months after the loan becomes effective.
- NTDC will bear budget and resources for the implementation of the CAP; and,
- The CAP should be implemented in true letter and spirit for improving environmental, health, and safety conditions.

119 The estimated budget required for CAP implementation is in Table 3-1 and summarized below in Table 4-1.



Table 4-1: **Summary of CAP Implementation Budget**

In million Pak Rupees

<b>CAP Implementation Head</b>	<b>500kV Sheikhpura EGS</b>	<b>500kV Faisalabad West EGS</b>	<b>500kV New Multan EGS</b>	<b>500kV Rahim Yar Khan EGS</b>	<b>500 kV Guddu EGS</b>	<b>500 kV Dadu EGS</b>	<b>Bahawalpur EGS</b>	<b>Rawat EGS</b>	<b>Daharki EGS</b>	<b>Muhammadi EGS</b>
1 Regulatory Compliance	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2 Environmental Staff	0	0	0	0	0	0	0	0	0	0
3 Environment and OHS Compliance	0.2/year	0.2/year	0.2/year	0.2/year	0.2/year	0.2/year	0.2/year	0.2/year	0.2/year	0.2/year
4 Housekeeping	0.2/year	0.2/year	0.2/year	0.2/year	0.2/year	0.2/year	0.2/year	0.2/year	0.2/year	0.2/year
5 Hazardous Material Handling	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
6 Sewerage Waste Management	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
7 Climate Change and Green House Gases Emissions	1.0	0	1.0	0	1.0	1.0	0	1.0	0	1.0
<b>Total (in the first year)</b>	<b>4.4</b>	<b>3.4</b>	<b>4.4</b>	<b>3.4</b>	<b>4.4</b>	<b>4.4</b>	<b>3.4</b>	<b>4.4</b>	<b>3.4</b>	<b>4.4</b>
<b>Total (from the second year, annually)</b>	<b>0.4/year</b>	<b>0.4/year</b>	<b>0.4/year</b>	<b>0.4/year</b>	<b>0.4/year</b>	<b>0.4/year</b>	<b>0.4/year</b>	<b>0.4/year</b>	<b>0.4/year</b>	<b>0.4/year</b>